Environmental Studies
FOR OUR SHARED FUTURE
UC SANTA BARBARA

Senior Thesis Handbook

What is a senior thesis in Environmental Studies?

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The senior thesis in Environmental Studies is probably different from other work you have done during your college career. It is a substantial research project in which you will focus on a specific and limited problem the knowledge you have gained from a wide range of disciplines. You are *encouraged* to do appropriate original research (such as field observations, analysis of printed sources, interviews, or controlled simple experimentation); you are *expected* to draw upon appropriate resources in the library. An acceptable thesis will have these six characteristics: as research, it is driven by questions, it is original, it is public, it is substantial, it is shaped through interaction with an advisor, and it is scholarly.

1. As research, the thesis is driven by questions. Research is a search for knowledge and understanding of a defined topic. Students often come to believe that research means collecting a lot of information about a topic and patching it together like a monstrous book report. *This is a myth!* Research is *not* simply a collection of data; instead, it is an attempt to answer a question or a set of questions. The information you need to collect is whatever will allow you to answer the questions you have—so your questions are critical; they drive the whole research process.

This doesn't mean that the questions you start with are necessarily the questions you end up answering. You may find that you need to expand or (more often) narrow your questions; the process of research itself may lead you to new questions that you couldn't have asked before you began but come to see as more important than your original questions. If your questions change, don't be alarmed; that's normal.

Where do these questions lead a thesis researcher in environmental studies? Driven by questions about an environmental issue or problem, you will collect or generate data, you will analyze the data and draw conclusions. For most theses, answering your questions will mean making recommendations. For example, a thesis on the Channel Islands did not simply present bundles of interesting facts about the islands; instead, it analyzed those facts to determine the impacts of visitors to the islands, in order to recommend an appropriate policy for regulating those visitors. Another thesis on bicycling as an alternate form of transportation asked "What rules should be developed to reduce bicycle accidents?" The author developed a data base about bicycle accidents and their causes, developed and tested a hypothesis, drew conclusions and recommended a set of policies.

2. The thesis is original. Even if you are not conducting field research, even if you are working solely with printed sources written by others, there is an important sense in which your thesis is an original work. Even if all you are doing is synthesizing materials, the questions you ask of your sources and the purposes for which you draw on them allow you to write something that is original and creative. Perhaps you are applying a hypothesis to a set of data that has not been tested against that hypothesis; perhaps you are analyzing a body of information from a particular value framework or with a set of policy alternatives in mind. In any case, the thesis is *your* work, driven by your questions; *don't be afraid to think originally*.

3. The thesis is public. Unlike most papers you have written, the thesis is not something that passes only between you and your TA or instructor, perhaps also being shown to a friend for editing or a parent if you do well on it. The finished thesis is a public document, kept on file by the Environmental Studies Program for at least five years; selected theses will also be placed on reserve in the Reserve Book Room for future generations of students to use. The public aspect of the thesis has these implications:

a) Your thesis should be written to be read. This may sound obvious, but keep thinking about it. Readers approach research documents like your thesis not to be entertained, but because they need something from it. The decisions you make about what information to include, how to organize it, how to format it, what connections to make or conclusions to draw—all of these decisions should be made with the idea that readers will be trying to understand and use what you have written.

b) Different readers have different needs, and therefore will use different parts of your thesis. It's a good guess that 80% of the readers of a technical document like yours will read only 20% of what you write—but not necessarily the same 20%. Therefore it's crucial that you present your material in ways that allow each reader to get what she or he needs from it. For some of the decisions you will face—about format and organization, about using figures and documenting sources, for instance—this manual prescribes a way to do it. Our reason for these rules is the same as for the rules in any academic journal or in writing an Environmental Impact Report: to set up a system that makes it easy for different readers to get access to the part of what you know that they need. For all the decisions you face in your writing that this manual does not address, follow the same principle: make it easy for readers to access whatever kind of information or degree of complexity they need.

c) This thesis will demonstrate your abilities and those of the Environmental Studies Program. If you cut corners on this work, it will show to whoever reads the thesis. This may be an encouragement to start early, to budget more than enough time to carry through each stage of the work, and to seek out help when you get stuck.

