

**FRESHWATER QUALITY AND BENTHIC MACRO-INVERTEBRATE
ASSESSMENT OF THE WHITE RIVER AREA**

**FOR RIVER RIDDIM ECO-TOURISM PROJECT
November 2012**

Report done by: Marlon Beale (PhD Candidate) for



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FRESHWATER QUALITY AND BENTHIC MACRO-INVERTBRATE ASSESSMENT

Introduction

Chief Surveyor: Marlon Beale

Experience: Extensive fieldwork involving censuring of land birds (residents, endemics and migrant species) and other faunal species across the island

Extensive fieldwork involving assessments of vegetation and habitat types across the island

Current work on land birds in Eastern Jamaica (PhD Project)

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Jamaica Conservation and Development Trust

Scope of Work

A comprehensive description of the freshwater benthic macro-invertebrates was done. Other physico-chemical attributes of the river were tested as well.

Methodology

Freshwater Sampling and Benthic Macro-Invertebrate Identification

At each site, at least two 1-minute kick samples of the macro-invertebrate community are taken. This yields semi-quantitative information on the aquatic community. Qualitative sampling of the macro-invertebrate community is conducted by searching for them in likely places such as under rocks and in leaf packs. The numbers and amounts of invertebrates collected are recorded in the field (with identification to at least family if possible). General observations concerning riparian vegetation and exposure to sunlight and algal growth were made and recorded.

Stream water quality

Temperature readings were taken at each sampling site during biological sampling, along with other measurements of pH and dissolved oxygen, which are very useful, particularly the latter which is an indicator of biological oxygen demand (BOD).

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RESULTS

The sites samples are denoted on the Maps in Appendix 1. Pictures of Samples site 1 are included at Appendix 2.

Table 1
GPS Information for both sample points

Location ID#	Coordinates	Comments
S1	18° 23.055N 77° 03.058W	Elevation of 146m. Sample site was approximately 8ft wide and 1ft deep. There were noted at least two pool areas of greater than 6ft depth. Approximately 30% exposure to sunlight, with canopy cover of 70%. There was no algal growth observed.
S2	18° 23.140N 77° 02.963W	Elevation of 139m. Sample site was approximately 5ft wide and 1ft deep. The river was noted to be faster moving at this location. Approximately 20% exposure to sunlight, with canopy cover of 80%. There was no algal growth observed.

Table 2
Measured Physico-chemical results

Location ID#	Temperature (C)	Dissolved Oxygen	pH
S1	18.5	6.1	5.0
S2	18.0	6.2	5.0

Table 3
List of Observed Tree Species along Riparian Zone

#	Scientific Name	Common Name	Status	DAFOR Rating
1	<i>Spathodea campanulata</i>	African Tulip	Native	F
2	<i>Ficus membranacea</i>	Fig	Native	O
3	<i>Cecropia peltata</i>	Trumpet Tree	Native	o
4	<i>Nectandra</i> sp.	Sweetwood	Native	R
5	<i>Senecio discolor</i>	Whiteback	Endemic	O
6	<i>Dendropanax</i> sp.	Womanwood	Native	O

DAFOR: D – Dominant; A – Abundant; F – Frequent; O – Often; R – Rare

B. List of Observed Shrubs/Herb

Chainy Root	-	<i>Smilax balbisiana</i>	(O)
Redhead/ Red Top	-	<i>Asclepias curassavica</i>	(R)
Spanish Needle	-	<i>Bidens pilosa</i>	(F)
Shameweed	-	<i>Mimosa pudica</i>	(F)
<i>Sida</i> sp.			(F)
Wild Hops	-	<i>Flemingia (Moghania) strobilifera</i>	(O)
Wild sage	-	<i>Lantana camara</i>	(O)
Bromeliad	-	<i>Vriesea</i> sp. and <i>Tillandsia</i> sp	(F)

DAFOR: D – Dominant; A – Abundant; F – Frequent; O – Often; R – Rare

Table 4
List of Freshwater Benthic Macro-Invertebrates Observed

#	Common Name	Class	Sub-class	Order	Family	Site Observed
1	Gilled Snail	Gastropoda	Prosobranchia			S1 & S2
2	Caddis Fly (In)	Insecta		Trichoptera	Helicopsychidae	S1 & S2
3	Caddis Fly (Out)	Insecta		Trichoptera	Rhyacophilidae	S1 & S2
4	Mayfly larva	Insecta		Ephemeroptera		S1 & S2
5	Fish (unidentified)	Osteichthyes				S1
6	Beetle	Insecta		Coleoptera		S1
7	Flatworm	Turbellaria				S1
8	Mosquito larvae	Insecta		Diptera	Culicidae	S1
9	Aquatic Worm	Oligochaeta				S1
10	Damsel Fly	Insecta		Odonata		S2
11	Water Stryder	Insecta		Hemiptera	Gerridae	S1

GENERAL COMMENTS

It was noted that for both sites the physico-chemical attributes were similar, with only very minimal differences seen for temperature and dissolved oxygen.

