
From: Montagna, Paul [<mailto:Paul.Montagna@tamucc.edu>]
Sent: Tue 6/9/2009 3:32 PM
To: Todd Votteler
Subject: comment on SAGES study

Dear Mr. Votteler,

I have had an opportunity to read the final report of the SAGES study that was posted on line and have the following comments.

1) The report only provides an abstract of each individual study in Appendix A, and one would have to download and read the complete studies individually. I just don't have time to read all the supporting documents, which I feel is necessary before I could make any comments of a substantial nature regarding the science supporting the conclusions.

I must admit to surprise at some of the findings regarding blue crab (*Callinectes sapidus*) biology and have some general comments about that.

2) The focus of the experimental design is to look at ponds and connectedness of ponds. I am was not aware that blue crab spawn in these ponds as suggested by the study. My understanding is that blue crab is an estuarine dependent species, which means that it spawns offshore, larvae go through several planktonic stages in the water column before settling to the bottom as juveniles. This means that the crab actually use a range of habitats at different points in its life cycle. The conventional understanding is that the salinity gradient is very important for the planktonic stages to find nursery habitat. Thus, the complete range of habitats from the inlet to the Gulf of Mexico to the mouth of the river is the entire habitat range. It appears only a small part of that range was studied.

3) There are two species of blue crab in Texas. The second one is *C. similis*, yet there is little mention of this in the report. In my own sampling, I have found *similis* to be much more abundant than *sapidus*. There are also at least 50 other species of crabs in Texas bays, many of which do not have an estuarine dependent life cycles. It is not clear how the study of crab larvae identified the organisms captured in the samples as *sapidus*.

4) Blue crab abundances have been declining along the entire Texas coast since about 2000. In general, this indicates some large scale, coast-wide phenomenon is occurring. Also, similar declines started in the early 1990's along the east coast of the US. The best guess right now is climate change, in particular the effects of temperature and dissolved oxygen are key drivers. There is not much mention of the larger scale population issues, which is critical for an estuarine dependent species.

5) The main body of the report is about the whooping crane metabolic model (Chapter 3). In general, the conceptual model on how inflow affects salinity, and how salinity affects biology is correct. However, the model depends on linking several empirical relationships. For example, there is a great deal of variability between empirical relationships between flow and salinity (Fig. 3.4), which is found everywhere. The same is true for wolfberry-salinity relationship (Fig. 3.7). A problem arises when these noisy relationships are multiplied by one another because the errors are magnified. It would have been nice if some statistics of model fit to data were calculated or if the model was validated with independent data.

6) In the model section, the empirical formula given is that blue crab increase exponentially with salinity (and some other variables). This is not likely realistic, and it would have been nice to see this plotted to determine how the multiple variables are interacting with one another. What really happens is that estuarine dependent organisms have a preferred salinity range for each part of their life cycle, and it never increases without limit. I know from TPWD reports that there is more shellfish in northeastern Texas bays, and the number drop off as you move to saltier bays to the southwest, which make me wonder if the trend within a bay system with regards to salinity is ever significant.

Hope these comments prove useful to the authors of the study.

Paul Montagna

Endowed Chair for Ecosystems Studies and Modeling Harte Research
Institute for Gulf of Mexico Studies Texas A&M University-Corpus
Christi 6300 Ocean Drive, Unit 5869 Corpus Christi, TX 78412-5869 361-
825-2040 Telephone
361-825-2049 Facsimile
361-442-6791 Mobile
paul.montagna@tamucc.edu
<http://harteresearchinstitute.org/staff/montagna.html>