4. The thesis is substantial. The scale of this project makes it qualitatively different from shorter papers you may have done before. A paper perhaps 50 pages in length is *not* the same thing as five 10-page papers stacked on top of each other. You must select an issue that is large enough to be significant; you must *focus* it in a way that makes it small enough to manage. You must formulate research questions, decide on data-gathering strategies, collect and analyze information, draft and revise your final document—all serious, substantial intellectual tasks that must be managed in the real world, with available resources, completed on time by a set deadline.

How long should the thesis be? The best answer is as long as your topic warrants. However, that answer doesn't provide much help when you're trying to decide on the intellectual boundaries to the project—the scope and the level of detail your treatment will require—and on the time and energy you will need to commit. A good goal to aim for is a document of 40-60 pages of text, plus tables and figures, references, and appendices. That's 40-

60 pages of lean, focused writing, without padding; if you tend to write more fluidly and effusively, aim for a longer document and then edit your draft rigorously.

5. The thesis is shaped through interaction with an advisor. Throughout this project, you will be involved in a particular kind of close relationship with a faculty member or other professional. *The success or failure of your thesis depends to a great extent on your selection of your thesis advisor*. The advisor should provide you with guidance and feedback through your research process—from helping you define your topic and clarify your questions through designing a study plan and locating appropriate sources to analyzing data and drawing conclusions. Learning how to draw on your advisor for help is an important part of the thesis experience.

6. The thesis is scholarly. This criterion both sums up and goes beyond the other five. A clear understanding of scholarship is important, both as a goal for your own work, and as a standard to judge the sources you use. A work may be considered scholarly without meeting all of the criteria below, but the more strongly it meets each of them, the more scholarly it is. The following list of six qualities, adapted from Mauch and Birch (1987, pp. 16-18), characterize written scholarship.

a) "A scholarly work is published in a respected, refereed journal or in book form in the field of specialization appropriate to the subject of the work." This will be true of the scholarly sources you use from the library (see Chapter 4 for a discussion of the referee process); in most cases it will not be true for Environmental Studies senior theses (see Chapter 14 for exceptions).

b) "It is based upon the expert wisdom and literature of the field. The work indicates that the author is familiar with the conventional wisdom of the field [in other words, the common assumptions and beliefs of other scholars studying your topic], and if it departs in new directions, it presents a sound and rational defense for its departure."

c) "It demonstrates the workings of a thorough, careful, critical, and analytic mind, looking at all sides of any proposition, examining and testing hypotheses, setting up and knocking down arguments, and marshaling in a complete and fair way all the facts in the process of critically analyzing the study's findings. A scholar will, of course, believe and support the findings of a careful investigation, but a scholar is not an advocate or a promoter. The scholar is evenhanded and is willing to entertain the possibility that errors can be missed by even the most watchful investigator." In other words, a scholarly work demonstrates a search for truth rather than a defense of a too-hasty conclusion.

d) "It demonstrates to other scholars that the writer is a competent specialist who understands the theories and concepts of the domain and who has a systematic knowledge of the chosen field rather than a smattering of insights here and there."

e) It is honest about the author's political commitments and moral values relevant to the object of study. It does not pretend to be value-free, but rather it recognizes that an author's values and commitments will inevitably inform his or her work, especially in an area as value-laden and politically charged as study of the environment. It *does*,

however, attempt to compensate for any blindness or distortion that the author's commitments may cause. It seeks and presents fairly any evidence counter to the author's assumptions; it is not a polemic in favor of the author's point of view.

f) It is at least potentially useful to other writers.

