

DRAFT SENIOR PROJECT AND PROFESSIONAL DOCUMENTS MANUAL



**College of Agriculture, Food and Environmental Sciences
Natural Resources Management & Environmental Sciences
Department
California Polytechnic State University
San Luis Obispo, California**

2010 Edition

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Preface

This manual is intended for use by those individuals concluding their coursework in the Environmental Management & Protection and the Forestry & Natural Resources Management & Environmental Sciences curricula, as well as those students taking courses requiring a formal typewritten professional document. In order to facilitate the varying needs of those students, this document is divided into five sections. The manual itself is written following the style guidelines presented within. If at any time you are not sure of how something is to be presented, the manual can be used as a guide to answer your questions and ease the writing of your document.

While the layout and overall style of both the Senior Project and professional document may be similar, the underlying contents differ, as well as their structure. Nevertheless, this manual will provide you with the “how to’s” of structuring a Senior Project or professional document, and is provided as a guide to ease the progress of your report and answer some of the most common questions when it comes to writing a formal manuscript.

The basic reference style manual for Senior Projects is the 2010 Edition of the American Institute of Biological Sciences *BioScience* Style guide.

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SECTION 1: SENIOR PROJECT REQUIREMENTS

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Part I: Project Preparation

Introduction

The Senior Project requirement (NR 461) for the Natural Resources Management & Environmental Sciences (NRES) Department is designed to give students experience in identifying a resource issue, researching the problem and developing practical means for solving the problem. The project can include an experiment, field research, library research, or a combination of any of the aforementioned. In any case, the Senior Project is an independent study using a faculty advisor, of your choosing, for guidance. The outcome of the student's research effort should be a coherent, logically organized Senior Project. Specific library requirements for Senior Project format and submission to the library can be found in Section 4, Part II.

As an alternative to the undergraduate Senior Project, NR 412, Forest and Natural Resources Senior Assessment Project, can be taken during the student's final year as an undergraduate at Cal Poly. Please keep in mind that NR 412 is only offered during fall quarter. This course provides the student with a variety of topic discussions including but not limited to: integrated sampling and inventory of resource values in forested ecosystems, comprehensive timber harvest planning, watershed and wildlife management applications, and statistics, all culminating into a final student project report, which takes the place of the student's Senior Project. In NR 412, the contents of the student's Senior Project will be determined by lecture material and lab assignments as presented by multiple faculty members in the NRES Department. Typically, the final report is a compilation of lecture and lab modules presented by the faculty and their associated assignments. If you are interested, consult with your advisor or the course instructor for more information.

Definition of Senior Project

The Senior Project in the NRES Department at California Polytechnic State University is a study, research effort, or experiment that involves the management of natural resources, and culminates in a formal report. A Senior Project must be selected and completed by each student (NR 412 can be substituted) under a minimum amount of supervision prior to the receipt of the Bachelor of Science Degree in the NRES Department.

Choosing a Subject

In selecting a specific topic, you should draw from experience, issues, and concerns found in natural resources publications, or from consultations with professionals in the field of study. The file of previously submitted projects in the Library may be of help in choosing a topic.

In general, students tend to select topics that are too broad in scope or too complex for the limited time available; this is where consultations with your advisor can be helpful. Internship, summer employment, and Cooperative Education experience opportunities often provide interesting topic areas for Senior Projects. The grade for your Senior Project is not judged on the size or complexity of your document. The problem chosen, therefore, should be as compact and clean-cut as possible.

Study Plan

1. **Select a topic** for study or research and consult with your Senior Project Advisor. Set up regular discussion/review periods with your advisor for the duration of the Senior Project.
2. Write a **brief statement** of how you plan on using the topic to complete your Senior Project requirement. Include a justification for the project (the need for and benefits of the proposed project).
3. Develop a **title** for the project (i.e. group of key words that clearly indicate the essential considerations of the study)
4. Identify and describe the **setting** for your topic/research area (e.g., location, study area, region, etc.).
5. Define the **objectives** for the project, which are action items necessary to complete the project. They are achievable, measurable, and time specific.
6. **Organize** the tasks into a logical sequence of events for completion (flowchart of activity). Develop an **outline of activities** for everything you need to do to complete the tasks identified. Walk through the project in your mind so you don't overlook major points or significant details that need to be addressed.
7. Estimate the **time** it will take you to complete each task and the **cost** of materials necessary to complete each task (e.g., typing, paper, supplies, mileage, duplication, etc.). Include those items in the budget section of your proposal.
8. **Study Approach** (Procedures): Indicate how all information and data are to be obtained. The study approach or procedures are the means by which the objectives are completed. If your project requires the collection and analysis of field data, an experimental design may be necessary. Consult with your advisor or a statistician.
9. Itemize all materials required and other expenses anticipated specifically for your project (books, duplication costs, gasoline, typing, maps, etc.). Costs will be paid by the student unless other arrangements are made well in advance. Keep all records/receipts for all items purchased, and include these items in a budget.

