Fisheries Biology: Term Paper

Date: August 31, 2015
File: d:\B173-2015\B173_term_paper.wpd

Summary

You are to write a scientific term paper about a topic related to fisheries biology.

Goal

The goal is for you to produce a term paper that illustrates that you have researched and thought in depth about a topic in fisheries biology. The term paper will tell me that you understand the important issues in a particular field and have identified the current cutting edge in that research.

This paper is NOT an essay. I do not want you to explain a topic to me. I want you to discuss **current research** on a topic. If you find yourself including extensive background material then you are not doing the paper correctly. The paper is about the current **research**, not just about the phenomenon. For each of your source papers, tell me what the authors were trying to investigate, how they did their investigation, what they found and what it means.

It is possible that you have never done this kind of paper before. If you are unclear about what you are doing, ask me about it.

> **If you think that this is just like writing a typical term paper on some topic, then you are dead wrong.**

Most importantly, think of this as an opportunity to show me what you can do, not as something that you have to do. I want you to discover something and to share that discovery with me.

Potential Topics

I suggest you look at the following journals for inspiration:

> Science, Nature, Journal of Fish Biology, Canadian Journal of Fisheries and Aquatic Sciences, Transactions of the American Fisheries Society, California Fish and Game

If you have a specific area of interest, I can suggest particular journals that you might look in.

Potential topics might include the biology of particular fisheries species, historical fisheries analysis, current methods in fisheries, aquaculture, genetically-modified fishes, introduced fishes, etc. Be careful with anything historical: I do not want just a condensed version of one of the many analyses of past fisheries collapses.

Source Material

Our library has some of the journals mentioned above, and I have others in my personal collection. Your task is to find recent research. You may use online approaches (e.g., Google Scholar) to get copies of journal articles in pdf form, but do NOT cite websites, unless you are absolutely sure that they are primary literature (which will almost NEVER be the case; ask me).

Mechanics

You will use the **primary** literature, not secondary sources like newspapers, magazines, encyclopedias or the internet. I want you to read what the current researchers are writing, not what someone else wrote about what the researcher wrote.

Your term paper will make use of a minimum of 5 papers from the primary literature. None of this literature may be older than 1995.

In writing the paper, you may need to cite some secondary literature as background material. So that I know that you know the difference between primary and secondary literature, in the Literature Cited section of your paper, you must put an asterisk in front of each paper you deem to be primary literature.

By the first due date , you need to provide me with a **typed** (not hand-written) one page proposal for your

paper. This proposal must include your name, the date, the title, the full and proper citation of one paper from the **primary** literature that you intend to use and a brief description of your proposed paper (one paragraph) that cites that paper. Examine the sample proposal online to see how this is done. See below for the proper way to format your citation. **This proposal must not be hand-written.**

By the second due date, you must provide me with the cover page, the introduction and the analysis of one of your pieces of primary literature, along with the full and proper citation of any literature that you have cited in your work, and the completed "Part I" checklist. The cover page must include your name, the current date (NOT the date it is due), and the title of your paper. It must be numbered as page 1. The introduction begins on page 2 (all pages must be numbered). The introduction provides a brief introduction to the topic and then briefly tells me how you are going to approach this topic, i.e., provide a roadmap to the rest of the paper. It must introduce and cite your five pieces of primary literature. You must attach all graded versions of your proposal to the back of this submission. .

For the final due date, you will turn in the completed paper, which includes analyses of all of your primary literature, along with the checklist (see below). You are allowed (and encouraged) to turn this in before the final deadline. You will attach all previous drafts that you turned in to the back of your final paper, after the checklist. At the same time, you will email me a copy of the final paper, with a file name in the following format:

Lastname_Firstname_Bio173Fall2015_termpaper.docx

It should go without saying, but I will say it anyway, you cannot submit a term paper that you are submitting, have submitted, or will submit, for another course.

You must have someone else read over your paper (to help you improve the writing) before you submit it. I strongly encourage you to select a reader from among your classmates. They must sign the checklist. You are to fill out the rest of the checklist, not them.