Don't be overwhelmed by all of these criteria. A Ph.D. dissertation or an article published by one of your professors in a professional journal may not meet all of these criteria fully, but they are goals for which to aim, and the closer you come to them, the better your thesis will be. While your thesis is not a Ph.D. or M.A. thesis, it *is* a project requiring a major commitment of your time and energy. Perhaps the most important piece of advice in this manual is the following, from a student who completed her thesis in 1990: "**Love your topic**." Otherwise you may not be able to stick with it all the way to the finish.

NOTE: You will find it helpful to spend some time looking at actual senior theses. The theses written by students in the past are kept on file by the Environmental Studies Program and are available for examination, just as yours will be. The Environmental Studies office is currently placing a record of all senior theses into a computer data base, which you can use to search by author, title, and key words. Start by asking to look at the card file in the office; it contains an *abstract* of each thesis. By looking at several theses on topics which interest you, you can get a good idea of the range of approaches, the degree of depth, the patterns of organization and forms of presentation that are acceptable.

Senior thesis chapter guide

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This handout provides you with an overview of the front matter and the general content of the chapters in your thesis.

Title Page

See sample title page in ES Senior Thesis Handbook.

Abstract

An abstract tells readers the essence of your thesis, in 200-250 words. The abstract will be on a separate page and will include the following:

- The title of the thesis and your name in full
- A brief description of the research problem, question or hypothesis
- A description of the methods used in gathering data or studying the problem
- A condensed summary of the findings and recommendations of your study. If your study produced any numbers, the most important ones should appear in the abstract.

Most readers of abstracts are looking for documents that are relevant to their own research; thus they will skim your abstract among many others. As you write the abstract, keep in mind the rapidly reading researchers skimming for materials relevant to their projects; identify your topic, research ideas and methods, and conclusions clearly and precisely by using key words.

The abstract is not the place to tell about your experience writing the thesis, your uncertainties, struggles and successes or failures; if you want to talk about your own process, put it in a preface or use it to explain the help of the people you thank in your acknowledgements section.

Throughout your entire thesis every word should count; in the limited space of the abstract, it's even more important to be precise and concise. If you know you tend to be a little wordy, write a 400 word abstract and then go through it sentence by sentence, mercilessly cutting it in half.

While the abstract appears at the front of your thesis, it should be one of the last things you write. See sample abstract page at the end of this document

Acknowledgements

Table of Contents

List of Figures and Tables

Chapter 1: Introduction and Overview

What is the research question?

In the first paragraph of the first chapter of your thesis, you will want to introduce the general area of study and your specific topic. What is the central puzzle, issue or concern that interests you? Most importantly, you will want to state your precise research question. Be focused. Your entire thesis is designed to answer this exact question. Are there any sub-questions?

Avoid "yes" or "no" questions. They are too black or white and don't allow for a rich understanding of nuances, complexity, processes, and contingencies. Also avoid questions beginning with "what is the role of …? These are too vague.

Note that whether you are moving from the broad to the specific, as outlined above, or starting with a narrow question and moving out to a broader theme, in your first paragraph you are establishing a connection between the your thesis project and the broader concerns important to Environmental Studies.

Why is the research important?

The second and third (and maybe fourth) paragraphs of your first chapter should tell the reader why the research is important. Why is this a question that needs answering? Why should anyone care? While this seems obvious to you, it may not be obvious to others. Do not take for granted that the reader understands *your* reasons. Spell it out. In particular focus on two kinds of justifications or rationales for why your research matters… the "policy rationale" and the "scholarly rationale."

1) ***Scholarly contribution***: The scholarly contribution describes how your research contributes to knowledge about your question. To describe the scholarly contribution of your research you must know what others have done before you and how well they have answered your research question. Therefore, the scholarly contributions becomes clear after writing your literature review (i.e. Chapter 2). Otherwise, how do we know that your study has not already been done? That you are not simply reinventing the wheel? The scholarly contributions should summarize your assessment of others' work on your topic and explain what you do differently and better, leading to a more comprehensive understanding.