10. Collect necessary **information** for your Senior Project through library study, field experimentation, and correspondence and/or personal contact with individuals who have experience in the topic you chose.
11. **Organize and analyze** the information you collected.
12. **Organize your results** for typing as concisely as possible as described in the Senior Project Manual.

Registering for the Senior Project

You, the student, will be allowed to enroll in NR 461 when your Senior Project advisor has approved your proposal prior to registration. NR 461 is the typical course taken by students to meet the Senior Project requirement. One to two quarters prior to registration in NR 461, a student should be researching possible projects, and keeping in touch with their faculty advisors. The quarter before registration in NR 461, the student must write a draft proposal of what their project will entail. After the draft proposal is reviewed by an advisor, the student will then write a formal proposal, and submit it to the faculty advisor at least one week prior to the end of the quarter proceeding when the student will be enrolled in NR 461. Once you have your approved proposal, signed and dated by your Senior Project advisor, they will issue you a permission number to add NR 461.

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Part II: Procedures and Deadlines

Project Proposal

You are required to prepare and submit a proposal to your Senior Project advisor prior to signing up for NR 461. You will propose a topic area for the Senior Project and a description of how that project will be implemented. The description will include, at a minimum, the topic area of study and the physical location for the research project (if applicable), procedures, timeline/flowchart for activities and cost estimates. A sample timeline/flowchart and cost estimate page is provided for you in Appendix J.

Grading Requirements

It is the expectation of the faculty that you will complete your Senior Project in the quarter you enroll in the NR 461 course. The normal grade at the end of one quarter will be an A, B, C, D, F, or U. Unusual circumstances, documented to be beyond your control, resulting in non-completion of the project may result in an incomplete (I).

Although the specific requirements and breakdown for grades may differ among faculty advisors, the following list represents generally what you can expect to be graded on:

- Adherence to the specified style guide
- The project is free of all spelling and grammatical errors, is clear and concise, and is written without “conversational” language
- A defined issue or problem, with specifics of why that particular issue needs to be dealt with
- Project includes a project area and description
- Project incorporates the needs of the community
- Student develops, and follows through with, manageable goals and objectives to complete the project
- Student develops adequate findings, conclusions, or suggestions

Preliminary Draft

A preliminary draft of the final report must be typed and submitted to your advisor no later than the eighth week of the quarter in which you registered for NR 461. Discuss the specific date and time with your advisor.

The preliminary typewritten draft, from the standpoint of English composition, should be as complete as possible. It should be free from spelling, grammatical, and formatting errors. The document is your responsibility.

Final Project Report

The final report must be submitted and accepted no later than the tenth week of the quarter in which you are registered for NR 461.

Failure to submit either the preliminary report or the final report when due will result in a grade of Incomplete ("I"). If a student currently holds an "I" in NR 461, and intends on completing the Senior Project during a subsequent quarter, they **SHOULD NOT** reregister for the course! They must complete the project as soon as possible in order to receive a grade change. If NR 461 is not completed during the quarter in which you originally registered for the course, you must complete the project within one year of the original due date, otherwise the grade will automatically become an (irreversible) "F". Under those circumstances, the student would need to retake NR 461, using a new project subject.

A student may take the course over again if they received either a "D" or "F" on their Senior Project report. A grade of "C" or better may not be retaken.

Part III: Project Submission

Grading

1. Senior Projects are typically completed and turned in by the end of last week of classes (before finals week begins).
2. The student should print out one unbound copy of their Senior Project, printed on high quality paper, and turn it in to their faculty advisor by the specific due date.
3. Each faculty member's specific standards and requirements are slightly different. Please make sure that you discuss the grading requirements and project submission requirements in depth with your advisor at the beginning of the quarter.
4. The faculty advisor will have the project graded no later than the first Tuesday following finals week (when all grades for all courses must be submitted).
5. The student is responsible for picking up their final document from their faculty advisor, unless other arrangements have been previously made.

Library submission

Additional library submission requirements, guidelines, and resources can be found on the Robert E. Kennedy Library website: www.lib.calpoly.edu/seniorprojects. Information located in this section has been adapted from the requirements listed on the Robert E. Kennedy Library website, listed above. *Note: Submitting your Senior Project to Kennedy Library is not required, it is merely an additional resource to have your project viewed by a variety of people, organizations, and employers in the future.*

Step 1: Get a cashier's receipt

- Pay the Senior Project library submission fee (cash or check only) at the Cashier's window in the Administration Building (Building 1, first floor), or online through the Cal Poly portal by e-check or credit card (MasterCard, American Express, Discover, or Diner's Club; **not** Visa)
- Make sure that you get 2 copies of the receipt: one to be attached to the Senior Project Requirement Form, and one to be kept with your own records.

