

Solving the Mysteries of ESRM 494, 495, and 496

A Survival Kit for Students in the ESRM Wildlife Conservation Option

Joshua J. Lawler

John M. Marzluff

Kenneth J. Raedeke

Stephen D. West

Aaron J. Wirsing

School of Environmental and Forest Sciences
University of Washington
Box 352100
Seattle, Washington 98195-2100

June 2012



THE SENIOR THESIS

The senior thesis or senior project is an opportunity to pursue a topic of personal interest and put to use principles and techniques learned previously. Although the choice of a topic is open, we have instituted a set of guidelines to provide a pathway through this unfamiliar territory. Faculty members are interested in your projects and will help you arrive at a realistic project design. Because it is very easy (and frustrating) to spend a lot of time thinking about projects that on closer inspection are unrealistic to accomplish with available resources, it is important that you seek advice about potential projects early on. Initial discussions should be about ideas and research questions. Subsequent discussions can turn to logistics. The choice of which faculty member to approach is usually done with respect to their areas of scientific expertise, rather than their roles as academic or program advisors. After you have decided on a project you will prepare a study proposal under the Senior Proposal (ESRM 494, 5 cr.). This will sharpen the focus of the project, give you time to research the pertinent literature, give you experience writing a proposal, and make clear to all the nature of your project. The Senior Thesis or Project (ESRM 496 or 495, 5 cr.) allows for conducting the research, the data analysis, and the write-up.

A NORMAL SEQUENCE OF EVENTS

Discuss project ideas and their feasibility with one or more faculty members



Gather information from many sources (e.g., libraries, faculty, peers, and professional biologists) on potential projects



Decide on a research question



With guidance from faculty prepare and submit the project proposal (ESRM 494)



Revise proposal as needed and gain faculty approval to proceed with Thesis or Project



With regular faculty guidance complete research for the Senior Thesis or Project



Write and submit Senior Thesis or Project

ELEMENTS OF THE RESEARCH PROPOSAL

The organization of the research proposal we would like you to use is similar to that of a standard scientific paper. Explanations of the rationale for this structure and suggestions on how to use it effectively are provided in Day and Gastel (2006)¹ In actual practice, the structure of research proposals varies a great deal, depending upon the desires of the granting or contracting group. Despite the variation, most proposals contain similar information. We request that your proposals be structured with the following sections:

Title Page

Please see the attached sample title page for the proposal (page 7).

Abstract

Provide a concise, indicative abstract of 200 words or less. An indicative abstract relates what you propose, why it is important or interesting, and how you intend to proceed.

Introduction

The Introduction should set the stage for the project. It consists of a general statement of the nature and goal (s) of your project, a discussion of how your project relates to existing knowledge, a selective, but thorough literature review of the chosen topic, and your general approach to the problem.

Objectives

In this section you should concisely state what question(s) you are addressing. Note that the rationale for these questions should have been provided in the Introduction. The questions might take the form of simple statements or formal hypotheses for statistical inference, depending upon the nature of the project.

Proposed Methods

You may find it convenient to subdivide this section. Common divisions include Study Area, Field Methods, and Analytical Methods. Carefully describe the field, laboratory, and analytical methods you plan to use. Are they the most appropriate ones? Where competing methods exist, justify your choice. Cite references for each. Will cooperators be involved? What will be their roles?

Research Timetable

Provide a time schedule of when you expect to conduct each part of the study. This can be done effectively in a chart of tasks vs. time. Make sure you allow enough time for fieldwork, data analysis, and report preparation. Final reporting will consist of the written report and a public presentation, which is required for all ESRM capstone courses. The presentation may be oral or poster.

Expected Results

Describe the nature of your anticipated results. Will these data be sufficient to answer your question(s)?

Literature Cited

¹ Day, R.A. and B. Gastel. 2006. How to write and publish a scientific paper. 6th Edition. Oryx Press. 320pp.

List all references you cite in your proposal. Use the author and date system followed by several journals (e.g., Conservation Biology, Ecological Applications, Journal of Mammalogy). Write out journal names in full. For example:

Jones, E.J. 1986. The winter diet of the Blue Grouse in the Cascade Range. Journal of Wildlife Management 45: 187-195.

Although the length of proposals will vary with the intent of the project and the nature of their authors, proposals have averaged about 10-15 pages historically.

SENIOR THESIS OR PROJECT GUIDELINES

You should write your thesis or project for a scientific journal. Because there are several variations in format among journals and we would like to have a standard format for all Wildlife Science Senior Theses and Projects, we request that you follow the general format of Conservation Biology. This journal offers a very readable format and an accessible style for cited literature, where journal names are written out in full.

Two copies of the Senior Thesis or Project are required, one that will be graded and returned to you, and one that will be retained by the Wildlife Science Group and kept for use by others. You may exchange a rewritten version of your thesis that incorporates suggestions made on the graded version by your thesis advisor. The exchange is optional and will not affect your course grade.