   NB#1: It is not enough to say you are "filling a gap" in the scholarly literature. You must also indicate why the gap should no longer be neglected. Are there new world events or scholarly developments or new data that suggest the need for more work in this area?

   NB#2: In Chapter 1, the discussion of the "scholarly contribution" is brief but to the point. A full elaboration of your critique of the state of knowledge on your topic is in Chapter 2: Review of the Literature. Indeed you will need to have completed the review of the literature in order to effectively explain how your work fits in and what you are contributing.

2) ***Policy contributions***: The policy contribution describes how your research is important to bringing about positive change in the world. How does your research contribute to enhancing environmental quality? The policy contribution section should describe how the research might make a positive impact on society.

Your hypothesis

The next paragraph of Chapter 1 restates your research question as a hypothesis. The heart of a research project is a hypothesis. A hypothesis is a prediction of the outcome of a study. At the outset it is a hunch, an educated guess, a proposition derived from theory, previous research, observation of patterns, or a combination of these. It is an assertion or a proposed explanation, say for a historical event or a theoretical possibility that you will examine with some kind of evidence. Because a hypothesis is proposition, not a statement of historical "facts," it is essential to discuss the logic, the informed reasoning, behind your hypothesis. How does the argument unfold? How do the pieces fit together? The hypothesis must succinct and specific enough to be able to find sufficient objective evidence to determine whether you are right or wrong, within the boundaries of your study.

NB#1: You must have a genuine research question and hypothesis. If you already know the answer, then why do the research? A good thesis is not based on preconceived notions or biases. It is NOT an opinion paper or editorial. Your research should lead you to your conclusions and entail actual deliberation over complexities as well as how well your evidence stands up against alternative arguments.

NB#2: Not all studies, such as those that entail conceptual development, are amenable to hypothesis statements.

Research design – Method and Data

In the fourth section of Chapter 1, you will describe in detail your approach to answering your research question and the rationale for each step in the research process. What is(are) the case(s), events, persons, processes you will investigate? Why do these cases or subjects provide the best opportunity for answering your research question? Is this a quantitative study, a statistical design involving correlations or regression analysis? Does it take a historical or ethnographic approach? A combination of approaches? Is it a comparative, either cross-national or longitudinal, study? Does your research question require a before and after set-up to determine and examine change? What is the time frame for the study and why? Do you define key concepts in a particular way that needs clarification? Or are you using a standard definition? Whose? How will you "observe" these concepts or investigate relationships among them? What are the limitations of the research design? How will you know if you are right or wrong?

Your research design will also describe specific data, i.e. <u>sources and evidence</u>. What specific materials, numbers, texts, polls, etc. do you need to address your question? How will you get them and how will you analyze and draw meaning from them? Specify what evidence will support your argument or prove you wrong. An original argument requires primary research. Primary sources are those that have not been interpreted by another analyst: diaries, oral histories, testimonies, government documents, memos, statistics, polling data, interviews, etc. Be specific. Give details. If you are using a database, government documents or newspapers, specify which ones and why. If you are designing a questionnaire, explain the methodology and include the major questions to be asked. Are questions open-ended? Standardized? Are the asked in person? By email? How many interviews did you conduct? What are the limitations of your data? Be honest. If any aspect of your research design is not ideal, which is usually the case for

all research projects, say so and tell us what we can learn from it nonetheless. When others critique your work, they will zoom right in on your research design and pick it apart, piece by piece. They will question every decision you have made, so it is worth your while to reflect on each one. Beware, when research fails, it often fails because of a flawed design.

Thesis roadmap

Finally, the last paragraph(s) of your Chapter 1 gives your readers an overview of the rest of your thesis chapters (1-2 paragraphs only). What does each subsequent thesis chapter accomplish? The chapter structure should flow logically from your argument. This is not just a list but a narrative with a purpose.

