**Worksheet - Ecosystem metabolism**

This worksheet is designed to help you to:

i) Calculate average gross primary production for each treatment.

ii) Statistically compare primary production and respiration between treatments.

Answer/address all of the following questions. In all cases, we require that your work be typed

and that you make computer printouts of spreadsheets, graphics, or statistical output. Your TA

may ask you to email your Excel spreadsheet.

1. What is primary productivity and how is it calculated? (5pt)

2. What factors affect rates of primary productivity? (5pt)

3. Is ecosystem metabolism a measure of ecosystem structure or function? (3pt)

4. State two sets of the null and alternative hypotheses for this lab. (2pt)

5. Present a table showing all system metabolism data. The spreadsheet should

also include calculated GPP, NPP, and R values (mg O2/L/hour) for each pair of bottles. (10pt)

6. GPP rates with phytoplankton or with periphyton/plant:

(a) Formulate a null and alternate hypothesis about whether you expect any differences among the three ponds we visited. What did you expect to find and why? (5pt)

(b) Run an appropriate statistical test comparing GPP between bottles with phytoplankton and those with periphyton, and show your output, highlighting the resulting P

value. (5pt)

(c) State whether the P value derived from the statistical test is greater or lesser than

your α value and giving reason, state whether you will reject or fail to reject your

null hypothesis. (5pt)

(d) Based on the statistical significance of your results, formulate a conclusion to

your initial question. (5pt)

(e) Briefly discuss whether or not your results differed from what you expected to

find. (5pt)

7. NPP rates **(phytoplankton only)** among the two ponds we sampled:

(a) Formulate a null and alternate hypothesis about whether you expect any differences among the ponds we visited. What did you expect to find and why? (5pt).

(a) Run an appropriate statistical test comparing **phytoplankton NPP** in the ponds, show your output and highlight the resulting P values. (5pt)

(b) State whether the P values derived from the statistical test are greater or lesser than

your α value and giving reason, state whether you will reject or fail to reject your

null hypothesis. (5pt)

(c) Based on the statistical significance of your results, formulate a conclusion to

your initial question. (5pt)

(d) Briefly discuss whether or not your results differed from what you expected to

find?(5pt)

8. Describe and discuss (**in detail**) the important biotic and abiotic components of the pond ecosystems that may have lead to different (or similar) rates of ecosystem metabolism (NPP, GPP and R). How are the ponds similar and different and how does that impact their metabolism? (25pt)