Step 2: Download and fill out the Senior Project Requirement Form

- You can find the form at:
http://lib.calpoly.edu/seniorprojects/seniorproject_reqform.pdf
- You must fill out Sections I, II, and III.
- Please keep in mind the following requirements when filling out the form:
 - Enter the author(s) name exactly as it appears on the title page.
 - If more than one author, list them on the form in the same order as they appear on the title page.
 - Use the same title as on the title page.
 - Enter the full name of the department, not the abbreviation.
 - Sign the form in the appropriate area.
 - Please print one copy of the completed form for the Kennedy Library (the NRES may require additional copies of the form; speak with your advisor for the most updated information).

Step 3: Deliver the final product to the NRES Department faculty advisor.

- At this point, Sections I, II, III, and IV of the form should be completed, including both the student and advisor's signature.
- Give the Senior Project Requirement Form, the cashier's receipt, and your completed Senior Project to your NRES Department faculty advisor.
- Your advisor will grade your final document. If/when they approve your project; they must fill out all of Section IV of the requirement form. The faculty advisor signature is required on all requirement forms in order for your Senior Project to be processed and accepted into the library database.
- The signed Senior Project Requirement Form, with the cashier's receipt attached, must be forwarded to the library for the Senior Project to be approved and officially added to the database.

Step 4: Upload your advisor-approved Senior Project to the library submission website: *DigitalCommons@CalPoly.edu*.

- Once your advisor has graded your project and signed the Senior Project Requirement Form certifying that your project is complete, you may then upload your document to the library database: *DigitalCommons@CalPoly.edu*.
- Specific guidelines for uploading your Senior Project can be found in the "Electronic Senior Project Information Packet," which can be downloaded as a PDF from *www.lib.calpoly.edu/seniorprojects*.
- If you need assistance in uploading your Senior Project, please contact Karen Beaton, Library Acquisitions (room 104 Kennedy Library) either by appointment, or via email at *senior.project@lib.calpoly.edu*.

- If the student uploads their document to the database before the advisor has forwarded their approval and cashier's check to the library, the document will be held on file (but not available for viewing) until those records are processed.

Step 5: Senior Project is made public on the *DigitalCommons@CalPoly.edu* site.

- The library will make the Senior Project publicly accessible on the web. The student should receive an email notification when their paper is available. Robert E. Kennedy Library will create bibliographic record in the library catalog.
- Paper versions will no longer be accepted by Kennedy Library. Microfiche copies will no longer be made, or provided to departments.

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SECTION 2: DOCUMENT STANDARDS

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Part I: General Document Information

Writing Information

Write to inform the layperson (i.e., someone who is not part of the profession and may not understand highly technical terms). This will reflect confidence in the written presentation and ensure that material presented is not too difficult to comprehend. This will also reflect positively on your oral presentation (should one be required). The more familiar with your topic you are and the less detailed you keep the subject matter, the more professional your document will become.

Senior Project Outline Inclusion

1. Senior Project Requirement Form

This form must be completely filled out, signed by both the student(s) and the academic advisor, and paper clipped on the top sheet of the student's Senior Project.

2. Copyright Page

It is optional to register your Senior Project with the Copyright Office. If you would like to do this, please see the Library Submission section of this document. When you have registered your project, place the copyright symbol (©) on the back side of the Title Page.

3. Authorization for Reproduction Form Page

This page is optional. If you would like to give permission to have your document reproduced in the future, you must right a statement stating your agreement, and then sign it. An example can be found in Appendix D.

4. Title Page

The following information is generally found on a title page (an example can be found in Appendix B):

- Title (of report): A meaningful group of words (approximately ten) that clearly

indicates the essential consideration of the project. Use title or headline capitalization: Capitalize all words in the title except for prepositions, coordinating conjunctions, and articles (unless any of these are the first or last word in the title). There is no period at the end of the title.

- Submitted To: The university and department which the project is being presented to.
- Author(s): Name of person(s) submitting the report. Do not refer to the author(s) by his or her formal title. If the author's name has a unique spelling, follow the author's lead in terms of capitalization and spacing.
- Date: The month and year that the project is complete.

5. Abstract/Executive Summary

In general, this section of a document is typically referred to as an Executive Summary or Abstract. It is imperative that it provides adequate information without being wordy; some individuals (executives) may only read the summary or abstract provided.