Types of Literature

In class, we will discuss the differences between the primary and secondary literature. The primary literature consists of the material published in journals (which are very distinct from magazines), written by the scientist doing the work and reviewed by scientific referees. Reviews or books (with rare exceptions) do NOT constitute the primary literature. Textbooks are NEVER primary literature. These are considered secondary literature. Magazines like *Scientific American*, *Biosciences*, *American Scientist, Discovery* or *National Geographic* are NOT primary literature.

Gray literature is particularly common in fisheries and wildlife work; beware of it. The California Department of Fish and Game produces tons of it each year. Gray literature consists of circulars, bulletins, reports, technical reports, in-house documents and the like which are printed but do not undergo the typical scientific review process. These are used for internal purposes but because they have not undergone any external review, they are not considered scientifically valid. Nonetheless some gray literature is useful, but it must always be evaluated with a strong sense of caution.

The title of the publication does not always tell you whether something is primary, secondary or gray literature. For example, the *Bulletin of the Fisheries Research Board of Canada* (now *Canadian Journal of Fisheries and Aquatic Sciences*) is the most highly regarded journal in fisheries research and is not a "bulletin" in the typical sense (which is why they changed the name a number of years ago).

Similarly *Transactions of the American Fisheries Society* sounds like a list of Meeting minutes or some such thing but is in fact a respectable journal of basic fisheries research. By contrast, *Fisheries Bulletin* is exactly what it says it is: a bulletin of what is going on in fisheries and not a part of the primary literature.

If a journal is titled *Reviews in Evolution* or something similar to that, you can be pretty sure that nothing in it is primary literature. For example, the journal *Trends in Ecology and Evolution* is NOT primary literature. That does not mean that you should not look at that journal for inspiration, but the papers in it are not primary literature (with rare exceptions).

Sometimes the same issue of a journal will contain items that are primary literature and others that are secondary literature. For example, it is often the case for journals to have a review article in the front of each issue. The word "Review" at the top should be a strong hint that this is NOT primary literature. The journal *Science,* one of the most respected journals in science, often includes many news reports, etc. that are not primary literature, as well as substantial primary literature, in the same issue.

If you are unsure as to whether a paper is primary literature or not, ask me about it.

As a very simple litmus test: if a paper is really easy to understand, like it was written for non-scientists, the odds are high that it is NOT primary literature. Primary literature is densely written, often full of unexplained highly technical jargon. It is that stuff that you need to use for this term paper.

Format

The paper MUST BE TYPED -- I will not read handwritten papers under any circumstances.

The paper must be double-spaced with pages numbered, starting with the cover page as page 1. It may be printed on one side of the page only or double-sided.

This paper should be no more than, and not much less than, 9 pages (all inclusive) and must include a cover page with the title, your name and date.

e.g.,

Regulating the Bluefin tuna harvest

by

Ron Coleman
November 16, 2015

The Literature Cited goes on the last page, but not on a separate page, i.e., they start right after the last bit of text, preceeded by the word "References" or "Literature Cited".

Write clearly and precisely.

I am very unimpressed with spelling mistakes or grammatical mistakes. These kinds of mistakes will **DRAMATICALLY** affect the grading of your paper. Use a spelling checker program to check your writing and have a friend read it as well before turning it in. I expect a very high quality product.

How to Cite Sources

The purpose of citing material in a scientific document is to properly credit the work of others. A citation shows that the thought or information just presented is not that of the author of the current document, but rather comes from someone else and that person deserves the credit (or the blame).

You do NOT cite what is regarded as general knowledge. But, and here is an important point to ponder, you should not be writing much general knowledge in your paper anyway. For example if you are writing a paper on the swimming biodynamics of tuna and you find yourself writing that tuna are fast moving fish that live in the ocean, then there is no need to cite anyone for that, but equally, there is no need to write the original sentence in the first place. We all know that tuna are fast moving fish that live in the ocean. Now if you want to tell me something specific, like tuna are the fastest swimming fish, clocked at over 50 miles per hour, you need a citation because I want to know who said that and then I can check it out myself if I do not believe it.