Chapter 2: Literature Review

Research does not exist in a vacuum. It draws upon previous studies and, in a specific way, feeds back into current debates. Only after you know what others have said (what questions they asked, what they found, and how they went about their study), can you know if you are asking an interesting question that promises to expand knowledge. The goal of the second chapter of your thesis is to place YOUR research within the context of the previous research, conventional wisdom and current debates about your topic. A literature review is YOUR synthesis and critique of the state of the knowledge of YOUR topic from the viewpoint of YOUR argument. This means you are assessing others' work with the goal of showing what you are doing differently and what your study will contribute to existing research.

Literature reviews are challenging to organize and write. For most undergraduates, this is a completely new experience. Take heed: This chapter is NOT a set of summaries of others' work. It is NOT an annotated bibliography. If each paragraph begins with the name of an author or book you're on the wrong track. Bring YOUR VOICE to the foreground. If the reader is not convinced of your knowledge of alternative arguments, then she will question the validity of your research question, your design, and your ability to make a contribution. Result? You've given your audience no reason to read further. Make no mistake. This is THE WORST thing that can happen to your thesis.

This chapter, like all chapters, has an introduction and conclusion. The introduction establishes which bodies of literature and/or which debates you are examining, the criteria for analyzing and comparing the research you have included, and how you have organized the review. It is often useful to state why certain bodies of work are excluded (especially if you can imagine someone saying "I wonder why she didn't include x, y, or z"). The conclusion of the chapter draws together the state of knowledge (what THEY/OTHERS say) with the author's hypothesis (what YOU say). Hence establishing the intellectual need for your study and the broader implications for our understanding of the research problem. It is through the process of research and writing the literature review that the research question, its significance, and the research design are refined.

Chapters 3: Background/Context

Depending on the needs of your particular study, Chapter 3 may provide historical, geographical or technical background on the case or cases that follow. Alternatively, it may provide additional context on the debate in question or a more detailed treatise of a key theoretical issue.

Chapters 4-6: Data and Analysis Chapters

The middle and longest section (typically two to three chapters depending on your topic) is where you get your fingers dirty, where you dig deep on-line for primary materials or even create your own data (interviews or laboratory experiments for example). Here you tell the story that answers your research question by presenting and examining the evidence to determine the extent to which the hypothesis you outlined above holds.

In a comparative study, chapters can be organized by country or by issue (with a comparative discussion within each chapter).

Do not be alarmed if your thesis is incorrect or the results are inconclusive. Surprise findings are also important; they tell us that something else is going on, other than the expected, or that the issue is more complex than originally thought. What might explain this surprise? The answer, in turn, generates new research questions, new studies and this is a good thing. Remember, as you analyze your evidence for and against your hypothesis, you must make references to the findings and conclusions of previous studies and theories discussed in the literature review. In other words, the literature review does not stand alone; it is an integral part of the analysis and interpretation of findings.

Chapter 6: Conclusion

In the final chapter of your thesis, you will describe what you learned from conducting research and discuss the implications of your findings. What have you learned and what does it mean? Your conclusion will have five main parts:

- Begin by briefly restating your research question.
- Briefly summarize your findings
- Discuss the significance of your research findings:
    1. First, what are the implications for the specific question or puzzle you presented in Chapter 1? What do they mean for the case(s), the people, organization, region you studied?
    2. Second, what do they mean for theory and/or practice? What are the broader implications of you study? To what extent can your conclusions be applied to other cases or sets of relationships? Take a big step back to the "big picture," the broader social, economic, political and intellectual concerns with which you began. This requires returning to the literature review, key debates, and the rationale sections of the thesis. What are the implications of your conclusions for theory? Do they suggest new theories or mechanisms? What are the practical implications for decision-makers and policy?

- Discuss the limitations of your research. What was not ideal? What might you have done differently?
- What do your findings suggest about directions for future research?

Works Cited

Include all sources cited in your thesis. Be sure to follow APA style.

Appendix/Appendices

Material that is pertinent but distracting if placed within the text itself goes here. This might include maps or detailed tables or statistics from a database. If your study contains a survey or uses discourse or content analysis, you must also include an appendix that contains your survey questionnaire or coding sheet.