A total of five classes were observed across both sample sites (S1 and S2). The classes Insecta and Gastropoda were observed at both sites. The small number of macro-invertebrate classes observed indicates that diversity within the stream at the time of sampling was low. It is important to note that the consistent rainfall for at least 5 days prior and rainfall associated with Hurricane Sandy may have reduced the amount of observed macro-invertebrates. It is recommended that future surveys be conducted especially in the drier months to assess the diversity level.

The determination of endemism within this stream is very difficult and would require collection of species with an intent to conduct further microscopic identification.

POTENTIAL IMPACTS

Dependent upon the point of entry from the attraction, any excess water from the area would impact the water temperature, the number and type of benthic macro-invertebrates downstream. Also any form of chlorination will impact the benthic macro-invertebrates and dissolved oxygen content of the stream. Further other nitrogen based chemicals which enter the stream system can promote algal growth.

References

Adams, Charles D. 1972. Flowering Plants of Jamaica. University of the West Indies Press, Mona Jamaica.

Parker, Tracey 2003. Manual of Dendrology – Jamaica. Forestry Department, Ministry of Agriculture, Government of Jamaica.

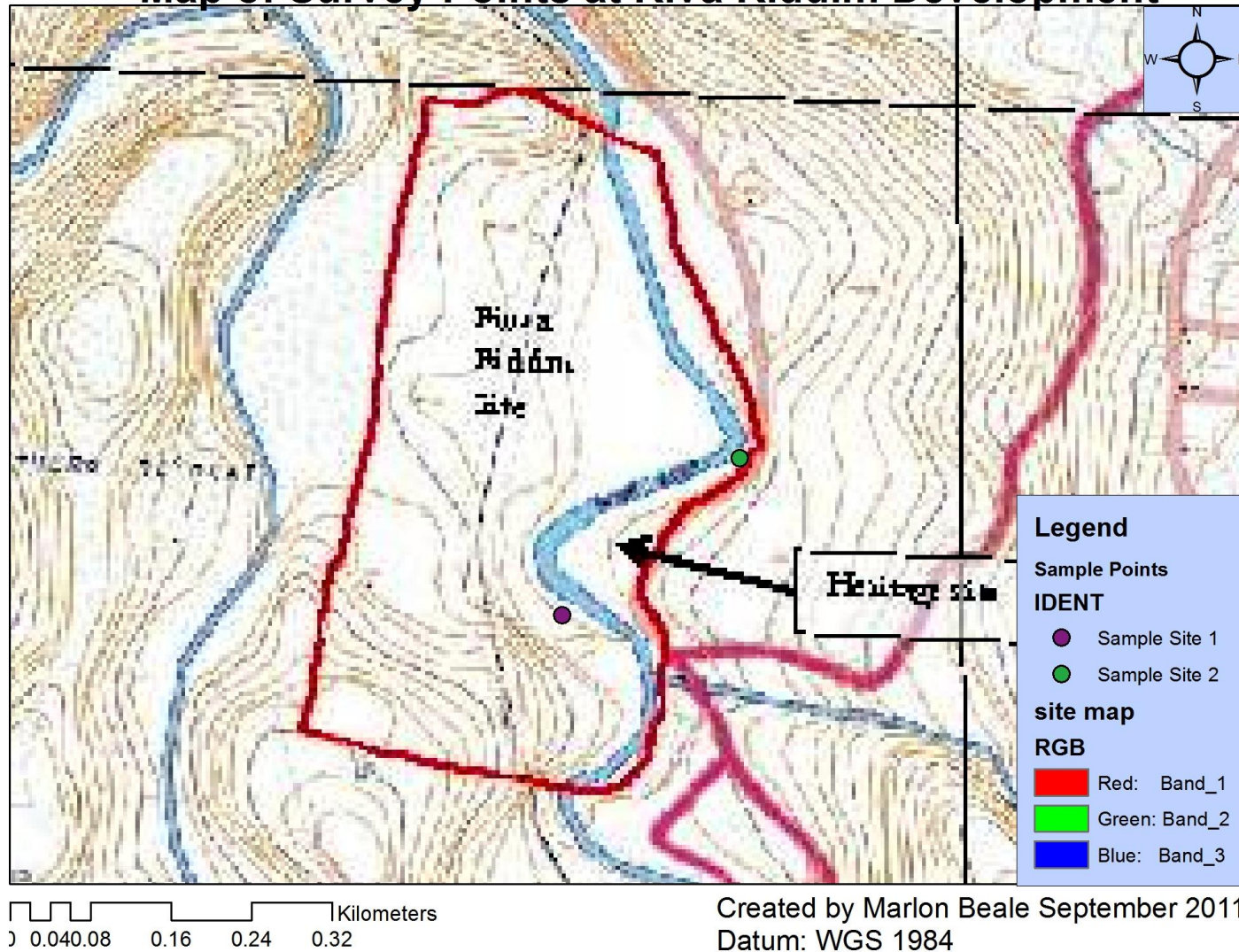
Hyslop, Eric J. 2001. Keys for the Identification of Freshwater Invertebrates Collected in Jamaica. Revised version

APPENDIX 1

Google Image Showing White River Sample Sites



Map of Survey Points at Riva Riddim Development



APPENDIX 2

Pictures taken at sample Site 1