<u>The Literature Cited section</u>

The **Literature Cited** should contain ONLY citations to published work and must be set out consistently and professionally, paying attention to having complete information, the order of the information and the format of how that information is presented, e.g.:

journal article:

Galen, C., J.A. Shykoff and RC Plowright (1986) Consequences of stigma receptivity schedules for sexual selection in flowering plants. *American Naturalist* 127: 462-476.

book chapter:

Plowright, RC and C.M.S. Plowright (1987) Elitism in Social Insects: A Positive Feedback Model. Pp 413-436 in: *Interindividual Behavioral Variability in Social Insects* (Ed. R.L. Jeanne), Westview Press, Boulder, Colorado.

book:

Moyle, P.B., and J.J. Cech Jr. (1988) *Fishes: An Introduction to Ichthyology (Second Edition).* Prentice Hall, Englewood Cliffs, New Jersey.

The references should be listed in alphabetical order of the last name of the first author. In other words, a paper by Connor, S. (2006) would appear higher in the list than a paper by Jones, A.B. and C.D. Dunnit (2001).

You NEVER change the order of the authors within a particular reference.

Notice the placement of the various pieces of information, such as the year. Notice that the issue number is not included, only the volume and the page numbers. Write out journal names in full. Notice the use of hanging indentation. This is NOT done by hitting the space or tab key. Ask me if you do not know how to do this properly.

Some of the papers you may encounter will be published in electronic journals, such as PloS ONE. This is NOT the same as a website. Such papers often do not have page numbers. Instead they might have a document number.

How Citations Appear in the text

The three citations listed above would appear in your text as, respectively, Galen et al. (1986), Plowright and Plowright (1987), and Moyle and Cech (1988). Note that citations to papers with more than two authors -- such as the first one above -- appear in your text as the first author followed by the words ‘et al.’ (Latin for "and others") but the full list of authors is given in your Literature Cited section. Notice that in the words ‘et al.’ there is no little dot after the word ‘et’ but there is a dot after the word ‘al.’. This is because ‘al.’ is an abbreviation, whereas ‘et’ is not.

Unpublished work is referred to in the text either as "(A.J. Smith, unpublished data)" or "(J.G. Bloggs, personal communication)", depending on the context, but is not listed in the Literature Cited.

DO NOT USE footnotes as a means to cite references. In fact, do not use footnotes at all. Most scientific journals do not allow them. Some journals use a numbering system when referring to references. DO NOT do that in this paper.

Do not ask me whether you should use APA style or MLA style. The instructions are given above. If you ask me, I will be very unhappy that you have not read the instructions.

Quotations

It is almost never correct to use quotations in scientific writing. This is because in science we are interested in the ideas we get from others, not their exact words. If Jones said something interesting in 1992, then paraphrase what Jones said and give her credit. For example, the following might appear in your paper,

The bluegill sunfish exhibits a diversity of reproductive styles (Jones 1992).

You do not need to put the words in quotation marks because you are telling us that Jones wrote a paper on this topic. We now know that it was not you that first found out this exciting fact, but rather it was Jones and we know where to look to find more details. But, do NOT simply copy the text from Jones. You must paraphrase it. To simply copy it, whether you cite ir or not, is plagiarism, a serious academic offense.

The only time you need to use quotations in science is when the actual exact words are very important. For example, Robert Trivers wrote a very famous definition of parental investment in 1972 and this one line is quoted extensively in the literature because each and every word is very precise and important.

Long chunks of text

Imagine you are writing a term paper on sea snakes and you want to make extensive use of Roberts (1999) paper on sea snakes.

You do NOT do the following:

Roberts (1999) wrote extensively on the ecology and reproduction of sea snakes. He found that

> most sea snakes are livebearers (Roberts 1999). Fourteen of 26 species are striped (Roberts 1999). They are found in all tropical oceans (Roberts 1999).

You would do the following:

> Roberts (1999) wrote extensively on the ecology and reproduction of sea snakes. He found that most sea snakes are livebearers. Fourteen of 26 species are striped. They are found in all tropical oceans.

There is no need to put "Roberts (1999)" everywhere because it is clear that all of this material is coming from Roberts' paper.

The bottom line when citing material is as follows: you are trying to make sure that the reader knows who said what and where the reader can go to find more information.