UNIVERSITY OF CALIFORNIA

Santa Barbara

Thesis Title:

Thesis Subtitle (if there is one)

by

First Name Middle Name Last Name

A senior thesis submitted for the degree of

Bachelor of Arts or Science

in

Environmental Studies

Thesis Advisor:

Name, Title, Department

Month, Year

Writing an abstract for your senior thesis

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An abstract tells readers the essence of your thesis, in 200-250 words. The abstract must do the following:

- Contain the title of the thesis and your name in full,
- State briefly the research problem, question or hypothesis,
- Describe the methods and procedures used in gathering data or studying the problem, and
  Give a condensed summary of the findings and recommendations of your study.
- If your study produced any numbers, the most important ones should appear in the abstract.

Most readers of abstracts are looking for documents that are relevant to their own research; thus they will skim your abstract among many others. As you write the abstract, keep in mind the rapidly reading researchers skimming for materials relevant to their projects; identify your topic, research ideas and methods, and conclusions clearly and precisely by using key words.

The abstract is not the place to tell about your experience writing the thesis, your uncertainties, struggles and successes or failures; if you want to talk about your own process, put it in a preface or use it to explain the help of the people you thank in your acknowledgements section.

Throughout your entire thesis every word should count; in the limited space of the abstract, it's even more important to be precise and concise. If you know you tend to be a little wordy, write a 400 word abstract and then go through it sentence by sentence, mercilessly cutting it in half.

While the abstract appears at the front of your thesis, it should be one of the last things you write. See back of this handout for a sample abstract page.

ABSTRACT

Characterizing the Climate Issue Context in Mexico:
Reporting on climate change in Mexican newspapers, 1996–2009

by

Jaime Sainz-Santamaria

Mexico stands out as an exception in the climate policy arena. In 2012, the Mexican government legislated a long-term greenhouse gas emissions reduction target, a feat which other large emerging economies (and many industrialized countries) have not been able to match. An analysis of newspaper coverage of climate change in Mexico from 1996 to 2009 offers insight on the issue context within which Mexico pursued its unilateral action. Like in many developing countries, climate change news coverage in Mexico increased steadily over the 15-year study period, with a significant increase in attention to the issue in 2007. Initially, news coverage of climate change in Mexico was dominated by framings tying climate change to weather patterns and adverse impacts at national and sub-national levels. As news coverage of the climate issue matured, there was an increase in frames linking climate change to domestic economic and energy concerns. A review of the secondary literature on climate change news coverage in other countries in the Global South suggests this domestic focus, in discussions both of climate impacts and of greenhouse gas emissions drivers, is unusual and may offer some insight into the antecedents of Mexico's climate policy leadership.

Senior thesis formatting guidelines

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In every field, professional communications (journal articles, grant proposals, environmental impact reports, or whatever) are structured in accordance with specifications that are more or less clearly spelled out and more or less widely known. These specifications vary in their details from field to field, and indeed between sub-fields or kinds of communication within a field. Nevertheless, they govern every professional communication, and this thesis is no exception.

Rules or "conventions" for format and structure serve at least two purposes. For the author, they insure that at least some specified range of material is covered and included, and that important elements from that range are not totally left out. For the reader, they create clear expectations for the kind and form of information to be presented, so that it may more easily be located and taken in.

The following is the format that must be followed for the senior thesis in Environmental Studies.

Layout and Formatting Specifications

The physical specifications for the senior thesis are as follows:

Spacing:

The text of your thesis is to be **double-spaced**. Tables and material in the appendices, and certain quotations (see 10.3 for more information) may be single-spaced as appropriate.

Margins:

Leave margins of one inch at the top and bottom, and 1.25 inch on the left and right sides to accommodate the binding (unless you're using a program like WordPerfect which has a "binding offset" feature—then leave one inch margins on both sides with an offset of 0.25 inch).

