

Remarks on “The role of substrate organic matter ...”  
Osborne, December, 2003

1. In the subsection entitled **Batch studies** within the MATERIALS AND METHODS section, the 4th sentence begins “Both data sets from ...”

I would say

In the analysis of data from years 2001 and 2002,  $NO_3^- - N$  concentrations were normalized relative to initial levels to account for this variability about the targeted levels.

(Note that this point is reiterated in the *Nitrate Removal Studies* subsection of the **Results and Discussion** section. It may only be necessary to mention it once.)

2. In the *Data Analysis* subsection of the **Materials and Methods** section, the first sentence contains the clause “univariate and multivariate ANOVA of the estimated regression coefficients from the regressions, to test for treatment effects.” We ended up taking a different approach, so I would delete this clause. The multiple regression methodology is described in more detail in the *Nitrate Removal Studies* subsection.
3. In the *Nitrate Removal Studies* subsection, I would consider deleting the 2<sup>nd</sup> sentence which begins “Statistical analyses were performed ...” and adding the clause “In analyzing the experimental data,” or “For analysis of data,” at the beginning of the next sentence which begins “ $NO_3^- - N$  treatment curves from ...” Can we drop the sentence “Even though the initial ...”? We might even drop the sentence “To test for treatment ...” too unless you want to reiterate this point that may have been made previously (see item 1. above.)

This is how I would embellish the description you’ve provided:

A multiple regression model which took the  $\%NO_3^- - N$  removal to be quadratic in time, with normally distributed errors, provided a reasonable fit. To be precise, let mean  $\%NO_3^- - N$  removal for observation  $i$  at time  $t_i$  be denoted by  $mnr_i$ . Then the model is given by

$$mnr_i = (\beta_1 + \beta_2 x_{i2} + \beta_3 x_{i3} + \beta_4 x_{i4})t + (\beta_5 + \beta_6 x_{i2} + \beta_7 x_{i3} + \beta_8 x_{i4})t^2$$

where  $x_{ij}$  denotes an indicator (or dummy) variable for treatment  $j$  and observation  $i$ . For example, for treatment 2,  $x_{i2} = 1$  and all other  $x_{ij}$  are 0 so that the removal curve is

$$mnr_i = (\beta_1 + \beta_2)t + (\beta_5 + \beta_6)t^2.$$

The hypothesis of no overall treatment effect is equivalent to all coefficients being 0 except  $\beta_1$  and  $\beta_5$ . This hypothesis leads to

a model which is *nested* in the full quadratic regression with 8 coefficients given above and can be tested using using an F-ratio based on the difference in residual sums of squares between the two models. Pairwise comparisons between any two treatments are conducted similarly.

I don't see that it is necessary to mention multiplicity.

4. page 17: whenever you report no significant difference, you might consider including an Fratio (w/ degrees of freedom) and a pvalue like ( $F_{3,8} = 1.91, p = 0.21$ ). Glancing at the manuscript, I see “no difference” or “no significant difference” mentioned
  - in the 4<sup>th</sup> sentence of the 2<sup>nd</sup> paragraph of the *Batch 1 - Feb. 12<sup>th</sup>* subsection,
  - in the 3<sup>rd</sup> sentence of the 3<sup>rd</sup> paragraph of the *Batch 1 - Feb. 12<sup>th</sup>* subsection,
  - in the last sentence of the 2<sup>nd</sup> paragraph of the *Batch 2 - May 7<sup>th</sup>* subsection,
  - in the last sentence of the last paragraph of the *Batch 2 - May 7<sup>th</sup>* subsection,
  - in the last sentence of the last paragraph of the *Batch 3 - May 7<sup>th</sup>* subsection,
  - in the 4<sup>th</sup> sentence of the 2<sup>nd</sup> paragraph of the *Batch 4 - July 2<sup>nd</sup>* subsection,
  - in the last sentence of the last paragraph of the *Batch 4 - July 2<sup>nd</sup>* subsection.

I can also see why you might not choose to do this, as it will end up making for lots of numbers in the manuscript.

5. When the differences are significant, you kindly provided pvalues, as at the end of the *Batch 1* discussion. You could be even more thorough by providing the *F - ratio* like ( $F_{2,76} = 4.23, p = 0.0181$ ).
6. in the *Statistical summary of wetland performance* subsection, last sentence, I would use “highly significant” instead of “strongly significant”.
7. Last sentence of 2<sup>nd</sup> paragraph of *Wetlands Biomass* subsection, do you mean “no *significant* difference?”