DO NOT QUOTE when writing in science.

Plagiarism

Do not copy material form a source, and that includes copying references. Wth few exceptions, any time 4 or 5 words appear exactly the same in your paper as in a source, that constitutes plagiarism and you will receive an automatic F. I will check this with the software Turnitin.

Check List

At the end of this document is a checklist that **must be turned in** with your final term paper. **Do not ask me for a copy of the checklist when you turn in your paper.** Doing so makes it clear that you did not USE the checklist in writing your paper and I will be very unhappy.

Due Dates

Sept 23, 1:00 pm: Proposal due
Nov 2, 1:00pm: Part I due
Nov 16, 1:00 pm: Final paper due

Note: You may turn in the paper before the due date if you wish. You are encouraged to do so.

Grading

The paper will be graded out of 20 points. **There is no late. The paper is due at 1pm. After that, even 5 minutes, the paper is worth 0. Inappropriate literature will be a loss of 5 points at a minimum.**

[A sample introduction to a term paper]

Conflict and Cooperation: A review of biparental care

Biparental care is the name given to any situation where both parents (the male and the female) participate in parental care of the offspring. Biparental care is the norm in birds, is widespread in mammals and occurs sporadically in amphibians and fishes (Gross and Sargent, 1985). Biparental care is intriguing because it is a balance between cooperation and conflict between the two parents (Houston and Davies, 1985). In many cases, the long-term interests of the two partners are not aligned, e.g., when mating is only for a single reproductive event, and thus there may be conflict in terms of how much each parent is willing to invest in the offspring. And yet, if the parents do not cooperate to some extent, e.g., to protect the young, the offspring will perish and so some degree of cooperation is necessary. What factors influence this careful balance between cooperation and conflict? In this paper, I will examine five studies, from a diversity of taxa, which illustrate that the balance can be influenced by such things as availability of other partners, age of the offspring, number of offspring and even characteristics of the parents themselves (e.g., their relative sizes). Together these studies show that parents incorporate diverse information into their biparental investment decisions.

Coleman (1993) examined biparental care in the convict cichlid *(Archocentrus nigrofasciatus*) using a manipulative laboratory experiment to see the effect of relative value on the balance of biparental investment. In this experiment, Coleman utilized 15 pairs of convict cichlids, which he bred in 15 different aquaria. The key to the experiment was that Coleman deliberately created pairs of particular size combinations....

[...and so on.]

Notes:

1. The papers cited in the first paragraph are for background information. Some of them are secondary literature (e.g., reviews). These do not count in the three primary literature papers you are to utilize for this assignment.

2. Notice the underlined sentences at the end of the first paragraph. I have underlined them so that you will notice them – do not underline them in your paper. However, you should have roughly similar sentences in your paper at the end of the introduction providing a clear ROADMAP of where the paper is going and what it finds.

3. Do not describe the Methods in great detail but give enough information so that the reader has a good feeling for what was done, how many animals were used, whether it was a lab or field experiment, etc]

Ronald M. Coleman

February 16, 2015
Bio 173 Term paper proposal

Camouflage: Winning at Hide and Seek

Organisms have evolved many different ways to avoid being detected and eaten by predators. One of these is called camouflage. Camouflage refers to when a prey organism attempts to blend in with the background. How does such a defense system work in a changing world? Snowshoe hares are large rabbits that life in the northern United States and Canada (Zimova et al. 2014). They are preyed upon by various species, particularly Canadian lynx (a large cat). To escape detection, snowshoe hares molt their fur color at the start of every winter from the brown color they have during summer, to a snowy white fur. The latter helps them blend in with a snow-filled environment. They then molt back to brown for the summer. Global climate change has caused the snow to arrive later in the fall and to disappear earlier in the spring than in the recent past, and so Zimova et al. (2014) wanted to know if this has affected when snowshoe hares change their coat color. For my term paper, I will examine this article plus two others on the topic of camouflage.

Literature Cited

Zimova, M., L.S. Mills, P.M. Lukacs and M.S. Mitchell (2014) Snowshoe hares display limited phenotypic plasticity to mismatch in seasonal camouflage. Proceedings of the Royal Society B: Biological Sciences. 281: 201-208.

