Water Quality at Sibun Education and Adventure Lodge

January 2013

By: Amy Allison

Table of Contents

Introduction…………………………………………………………………....3

Materials & Methods………………………..………………………….….3-4

Chemicals Tested………………………………………………………………4-5

Results………………………………………………………………………………5

Conclusion………………………………………………………………………..6

Works Cited………………………………………………………………………7

**Introduction**

In Belize the Sibun River is an amazing river used for many purpose such as a place for the locals to wash their cloths, a thriving ecological hub for many river creatures, as well as the water the locals drink every day. Unfortunately there are many pollutants such as commercial/septic sewage, agricultural (pesticides etc.), industrial pollution from urbanization, and general chemical wastes from agriculture, manufacturing, domestic chemical wastes, etc. (Department of Environment Ministry). But with all of these pollutants around the river is it truly safe for the locals to drink the water from their favorite stream? The research I am conducting is to see how healthy the water in the place that I am staying is as well as the local bottled water they offer compared to how healthy the water is from the stream in which the local water comes from. In this paper I am hoping to prove that the water quality at Sleeping Giant Lodge and the local bottled water is healthy drinking water and the water from the river is healthy biologically by testing the health of the water from the stream and the water from the place in which I am staying.

**Materials & Methods**

To conduct my experiment I took water samples from the Sibun Education and Adventure Lodge River, the tap water from the Sibun Education and Adventure Lodge, the local bottled drinking water to conduct chemical tests on all of them. The chemical tests will be performed 3 times on each sample to make sure the results are not a fluke. Some of the things I will be testing for are appropriate pH levels, nitrate levels, and phosphate levels. The water collected from the river will be collected from the top third of the water since the pollutants will be most likely to be closer to the surface. The water that is being collected at the Lodge will be taken from the tap water supply as well as the bottled water because our target for this experiment is the water we will be consuming as well as the water the locals consume.

**Materials Needed:**

1. Water Testing Kit for testing of the chemicals (pH, nitrate, ammonia)

2. 4 bottles with stoppers to insure no unwanted air pockets

**Chemicals Tested**

**pH Levels**

Levels of pH are important in rivers because if the pH is off by even a little it can make the water toxic for the plants and animals living in the river. The desired pH levels in rivers are between 6 and 8 mg/L (Water Quality). Some of the reasons for dangerous changes in pH levels are agricultural runoff and sewer overflows which we already know are pollutants near this river (Water Quality Indicators). Levels of pH in our drinking water should preferably be between 6 and 8.5. Besides the fact that if the pH levels in your drinking water are off it will definitely taste funny, there are some health risks associated with the toxins produced by low pH (Free Drinking Water).

**Nitrate Levels**

While nitrates are good plant nutrients when they are in abundance in rivers it causes problems such as oxygen depletion, death of many aquatic river dwellers, and buildup of algae. Ideally the range for Nitrate Levels in rivers is between 0.9 and 3.15 mg/L (Water Quality). Some of the leading causes in nitrate pollution are failed septic systems and runoff from farmland and animal storage areas. Having high levels of nitrate is extremely dangerous in our drinking water. This risk is the greatest for infants and pregnant women because it causes many complications and has been suspected to be connected with random miscarriages. Nitrate levels ranging from 0 to 10ppm (parts per million) are acceptable for drinking water for everyone. But 11 to 20ppm of nitrate is not safe for infants or mothers but would be ok for others because they would still be able to handle the nitrate with no harm. Anything over 20ppm is not acceptable for long term drinking water (Daniels).

**Phosphate**

The ideal range of phosphate is 0.1 mg/L because you do not want to have too much in a stream or you there will be unwanted results biologically (Zurawski, Physical and Chemical). In normal drinking water low levels of phosphate are very common because phosphate is a “corrosion inhibitor to the leaching of lead and copper from pipes” (United States EPA).

**Results**







**Conclusion**

After looking at all three tests for each category and item I would say they all fall within the preferred levels. The average of all three tests for the level of pH present from the Sibun River is 7.833, the local tap water is 6.33, and the local bottled water is 6.67. These results are within the range that we have found to be desirable in water (6-8) therefore concluding that all three sources are healthy. The average of the three nitrate tests from the all three items interestingly came to .0167 ppm. We can conclude that all of these items are in the preferred range (0-10ppm). Since these results are father away from the danger range (10ppm) we can also conclude that all of these items are extremely safe. The results for phosphate were the most interesting of all of the tests/results. The average of all three tests for the level of phosphate present from the Sibun River is 1 ppm, the local tap water is 0.6833 ppm, and the local bottled water is 2 ppm. All of these averages show that all three items once again have the preferred range of phosphate present. After analyzing the results of all of the tests from the Sibun River, the local tap water, and the local drinking water I would say it is safe to conclude that the water quality is relatively safe for patrons.

Works Cited

Daniels, Barbra, and Nancy Mesner. "Nitrate." Utah State University, Dec. 2010. Web. 02 Dec. 2012. <http://extension.usu.edu/files/publications/factsheet/NR\_WQ\_2005-23.pdf>.

"National Plan of Action for the Control of Land-Based Sources of Marine Pollution in Belize." Department of Environment Ministry of Natural Resources and the Environment, 28 Feb. 2008. Web. 11 Nov. 2012. <http://www.cep.unep.org/about-cep/amep/belize-npa-feb-28-08- draft.pdf>.

"PH Values Of Water Completely Explained." Free Drinking Water. APEC, n.d. Web. 01 Dec. 2012. <http://www.freedrinkingwater.com/water-education/quality-water-ph-page2.htm>.

"Water Quality." Center for Earth and Environmental Science Indiana University. Purdue University, Indianapolis, n.d. Web. 1 Dec. 2012. <http://www.cees.iupui.edu/education/Workshops/Project\_Seam/water\_quality.htm>.

"Water Quality Indicators." Water Quality Indicators. Colorado River Watch Network, 12 Oct. 2012. Web. 30 Nov. 2012. <http://www.lcra.org/water/quality/crwn/indicators.html>.

"Why Do Water Systems Add Phosphate to Drinking Water? What Are the Health Effects of Drinking Water Containing Phosphates?" United States Enviornmental Protection Agency. N.p., 15 Apr. 2011. Web. 27 Dec. 2012.

Zurawski, Michelle. Physical and Chemical Analysis. Moraine Valley Community College,

2009. <http://www.llcc.edu/LinkClick.aspx?fileticket=YkXUrXi8pao%3d&tabid=5454&mid=1

0430>.