Pagination:

Number the pages in the "front matter" (abstract, acknowledgements and table of contents) with lower-case Roman numerals (ii, iii, iv, etc.) either centered at the bottom of the page, 0.5 to one inch from the bottom; count the title page as the first page but do not place a number on it.

Number the pages in the text (from the introductory chapter through the references) consecutively with Arabic numerals (2, 3, 4, etc.) either centered at the top of the page or in the upper right-hand corner, one inch from the top and 0.5 inch above the first line of text.

Label each appendix consecutively with a letter of the alphabet (Appendix A, Appendix B, etc.) and number the pages of each appendix with a combination of the appendix letter and the page number (pages A-1 through A-4 in Appendix A, pages B-1 through B-2 in Appendix B, and the like); center the page number at the bottom of the page.

Printing:

The final draft of the thesis is to be printed on a letter-quality computer printer. Use a printface and font size similar to that in this manual; do not print the thesis in italics, script, or any other non-standard printface. Double-sided printing is acceptable.

Photocopies:

You are expected to keep the original copy of your thesis and to submit high-quality photocopies to your advisor and to the Environmental Studies Program. To minimize paper consumption, photocopies are to be printed on recycled paper and are to be two-sided. Lay out the thesis with blank pages if necessary so that the abstract, the table of contents, each chapter, the references, and each appendix begin on the right-hand page—like this manual.

Binding:

The final draft is to be bound in a clear plastic cover with the title page showing through, with a binding strip down the left side.

Using graphics

While much of any thesis will consist of the words you write, usually a strong thesis will also make careful use of visual elements, recognizing that we process information visually as well as verbally. Visual tools can be as simple as white space on a page, setting off an indented list or indicating the breaks between sections of a chapter. **Illustrations** are more complex tools, divided into two categories and labeled as such: information (as numbers or other forms of data) organized into an array of rows and columns is called a **table**; any other illustration (a map, photograph, drawing, histogram, line graph or any other kind of chart) is called a **figure**. Illustrations can present data more economically than mere words, can show relationships more clearly, and can show the essence of complex data precisely and clearly.

Organizing your data visually is useful not just for your readers; it can also help **you** make sense of what you've found. In fact, many scholars **begin** writing by constructing their tables and

figures. Once they know what their graphics show, they can figure out what else they need to say.

Tables and figures for many writers and readers are the guts of the paper and must be able to stand alone: In other words, they must make sense to a reader who turns directly to them without reading the surrounding text, as many readers of technical documents are apt to do. The caption or title must explain precisely and fully what is being presented. All key elements (x-axis and y-axis, rows and columns, etc.) must be clearly and fully labeled; make a legend or key if necessary. The table or figure must also be cited.

At the same time, each illustration must also be tied into your text by a reference to it at the place where the illustration is most relevant. Your reference may be parenthetical (Figure 1) or may be written into the text as below: "In Figure 1, the hourly averages for..."

You are encouraged to construct your own graphics, using data you have collected. If you find an illustration in one of your sources that you want to use—a map of the region you are studying, for example, or a table crammed full of data relating to your topic—you are encouraged to *adapt* it, redrawing the map to include only those features relevant to your topic, for example, or selecting from the table the most relevant data. If you decide to photocopy an illustration (a photograph, for instance, or some other key visual), *do not* include the caption and table or figure number provided by your source; write your own caption.

Citing Tables and Charts

If you reproduce an illustration from a source, if you adapt an illustration from a source, or if you create your own graphic using data from a source, your illustration must include a citation of that source. Place the citation at the very bottom. You will also need to include a full reference to the source in your list of references at the end of the thesis, even if you cite it nowhere else.

If you have reproduced an illustration exactly, cite it as follows:

Reprinted from Author's Last Name (Date).
Example: Reprinted from Johansen (1984).

If you have adapted the illustration, cite it as follows:

Adapted from Author's Last Name (Date).
Example: Adapted from Flavin (1987).

