WATER QUALITY TRACKING AT THREE SAMPLING LOCATIONS IN METRO ATLANTA

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GOALS

To develop a three-way "course intersection" model that will bring together students in the laboratory science classes CHM 102L and PHY 102L with mathematics students from MAT 111 in a study of the physical characteristics of surface waters in several metro-Atlanta locations. Our efforts have been focused particularly on tracking those parameters which may be important indicators of water quality. Statistics students informed the site selection process and will contribute to the hypothesis testing portion of the analysis once the data are gathered. The chemistry and physics students bring to the project an understanding of the physical quantities to be monitored as well as bearing some of the responsibility for trying to imagine scenarios and mechanisms which might explain the variations in the parameters being monitored as functions of time, location, rainfall and other weather phenomena, etc. An additional goal is to introduce participants to the methodology and inherent difficulties associated with collecting and analyzing a large (in both the temporal and spatial senses) sample set from the field.

PROCESS

Seventeen groups cooperatively collect samples from seven sites per day, six days per week. Three sites are at Blue Heron Nature Preserve, three at Silver Lake, and one at the stream near Emerson Student Center.

Two instruments were used in the project. The first is the Hanna Combo Meter and is used to measure pH, EC (Electrical Conductivity), TDS (Total Dissolved Solids), and temperature. The second instrument used is the LaMotte Smart 2 Colorimeter. The instrument itself can perform over eighty-five pre-programmed tests, however, for our purposes we will only be using it to measure turbidity.

DATA AND PRELIMINARY ANALYSIS

Date	Indicate **Sat** or **Sun** for weekend	Group	Time	Equipment Set	Graffiti Cut Turbidity (FTU)	Temp. (ºC)	pH	EC (µS)	TDS (ppm)
Monday, March 02, 2009		1	4:10 PM	Blue	26	10.2	6.15	0	0
Tuesday, March 03, 2009		5	5:48 PM	Red	13	12.1	7.12	0	0
Wednesday, March 04, 2009		7	11:37 AM	Red	7	8.4	6.59	122	58
Thursday, March 05, 2009		8	12:15 PM	Blue	7	12.1	6.33	176	69
Friday, March 06, 2009		10	12:32 PM	Green	5	12.5	6.44	139	83
Weekend, March 07-08, 2009		12	2:09 AM	Blue	4	18.9	5.11	318	135
Monday, March 09, 2009		13							
Tuesday, March 10, 2009		14							
Wednesday, March 11, 2009		17	5:43 PM	Red	14	20.3	6.91	178	78
Thursday, March 12, 2009		1		Blue	0	19.2	6.83	0	0
Friday, March 13, 2009		5	11:30 PM	Red	7	17.4	7.51	120	59
Monday, March 23, 2009		7	5:00 PM	Yellow	5	19.4	6.93	264	160
Tuesday, March 24, 2009		8	12:00 PM	Green	7	14.4	7.51	153	66
Wednesday, March 25, 2009		10	5:00PM	Blue		18.4	6.27	192	117
Thursday, March 26, 2009		12	4:37 PM	Red	50	16.7	6.29	65	35
Friday, March 27, 2009		13	11:30pm		7	17.4	7.51	120	59
Weekend, March 28-29, 2009		14							
Monday, March 30, 2009		17	[illegible]	Green	[illegible]	[illegible]	[illegible]	[illegible]	52
Tuesday, March 31, 2009		[illegible]		Blue	7	[illegible]	[illegible]	[illegible]	0
Wednesday, April 01, 2009		5	5:12 PM	Red	17	22.1	6.4	88	47
Thursday, April 02, 2009		7							
Friday, April 03, 2009		8	12:00 P.M.	Green	40	14.6	5.34	98	56
Weekend, April 04-05, 2009		10							
Monday, April 06, 2009		12	2:32 AM	Yellow	3	14.3	6.69	143	71
Tuesday, April 07, 2009		13							

Preliminary Conclusions:

- Rainwater is much more acidic than groundwater.
- Rapid run-off correlates with lower pH in surface water.
- Different sites in the same body of water have significantly different values of pH, turbidity,

For Further Investigation:

- What are the processes by which rainwater is neutralized by the soil?
- Just which site differences are statistically significant?
- What explains the statistically significant site differences?

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