- An abstract is a brief statement of the essential material of the report, which contains the purpose of the study, its relevance and the results. It is a complete paragraph(s) that can stand by itself.
- It is expected to be about 150 words in length, and may not exceed one page.
- It is used as a quick overview of the document and a refresher of the main points.
- Appears on a page by itself.
- It is the most important single element of the proposal. Most often used without the proposal.
- In general, it should be written last. Flesh it out as the document is written.
- It should answer the questions raised within the formal document [problem(s)/Issue(s)/Concern(s)].

6. Acknowledgements

- Keep acknowledgements brief (about 100 words).
- Include grant information or disclaimers in this section.
- Place the Acknowledgements at the beginning of the document.

7. Preface

The preface (if appropriate) is typically a brief essay dealing with the purpose and scope of the project. It is not a necessary item. It is included when the reader needs additional information prior to reading the document. Please refer to the Preface of this manual for additional information.

8. Table of Contents

The table of contents identifies the major sections of the document. The number of levels

depends upon the type of information being presented. Three levels are appropriate for detailed presentations. Please refer to this manual for examples and format.

9. Introduction

- Used to introduce subject.
- Start with what is being assessed:
 - The problem, its origin, cause or stimulus. This demonstrates comprehension of the subject matter to the reader.
 - Background and/or source of problem (Context). Reflects careful planning. This may be a section by itself. Background information will generally include:
 - Project Description
 - Site Location (when appropriate)
 - Site Description (when appropriate)
 - Identify the study area and/or group/population, etc.
 - Present a clear statement of Purpose and Need for the project. Need should reflect public interest/concern(s), etc.
 - Arrangement of the text. Show how the sections are organized, and how this is important to the reader or in how your material is presented.

This is information that introduces the assessment to the reader. It is written to inform the layperson. Below is a list of topics that would help orient the reader, however not all of them may apply to all projects. Only include information that is relevant to your Senior Project.

- Purpose, Need, Concern, Problem, etc.
- Background. Include the origin and background of the problem, and its cause or stimulus. Sometimes this is a section by itself.
- Description of Study Area or Region
- Geographic Location
- Vegetation and Animal Life
- Physical characteristics
- Topographical
- Temperature and Precipitation
- Archeological and Historical Sites
- Social and Cultural Habits and Customs
- Existing Land and Water Uses
- Arrangement of Section

Problem Statement: Define issue(s), concern(s), etc. that you are going to assess. It is sometimes easier to initially draft this as a question.

- Questions raised for inquiry, consideration, or solution.

- A proposition stating something to be done.
- An intricate, unsettled question.
- A source of perplexity, distress, or vexation.

Questions to ask:

- As a consultant/researcher, what do I need to accomplish to carry out this project?
- What knowledge base is necessary?

The statement is your interpretation of what needs to be done to solve the problem. The statement should reflect the interest/desires of the concerned group/agency. This may require special research to determine what objectives, interests, and desires your group or agency may have.

- It should state in a general way, the importance, significance, or purpose of the assessment.
- It should include the scope of the project, problem solution(s), or justification of the project.

10. Objectives

Objectives are sometimes confused with goals. In general, the goal is the finished product, i.e., your research assessment report. Objectives are means to obtain that goal. Your objectives may be to identify the problem, collect preliminary information related to the problem, develop a research design to collect relevant data, etc.

- Sometimes it is important to state your goal, and then factor out the objectives.
- Objectives are precise statements that can be accomplished in some achievable timeframe
- They could be questions that need to be answered, problems that need to be solved, issues that need to be resolved, etc.
- Distinguish between long-term and short-term goals and objectives.

11. Procedures and Methodology

Definitions:

- Procedure: To begin and carry-out an action or process.
- Methodology: The principles, practices, etc. of orderly thought or procedure applied to a particular problem and arrived at by systematic analysis and application of the techniques of logic.

This section is the heart of a professional document, and can include your sampling design, flowchart for completing your objectives, and related research. Include the rationale for your assessment in logical order. Describe the methods employed in the sequence they occurred.

- It is your research design, methodology, and procedures. It is how you have implemented your assessment. Make sure you are:
 - Clear on your focus.
 - Able to define limits of your project research.
 - Detailed about the schedule of events that took place during the assessment.
- Identify resources that were available.
- Identify assumptions made, if any.

12. Analysis and Results

This is where you present and explain how you analyzed your data and findings. It may include one or more of the following:

- The data needed and obtained.
- Adequacy of the designs and sampling procedures.
- How the data was obtained (field research, library, etc.).

It is important to make clear the connection between your objectives, methodologies, and the results. To make this connection evident, you may want to include:

- Resources
- Assumptions
- Evaluations, and
- End product(s)

13. Discussion

After you have reported your results and analyzed them, you must discuss them in the context of the surrounding community or environment.

14. Conclusion

The final section of the main text of the document should be your final conclusions for the project you completed (if appropriate, your recommendations for future follow up).