NOTE: Notice that you MUST cite the reference, i.e., Zimova et al. in the body of the proposal. It is not enough just to list the reference at the end of the page. Notice also the use of hanging indentation when formatting the Literature Cited.

Term paper Part I Checklist

Name: _____

The Author (not the proofreader) must fill out and turn in this page with the term paper.

Overall

___ The paper was read by a proofreader. Printed Name of proofreader _____

Signature of Proofreader _____

___ There is a title page

___ The pages are numbered, starting with the title page as page 1

___ The paper is double-spaced

___ You have read your paper carefully for spelling and grammatical mistakes

___ You have written a careful analysis of RESEARCH on a topic, not a description of a topic

___ There is an introductory paragraph to introduce the topic

___ The introduction cites all five of your pieces of primary literature

___ You have attached to the back all drafts of the paper that you previously submitted

General Punctuation and Writing

___ There are no quotations in the paper

___ Every sentence ends with a period, exclamation point or question mark.

___ You have not used any contractions, e.g., “didn’t” instead of “did not”

___ Scientific names are written in italics, e.g., *Lepomis macrochirus*, including those in the references

___ The name of the Genus is capitalized and the specific epithet is NOT capitalized, i.e., *Lepomis macrochirus,* NOT *Lepomis Macrochirus*

Citation of Literature in the body of the paper

___ You used at least five pieces of primary literature, none older than 1995

___ You used "et al." when there are three or more authors

___ You checked that "et al." is correctly written -- notice the "." after “al.” Do not put the words “et al.” in quotation marks in your paper.

___ EVERY paper cited in the body of the paper is listed in the Literature Cited section

Literature Cited section

___ The papers are listed in alphabetical order by the last name of the first author

___ You put an asterisk in front of each piece of primary literature in the reference section

___ Papers with three or more authors have ALL authors listed fully (i.e., you did not use et al. in the Literature Cited section)

___ EVERY paper listed in the Literature Cited section is actually cited in the body of the paper

Final Term paper Checklist

Name: _____

The Author (not the proofreader) must fill out and turn in this page with the term paper.

Overall

___ The paper was read by a proofreader. Printed Name of proofreader _____

Signature of Proofreader _____

___ There is a title page

___ The pages are numbered, starting with the title page as page 1

___ The paper is 9 pages in total (including the title page), and is double-spaced

___ You have read your paper carefully for spelling and grammatical mistakes

___ You have written a careful analysis of RESEARCH on a topic, not a description of a topic

___ There is an introductory paragraph to introduce the topic

___ There is a concluding paragraph at the end to bring the material together

___ You have attached to the back all drafts of the paper that you previously submitted

___ You have emailed me a copy of the paper, as a file attachment, with the following file name format Lastname_Firstname_Bio173Fall2015_termpaper.docx

General Punctuation and Writing

___ There are no quotations in the paper

___ Every sentence ends with a period, exclamation point or question mark.

___ You have not used any contractions, e.g., “didn’t” instead of “did not”

___ Scientific names are written in italics, e.g., *Lepomis macrochirus*, including those in the references

___ The name of the Genus is capitalized and the specific epithet is NOT capitalized, i.e., *Lepomis macrochirus,* NOT *Lepomis Macrochirus*

Citation of Literature in the body of the paper

___ You used at least five pieces of primary literature, none older than 1995

___ You used "et al." when there are three or more authors

___ You checked that "et al." is correctly written -- notice the "." after “al.” Do not put the words “et al.” in quotation marks in your paper.

___ EVERY paper cited in the body of the paper is listed in the Literature Cited section

Literature Cited section

___ The papers are listed in alphabetical order by the last name of the first author

___ You put an asterisk in front of each piece of primary literature in the reference section

___ Papers with three or more authors have ALL authors listed fully (i.e., you did not use et al. in the Literature Cited section)

___ EVERY paper listed in the Literature Cited section is actually cited in the body of the paper

Note: All these things must be true or your grade will suffer severely. In addition, if you check these things off and they are not true, your grade will also suffer severely.