If you have constructed the illustration to present data from a source, cite it as follows:

Data from Author's Last Name (Date).
Example: Data from Flavin (1987).

Tables must be numbered consecutively (Table 1, Table 2, etc.) from the beginning of your thesis; table number and caption are placed above the table; citation to the source (if any) is placed below the table. Figures are also numbered consecutively (Figure 1, Figure 2, etc.) from the beginning of your thesis; figure number and caption are placed below the figure; citation to the source (if any) is placed below the figure number and caption. Tables and figures are listed separately in the "Table of Illustrations" at the front of your thesis, behind the Table of Contents.

Quotations

There are three ways of using the work of another: direct quotation, paraphrase, and summary. In good research writing, direct quotation is used very rarely, only when the language of the source itself is essential for the point you are making (as, perhaps, in a law enumerating a list of activities which are required or prohibited, or in a statement by a public figure which becomes part of a controversy) or when the author's statement is exceptionally clear or powerful.

Short quotations are, of course, enclosed in quotation marks, and they must be embedded within part of a sentence of your own, as in this example: "There are some who can live without wild things, and some who cannot. These essays are the delights and dilemmas of one who cannot" (Leopold, 1986, p. xvii). Longer quotations (of more than three lines) should be block indented five spaces and single-spaced. The block indentation indicates that it is a quote, so quotation marks should not be used:

> Like winds and sunsets, wild things were taken for granted until progress began to do away with them. Now we face the question whether a still higher 'standard of living' is worth its cost in things natural, wild, and free. For us of the minority, the opportunity to see geese is more important than television, and the chance to find a pasque-flower is a right as inalienable as free speech. (Leopold, 1986, p. xvii)

A paraphrase, which is used a little more often than direct quotation, restates the ideas of the passage in the researcher's own words. By far the most common use of a source, especially in scientific and technical writing, is the summary, which condenses the relevant point into a few words: Leopold (1986) argues for the value of wild things. Often several sources which converge on the same point can be summarized in the same sentence: Keller (1987), Manalis (1988) and McGinnes (1989) all argue for the value of the senior thesis. Be sure to include transitions before, and explanations after the quotes. Explain why the quote is important and why you have included it, so the readers see the connection between your ideas and the ideas presented in the quote.

ES Senior Thesis Evaluation Criteria

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Evaluation - Substance

- Does the author present a focused and interesting research question or puzzle?
- Is the broader significance of the research—to scholarly work and real world events—clearly discussed?
- Does the author demonstrate a solid intellectual grasp of the topic and take a critical stand on alternative approaches and explanations?
- Is the research design appropriate given the research question?
- Does the author use a variety of sources, including primary sources?
- Is the evidence balanced and adequate to support the argument?
- Is there a clear pattern of analysis and insightful interpretation of evidence?
- Are the larger implications (practical, theoretical, conceptual, methodological) of the research discussed?
- Does the thesis make an original contribution to important theoretical or political debates?

Evaluation – Presentation

- Is the thesis cogently organized?
- Is the writing clear and effective in presenting the argument and evidence?
- Are all sources, documents, and interviews adequately documented?
- Does the thesis follow academic conventions for notations and bibliographic references?
- Is the thesis void of grammatical and typographical errors?

Environmental Studies Senior Thesis Advisor Contract

This form is intended to inform the Environmental Studies Program Office of your commitment to advise a senior thesis in Environmental Studies for the following student:

_____
Student's name

_____

_____
Intended thesis topic/Tentative thesis title

By signing this contract, you indicate your agreement to work as the student's senior thesis advisor. This entails:

- Providing substantive guidance on the project;
- Advising the student throughout the entire writing process (beginning from when this contract is signed until the completion and submission of the thesis in May of the following year); and
- Meeting regularly with the student during the fall, winter and spring terms to assess progress and offer guidance.

_____
Advisor's name

_____
Advisor's signature

_____
Advisor's department/affiliation

_____
Date