15. References cited

Detailed examples and guidelines for references cited can be found in Section 2, Part IV. These include both in-text citations and citations for the section that follows the main body of the text.

16. Related Research and Citations

This section is not always necessary. It is typically used when one is trying to demonstrate that the research activities identified are superior to other research, or augments existing information. Generally, you will need to include:

- Background information completed.
- A summary of background literature/research for peer review.
 - Identify only 3 or 4 background information pieces that are on the edge of knowledge (state-of-the-art).
- Past work including literature review and summary of similar projects.
- Flaws of the earlier research, study, etc.

17. Appendixes

An appendix contains material that is useful for a detailed review appraisal of the study, but is not essential to an understanding of the text presentation. For example, the appendix may be used to place bulky tables, lengthy or detailed quotations, and standard methods of analysis or large figures. This material is available as supporting data even though the data may not be specifically utilized in the text. Note, however, that some reference to the fact that this data appears in the appendix must be included in the appropriate part of the text. A cover page should be used for each appendix. Always make sure material in the Appendixes section is referenced in the document! If you question whether it should be in the appendix or not, leave it out. Don't create a lot of bulk.

Appendixes are referred to by letter, e.g., Appendix A, Appendix B, etc. If an appendix contains several pieces of information, each piece is identified by a letter and number, e.g., Table A-1, Table A-2, and Table B-1. Thus, Table A-1 indicates that it is Table 1 of Appendix A and so on.

The Appendixes should be listed by letter and title in the Table of Contents. The student should refer to the Table of Contents of this manual for an example.

The Appendix or Appendixes (**not** Appendices) should be placed after the "References Cited" section of the manuscript. Appendix pages are numbered consecutively (refer to this manual).

Part II: Design and Typography

Font Style

Font size should be either 11 or 12-point font. The same font style should be used for the entire manuscript. Times New Roman is the standard font style used for formal reports.

Margins and Spacing

Top, right, and bottom margins should be one-inch minimum. The left margin is an inch and a half, and the right margin should be as even as possible. Tables and other illustrative material should also conform to this specification. All typing is within, and does not touch, the margins required. For pages beginning with a major heading, the heading would be centered on its own page. All text material should be double spaced line spacing. All graduate theses must be double-spaced.

Pagination

1. Small Roman numerals (i, ii, iii, etc.) are used in numbering all pages preceding the Introduction. They are centered between the margins, and five lines (three fourths inch) from the bottom of the page. The abstract page is not numbered. The title page is labeled as page i, but the number is generally not shown. See the numbering in the front of this manual.
2. Arabic numerals (1, 2, 3, 4, etc.) are used in numbering all remaining pages. Periods or hyphens should not be used with the page numbers. Numbers should be placed five lines (three-fourths inch) down from the top edge of the page and one inch in from the right-hand edge (the text begins a double space below the page number), or one half inch from the bottom of the paper in the center of the page.

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Part III: Document Style Guide

The following professional style guide has been adapted from the American Institute of Biological Sciences (AIBS) BioScience Style Guide.

Table of contents

All section, table, and figure headings should read identical in both the document text and the table of contents. All pages are counted, and the page numbers are placed correctly. Each figure and table is numbered consecutively according to its order of citation in the text.

Headings

SECTION HEADING

Each major heading should be placed on a new page. All letters in all words of major headings are to be in capital letters, bolded, and centered on the page. The font size should be large enough to appear prominent.

Major Heading

The first letter in each word of the major heading is capitalized, bolded, and centered. The font size should be equal to or smaller than the SECTION HEADING font. Leave two (2) spaces above and two spaces (2) below the major heading.

Sub-heading

Only the first letter of the first word of the Sub-heading is capitalized; the heading should be bolded and centered. The font size of the Sub-heading should be smaller than both the SECTION HEADING and Major Heading font sizes. Leave two (2) spaces above and two (2) spaces below the Sub- heading.

(Sub-sub-heading)

Only the first letter of the first word of the Sub-sub-heading is capitalized. The Sub-sub-heading should be bold, underlined, and oriented on the left hand side. The font size for the Sub-sub-heading should be the same size as the text (point 12 is normal). Leave two (2) spaces above and one (1) space below the Sub-sub-heading.

Paragraph side head. This heading, when used, is placed two spaces below the preceding text and is to be underlined. Only the first letter of the first word begins with a capital letter (except for proper nouns). Notice the heading is followed by a period. The typing of the text begins on the same line, immediately following the heading.

