

Guide to Lab Report Writing Bio 362 – Marine Biology

General notes: You should follow the recommendations given in Pechenik, Ch. 9 (“writing laboratory reports”). Use past tense and active voice (“I counted isopods”) rather than passive voice (“Isopods were counted”) whenever possible throughout the report. Please use a reasonable font (Times, Cambria, Arial, or similar), 12 point, with ≥ 1 inch margins, double-spaced. There is no page requirement for the lab; however, it would be difficult to do the lab report well in fewer than 3–4 pages (double-spaced). Similarly, if your report is up to 7 or 8 pages, please consider that there may be more concise ways to describe your study.

Title Page

This will list the title of your report, your name, date, the course, instructor, & semester. The title should be concise and informative about your results, but not more than a dozen words or so.

Introduction

Here we discuss background information related to the topic of our investigation. This should include an overview of the abiotic and biotic factors structuring salt marsh communities, and a summary of the key species in NC salt marshes and their ecological niches. You should cite 2–3 journal articles (not your textbook) to support these introductory statements.

At the end of your introduction include both state the **objectives** of your research and your **hypotheses**. For example: My objective was to determine whether a typical North Carolina salt marsh exhibited vertical zonation. I hypothesized that species A would (*increase in abundance, decrease in abundance, etc.*) with inthan site B, because site A’s abiotic habitat (*is more homogeneous, is less homogeneous, is more anoxic, is less anoxic, etc.*). One page usually does it for the introduction.

Methods

I. Site descriptions

Tell when, where, and how samples were taken. Remember, in any methods section all you are reporting on is **how you conducted the research**, samples, experiments, etc. **DO NOT give any results** or any findings. Keep all methods concise! These descriptions should be short, but still allow the reader to replicate your work. If appropriate, describe any analyses—statistics, comparisons, etc.—you conducted, as this is part of your methods.

This is also a good opportunity to mention the flow and organization of your writing. Feel free to use roman numerals or subheadings to organize methods and results sections. This helps you and the reader understand that in a sense, you conducted different methods for different parts of the overall study. Also, strongly consider the flow of any subsections. Subsections should go from general (e.g., study area) to more specific (e.g., collection methods). Even if you didn’t collect the research in the most logical manner, present it as such.

Results

Think of results as reporting your data; i.e., no interpretation, just **raw information**. For example, in this section you might report the pattern of *Spartina alterniflora* abundance relative to tidal elevation, including a figure and the appropriate regression statistics. It is also appropriate to include any relevant qualitative observations (e.g., *Spartina* stalks were generally much taller near the waterline). The key is that you are reporting results and observations but **NOT** providing interpretation or discussing why you did or did not find results that supported your original hypothesis. Almost all tables and figures are found in the results section.

Avoid redundancy in this section. If you present data in a table or figure, do not also list that information in the text. The best practice is to report one or two individual numbers in text (e.g., “We observed a total of 5 species of isopods, but 15 species of foraminifera”), but for larger volumes of information, provide it in a table or figure and just report the overall pattern – possibly giving mean values or other summary information – with words (e.g., “Meiofaunal species richness was much greater for all taxa at site 1 than at site 2 (Table 1)”); in this example, Table 1 would list the identities of all of the species at each site).

Tables and figures should all be enumerated starting at 1 and referred to in the text in numerical order. Some data are better suited to a table, while others make sense in a figure—it’s your job as a scientist to consider these alternate presentations and make a defensible decision. Similarly, if you decide to include equations, such as the Shannon–Wiener Index of Diversity, please use the equation editor.

Discussion/Conclusions

Here’s where you get to bring everything together and interpret your findings. **DO NOT report raw data here**. This section is reserved for telling the reader what everything means. Your results indicate that the diversity index was higher at site A than site B. Combine that with your particle size distribution and **draw conclusions** about all this information. Make sure you **revisit your objectives** (from your introduction, remember?) and make it clear you achieved them. Also, **address your hypothesis**. It doesn’t matter if it was right or wrong; what matters is you took good data, identified strong relationships, and can draw worthwhile conclusions. Recall that in science we do not prove or disprove things; rather your results will either support or reject your hypothesis. You may have also encountered situations where error (human error, measurement error, etc.) explains a dubious result. This is all part of science—take a sentence or two and let your reader know that you considered a specific source of error. Any reader will sympathize and be much happier you recognized this than left them wondering why so many things didn’t add up. Finally, in your introduction you convinced us that this study was important to do—how do your conclusions add to the big picture? Is any future work needed to clarify things?

Typically you want to start the discussion with a brief restatement of your major findings (don’t include statistics, just state what patterns you found), then report whether that supports or refutes your hypothesis. Then you spend some time discussing that,

potentially offering alternative hypotheses if yours was rejected. It is appropriate to cite 2-3 other journal articles here to support your new hypothesis or describe similar patterns found in other studies. Somewhere in the middle you can mention potential sources of error, but don't undermine your paper by dwelling on these points. Then conclude with the big picture and importance of your study.

Figures

Figures should appear on a separate page along with a legend. The figure itself must be created in Excel or some other computer program; it should be black & white and professionally laid out with a minimum of clutter ('chart junk' such as 3D effects) and short but informative labels (including units) for axes and axis ticks. The legend should briefly report what is shown in the figure ("Abundance of *Spartina* stems measured at each tidal elevation") and describe any symbols ('circles are *Spartina*, squares are *Juncus*') and explain anything else a reader would need to understand what is going on in the figure. Do not report statistics or describe the pattern shown, the data should speak for themselves. The legend appears beneath the figure.

Tables

Tables should be created with the Table functions in Microsoft Word. Use bold text for headings, and make sure table entries are consistent in terms of number of decimal places, etc. Above the table should be a short legend describing what is in the table in only 1-2 sentences.

References

Midway, S. R. 2011. A comparison of two local meiofauna communities. *Journal of Amazing Marine Research*. 13:1–6.

*Use whatever style you want, just be consistent (the simplest thing is to pick the format used in the references section of a published journal article, and mimic that). **Do not use internet references**; stick to books and journal articles as anything worth citing from the internet should be in a scientific article or book. The standard is that cited articles have been peer-reviewed, and are archived permanently for retrieval by a future reader. Most scholarly books and articles meet that standard, but blog posts, Wikipedia articles, and other web materials do not. If something is cited in the text, it must appear in the references, and if something is included in the references, it must be referenced in the text.*

See Rubric and the Pechenik text for criteria on other report components.