A characteristic of thesis or journal writing is conciseness. Everything is said efficiently, and with few exceptions, it is said only once. Your thesis should consist of the following sections, each of which (with the exception of the Abstract) may be subdivided as you see fit:

Title Page

Please see the attached sample title page for the thesis (page 8).

Abstract

The Abstract is a single-paragraph summary of your thesis. It should be an informative abstract of 250 words or less and should “(1) state the principal objectives and scope of the investigation (2) describe the methods employed, (3) summarize the results, and (4) state the principal conclusions” (Day and Gastel 2006).

Introduction

The Introduction serves several functions. According to Day and Gastel (2006) there are five of these: “(1) The Introduction should present first, and with all possible clarity, the nature and scope of the problem investigated. (2) It should review the pertinent literature to orient the reader. (3) It should state the method of the investigation. (4) ... It should state the principal results of the investigation. (5) It should state the principal conclusion(s) suggested by the results.” After finishing your Abstract and Introduction, the reader should have a very good idea of what your thesis is about and its significance.

Methods

The Methods section tells precisely what you did. It should be sufficiently detailed that the reader can judge whether your methodology is appropriate and can replicate your study if desired. In wildlife research you will often have to design specialized equipment. If your methodology is unconventional, you may want to defend it in the Methods section with explanations and literature citations. Additionally, you may want to point out the flaws or problems in your methods.

Results

The Results section clearly and simply reports the data of your thesis. Reasons for collecting these data are given in the Introduction and your assessment of what they mean is given in the Discussion to follow. **Do not include discussion or interpretation of your data in the Results section.** Data can be cast into tables or shown in graphs depending on their nature². If the data are not extensive and can be given in the text, do so. Provide descriptive statistics and a full report of inferential statistics if used. In the presentation of data, strive for efficiency. Instead of “It can be seen from the data in Figure 2 that abundance was higher in spring than fall” try “Abundance was higher in spring than fall (Figure 2).” If you have data you wish to include with your thesis that are too voluminous for presentation in the main body of the thesis, you can add them as Appendices after the Literature Cited section.

Discussion

In the Discussion section, you interpret the results. **Do not repeat results in the Discussion.** Generally, try to answer two related questions: What do the results mean? Why did they come out the way they did? Make sure you keep Results and Discussion separate in your mind. The results are facts—what happened. The discussion is opinion—why you think it happened and what you think it means. Relate your findings to the work of others. Do your results and theirs agree? Why or why not? The Discussion section should be as well documented and well reasoned as you can make it. In a long thesis a Conclusion section can be useful. It is not a summary, which should not be necessary in most theses, but draws conclusions from the results and discussion. What do you want the reader to take away from your study? The Conclusion offers broad, interpretative statements of what the study has shown and how the information might be used in practice and in further research. Management recommendations, if appropriate, should be included in the Conclusion.

Literature Cited

The Literature Cited section includes a complete citation for every reference in the thesis or project. It should not include any publication not cited somewhere in the thesis or project (it is not a bibliography). The format of the Literature Cited section varies greatly among scientific journals. As mentioned above, we would like you to follow the citation style of Conservation Biology:

Jones, E.J. 1986. The winter diet of the Blue Grouse in the Cascade Range. *Journal of Wildlife Management* 45: 187-195.

² Briscoe, M.H. 1996. *Preparing scientific illustrations*. 2nd Edition. Springer, New York. 204pp.

The references should be listed alphabetically. If there is more than one reference by one author, list the earliest one first. If you cite more than one paper published during the same year by the same author, cite them as Jones 1986a or 1986b and list them similarly in the Literature Cited section. See a recent issue of *Conservation Biology* for other issues of format.

When citing a reference, write: "Jones (1986) found that ..." or "Similar observations have been made by others (Jones 1986; Smith and Robinson 1987)". Do not use footnotes unless in a table. Personal communications may be cited as references in the thesis text, e.g., (Aldo Leopold, pers. comm.).

Acknowledgments

If you are indebted to others for any aspect of your thesis, they should be acknowledged for their help in this section.

Wildlife Conservation Option
School of Environmental and Forest Sciences
University of Washington
Box 352100
Seattle, Washington 98195-2100

**SENIOR THESIS PROPOSAL (or) SENIOR PROJECT PROPOSAL
ESRM 494 (or) 495**

TO: Name of faculty advisor

TITLE OF PROPOSED PROJECT: Title

STUDENT'S NAME: Your name(s)

PERIOD OF RESEARCH: Dates for the research

DATE OF PROPOSAL Date you submit proposal to advisor

Student's signature(s)

The Title of Your Thesis (or) Project Should be Here

by

Jane Q. Wildlife

A Senior Thesis (or) Project Submitted in Partial Fulfillment
of the Requirements for the Degree of

Bachelor of Science
(Wildlife Conservation)

School of Environmental and Forest Sciences
University of Washington
Box 352100
Seattle, Washington 98195-2100

Year

Approved by _____

Faculty Thesis Supervisor

Date _____