Style matters

Capitalization

- Capitalize a title if it precedes the name: *President Edward Jones*. Do not capitalize if the title follows the name: *Edward Jones, president of the Jones Corporation*.
- Capitalize trademarks and trade names.
- Do not capitalize in-text references to chapters, figures, tables, and other parts of a book.
- In titles, use lowercase for articles (*a, an, the*) and coordinating conjunctions (*and, but, or, for, nor*). The “*to*” infinitive is also lowercase.
- The formal names of office and departments are capitalized, but not shortened references to them (“*the Department of State,*” but “*state department*”).
- When abbreviating the name of a college degree, use caps (*i.e., BA*). When writing out the name of the degree, do not use caps (*bachelor’s degree*).
- Do not capitalize *federal* or *government* in such combinations as:
 - federal government
 - state government
 - US government
 - government agents
 - executive branch
 - federal courts
- Ethnic groupings do not follow a single rule:
 - black
 - Hispanic
 - Native American
 - white
 - Caucasian
 - Indian

- Latino
- African American
- In capitalizing hyphenated compounds, in a chapter title, for instance, always capitalize the first element and capitalize the second element if it is a noun or proper adjective or if it has equal force with the first element.
- Do not capitalize the names of seasons (winter, spring, summer, autumn, or fall)
- Use lowercase for equations, laws, theorems, and formulas:
 - van der Waals's equation
 - Newton's first law
 - the theorem of equal angles
 - Laplace's formula
 - the second law of thermodynamics

Italics

- Words from foreign languages and phrases or words not commonly used are set in italics. See *Words Into Type*, 3rd ed., for a useful list of italicized words and phrases, as well as the list of works at the end of this guide.
- Italicize the names of publications in text.
- Italicize all variables in equations.
- Italicize the genus and species of an organism.
 - Italicize the full Latin name when referring to an organism but not when the full name is not used (e.g., *Staphylococcus aureus* but Staphylococcus infection).
 - A genus name should be spelled out in the title of an article and on first mention in the abstract and text. After that, it can be abbreviated to the initial letter followed by a period and the species epithet. When two or more genera with the same initial letter are mentioned, use the initial letter for the first genus mentioned, and abbreviate the next genus mentioned to two or three letters, as necessary, to distinguish it from the first genus. Do spell out the full species name—genus and epithet—the first time that species is mentioned even if the genus, with a different epithet, has been introduced. For example, “Gardeners should know that *Porlieria chilensis*, *Proustia pungens*, *Plantagol hispidula*, and *Phyllottis darwini* are nice shrubs. It would be nice to have *P. chilensis* in your backyard, but *Pr. Pungens* and *Pl. hispendula* are hard to grow. Another nice shrub is *Porlieria augustifolia*. However, *P. augustifolia* doesn't grow well outside of Texas. No abbreviation should go beyond three letters, though “If *Salvelinus fontinalis* and *Salmo clarki* were discussed together, the former should be *S. fontinalis* and the latter should be written out in full, there being little saving in length with the abbreviation ‘*Salm.*’”

Lists

- Use bullets to set off lists in text, unless the introduction to the list mentions the number of items to follow, in which case numbers (followed by periods) should be used.
- If the list is composed of complete sentences, each entry is capitalized and followed by a period. Use no ending punctuation if the entry is not a full sentence.

Scientific names

The first time the common name of a species is used in the text it should be immediately followed by its scientific name, underlined or in *italics*, and in parentheses (e.g., the giant sequoia *Sequoiadendron giganteum* or *Sequoiadendron giganteum*). See Appendix G. Thereafter, the common name can be used without use of the scientific name.

When species are listed in tabular form for identification or catalog purposes, the scientific name (written in *italics*) should be included as well as the common name (Appendix A-7).

Punctuation

Apostrophes

- “*It’s*” is a contraction meaning it is. “*Its*” is a possessive and does not take an apostrophe.
- In decades and other plurals, do not use an apostrophe (“mid-1990s,” “a woman in her 40s,” “CD-ROMs”).
- Form the possessive of singular nouns by adding ‘s. Follow this rule whatever the final consonant (Exceptions: possessives of ancient proper names ending in *-es* or *-is*, the possessive *Jesus’*, and such forms as *for conscience’ sake*, *for righteousness’ sake*).

Colons

- A colon is commonly used to introduce a list or series. If a sentence follows the colon, the first letter is capitalized. If not, the first letter after the colon is lowercase.
- Do not use a colon if the list or series is a direct object or subject complement. For example:

The authors of the article are

Jane Doe, Cornell University
John Smith, Colorado State University

But

The authors of the article are as follows:

Jane Doe, Cornell University
John Smith, Colorado State University

- After a colon in the reference list, use an initial cap.
- Colons are used to indicate ratios (3:1)
- Use a semicolon to separate a series of items within a list if any one of them itself includes a comma, e.g., Treatments in the second fertilizer study were rates of 56, 112, and 448 kg ha⁻¹ N; 25 and 49 kg ha⁻¹ P; and 47, 93, 139, 186, and 279 kg ha⁻¹ K.

