Course: ESST 2006 Pollution Biology

Student ID #:   Total: _____/ 70   Demonstrator…………………………………….

Lab 1 – A review of techniques in water pollution biology

Date: Tuesday 26th September, 2017.

Learning objective:

- o   To understand different approaches used as indicators of pollution.

Brief introduction:

Various tools are required in the assessment of the effects of pollutants in the environment. These tools range from chemical specific to ecological indices. These tools are usually used to examine levels of stresses in the environment or how pollutants may be changing the structure of the environment (species diversity).

Section A: Categorizing Pollution

What types of pollutants may affect local surface water, such as rivers?

Provide a brief description of the major types of pollutants. It may be useful for you to firstly list the major types (10 MARKS).

Now show relationships between these pollutants and effects (20 MARKS). THIS EXERCISE IS MEANT TO ALLOW TO EXPRESS CREATIVITY. YOU CAN DEMONSTRATE YOUR UNDERSTANDING USING WHATEVER MEANS.

1. Review the different types of water quality indices.

a. Shannon diversity index

b. Simpson's Diversity index

c. Hilsenhoff index

d. Jaccard's index

e. Taxonomic distinctness

f. Abundance/biomass curves   (12 MARKS)

2. What are the main advantages of each? (6 MARKS)

a.

b.

c.

d.

e.

f.

Section B: Calculating Water Quality using indices

3. Please calculate Shannon diversity index and Simpson's Diversity index with the data given in table 1 (22 MARKS).

Table 1. Abundances of organisms found at various sites

Common names	Family	Matura	Blue Copper Trail	Sangre Grande	Rio Seco	Goldsborough
water pennies	Psephenidae	5	53	0	2	2
beetles	Elmidae	0	37	2	4	0
mayflies	Tricorythidae	5	50	0	23	6
mayflies	Baetidae	8	35	0	49	5
mayflies	Leptophlebidae	26	27	0	17	27
mayflies	Euthyplocidae	1	0	0	0	0
stoneflies	Perlidae	0	0	0	0	0
dragonflies	Libelluidae	1	0	1	3	0
damselflies	Coenagrionidae	4	0	0	7	3
web-spinning caddisflies	Hydropsychidae	4	28	0	10	2
snail-case caddisflies	Helicopsychidae	4	0	0	3	1
caddisflies	hydroptilidae	3	0	0	2	2
caddisflies	Glossosomatidae	0	25	0	11	7
caddisflies	Philopotamidae	4	25	0	12	5
caddisflies	Leptoceridae	1	0	0	0	0
blackflies	Simuliidae	1	0	0	1	0
flies	Chironomidae	7	0	0	4	2
pond-skaters	Velliidae	0	2	0	0	0
pond-skaters	Gerridae	0	4	1	0	0
manicou crab	Pseudothelphusidae	0	1	1	1	0
worms	Oligochaeta	0	0	0	1	1
Flat worms	Turbellaria	0	0	1	4	0
aquatic moths	Lepidoptera	0	0	0	1	0