Commas and Periods

- In a series, use a comma before the conjunction (“*shoot biomass, root biomass, leaf blade or leaflet length and width, and plant height*” or “*Tom, Dick, and Harry*” or “*0.8, 2.1, and 3.9 kg*”).
- A comma is used between city and state. If the city and state appear in text, use a comma after the state as well (“*The convention was held in Crystal City, Virginia, last August*”).
- A comma follows the complete date when it is used in a sentence (“*The convention was held on 12 April 1999, in Crystal City, Virginia*”). Do not use a comma when the day is not included.
- Use no comma in dates (e.g., May 2000; 14 May 2000).
- Insert a comma after an introductory phrase of five words or more.
- If a dependent clause introduces a complex sentence, it is followed by a comma.
- Do not use a comma to separate “*not only this*” from “*but also that.*”
- “et al.” is not set off by commas in parenthetical citations (*Burke et al. 2003*) but it is in references—Burke TJ, et al. 2003.

Dashes

- The en dash is used to indicate continuing or inclusive numbers, such as dates, time, years, page numbers, or seasons extending over two successive calendar years (e.g., “*1997-1999,*” “*9:00 a.m.-3:00 p.m.*”)
- The end dash should not be used when the first number in a range is preceded by “from” or “between” (e.g., “*from 1892 to 1898,*” **not** “*from 1892-1898*”).
- Another use of the end dash is to show equivalence: “*mass-ratio range*” or “*river-floodplain ecosystem.*”

- The em dash is used to denote sudden breaks or abrupt changes: “*Will he—can he—win the prize?*” However, this is a frequently overused punctuation mark. Do not use an em dash when a comma will suffice. Please use “--” for the em dash.

Hyphens

- When proofreading pages, please note that a word with an internal, single-letter vowel at the end of a line should be divided after the vowel (if splitting the word between lines): *maxi-mum*, **not** *max-imum*; *oxy-gen*, **not** *ox-ygen*.
- A compound modifier preceding a noun is hyphenated: a *well-dressed woman* or a *built-in bookcase*. If the modifier follows the noun, it is not usually hyphenated.
- Do not use a hyphen when the first element of a compound modifier ends with “-ly.”
- Compounds formed with commonly used prefixes (“*pre*,” “*non*,” “*bi*,” “*micro*,” “*pseudo*,” etc.) do not take a hyphen, unless the closed combination might lead to confusion with another term (e.g., “*re-creation*” and “*recreation*”).
- Use a hyphen with fractions (“*three-fourths*,” “*two-thirds*”).

Parentheses

- If an entire sentence is included parenthetically, place the period within the parentheses. Otherwise, the period goes outside the ending parenthesis (if the enclosed phrase or sentence fragment ends the sentence).
- When referring to a panel in the caption to a figure or photograph, use parentheses around the letter used as a panel label: “(a)” and “(b),” **not** “a.” and “b.”

Periods

- Punctuation in display lists (where each item starts on a new line) depends on the content and context. If all the items are short, independent phrases, use no period. If any one of the items is a complete sentence, end each item with a period. If the list is functionally part of the introductory sentence, punctuate with commas or semicolons and a final period, just as you would if the sentence had no line breaks.
- Commas and periods come before a closing quotation mark, an asterisk, or a superscripted footnote number; semicolons and colons come after. Do not double periods at the end of a quotation, e.g., “Once is enough.”
- Do not use periods with such abbreviations such as PhD, BA, MA, or US (see “Commonly Used Abbreviations and Acronyms”).

Semicolons

- Use a semicolon to connect two independent clauses when the conjunction is omitted.
- Use a semicolon instead of a comma between items in a series if one or more items already include commas.

Spelling and grammar

Grammar guidelines

- The first letter is capitalized for Regions, Sections, or Groups of sites commonly associated together (e.g., Corn Belt, North-Central states, the Midwest, the South, the West, West Texas).
- Do not capitalize the adjectival form (e.g., midwestern practices, southern states, western Texas). Note the following distinction: the southeastern USA, but the U.S. Southeast.
- The first letter of genus and all higher taxa (e.g., family and order), but not lower taxa (species, subspecies, variety). Only the lowercase forms (species and below) are set in italic type.
- Trademarked names. Trademarks are adjectives and must modify a generic noun. It is a misuse of a trademark to pluralize it or to derive a verb or noun from it. Trademark symbols, such as ® and ™ can be used in conjunction with the text.
- The first word after a colon if it begins a clause not logically dependent on the preceding clause.
- Words specified by number, and so treated as proper nouns (e.g., Treatment 1, Day 2, Exp. 3, Year 4, No. 5 [but Paper No. 6]). Exceptions may apply within special fields (e.g., chromosome 6 and metaphase I).
- Any title of office immediately preceding a name, or representing a specific office. Do not capitalize titles standing alone without reference to the incumbent (the CSSA Editor-in-Chief, and the Editor-in-Chief of the CSSA).
- If a chemical name is to be capitalized (as in titles or beginning a sentence), begins with a Greek letter, a numeral, or a prefix in italics or small capitals, leave that unchanged and capitalize the next letter e.g., b-1-4-Glucose, p-Coumaric acid, and D-Glyceraldehyde.
- Words derived from proper names but now in common usage tend not to be capitalized (e.g., paris green, bunsen burner, petri dish; but Erlenmeyer flask).
- Common names, races, and market types of crops are not capitalized, even if the name comes from a proper noun (e.g., bermuda grass, japonica rice, pima cotton, spanish peanut, sudan grass).
- Months and days of the week are capitalized, but not seasons.

Remember to proofread your paper carefully prior to submission to your Senior Project Advisor. It is suggested that you use a spellchecker and that you ask someone to read it who has never seen it before to check for any problems.

Commonly misspelled words

A

aboveground (adj.)
acknowledgment
ad hoc (italics)
administration (not capitalized—"the Clinton administration")
agroecology
agroforest
agroindustrial
amphibia (n pl.)
analog
antisocial
a priori (roman)
appendixes (not appendices)
arboreta
Arctic (n) (the place, e.g., the Arctic or Arctic Circle)
arctic (adj.)
atmosphere (hyphenated atmo-sphere)
au courant (italics)
author (noun—do not use as a verb)

B

backup (n)
backward (not backwards)
baseflow channel
belowground (adj.)
benchmark
benefited, benefiting
bidirectional, bidirectionality
birdwatcher
breakup (n)
break up (v)
Bruce effect (n)
Bruce-effect (adj) (e.g., Bruce-effect paradigm)
buildup (n)
build up (v)

C

cannot

carry-over (n)

carry over (v)

catalog

clear-cutting

“co” words:

- coauthor
- codependence
- codirect
- coeditor
- coevolve

colony members

colonymates

countermark (n,v)

countermarking

chapter (lowercase)

cropland

D

database

data set

decisionmaker, decisionmaking

deep water (n)

deep-water (adj.)

dialogue

die off (v)

die-off (n)

dike

downside

downward (not downwards)

drawdown

E

Earth (capitalized only when referring as a name of a planet)

ecotourism

e-mail

ensure (except when referring to insurance)

ex nihilo (italics)

ex situ (italics)

F

face-to-face (adj. or adv.)

fall (n), lowercase for the four seasons in the text

field study (n)

field test (n)
field-test (v)
field-validate (v)
fieldwork
figure (lowercase in textual citations)
fine-tune (v)
fine-tuning (n)
first-order (adj.)
fish (referring to multiple individuals)
fishes (referring to multiple species)
floodwater
follow-up (n, adj.)
follow up (v)
foreword
former president Ford (no capital letter on *former* or *president*)
formulas (not formulae)
forums (not fora)
full time (n); full-time (adj. or adv.)

G

germ line (n)
germ-line (adj.)
germplasm (n)
gillnetting
grass roots (n)
grassroots (adj.)
groundwater

H

half-century
half-yearly (adj.)
Hemisphere (Western, Southern, etc.)
homologue
honeybee
humanmade
human-wildlife (adj.) (e.g., human-wildlife interaction)
hypothesis testing (n)

I

impact (n—do not use as a verb)
input
in situ (italics)
intergeneric
interrelated
in vitro

J

Jr. (Jr, without the period and after first and middle initials, in “References cited”; no comma precedes “Jr.”)

judgment

L

land cover (n)

land-cover (adj.)

land use (n)

land-use (adj.) (e.g., land-use management)

laypeople, layperson

life history

life span

lifestyle

log on

long-standing (adj.)

Long Term Ecological Research (LTER) Network; LTER program, LTER sites

M

macroeconomic

mainframe

makeup (n)

make up (v)

markup (n)

mate-choice (adj.) (e.g., mate-choice trials)

meltwater

memorandums

Middle East

Mideast

mid-1980s (no apostrophe before the “s”)

midweek

midyear

minima

mole rat

multimale (adj.)

N

nearshore

Neotropics

nestmate

New York City

“non” words:

- nongovernment, nongovernmental
- nonhistone
- nonhuman

- nonlinearities
- nonrandom
- nonsustainable

O

one-half (as in one-half hour)
ongoing
online (adj.)
order of magnitude
overexpress, overexpressing
overmark (n, v)
overmarking (n)
overrepresentation

P

pair-bond (n)
part time (n)
part-time (adj.)
pastureland
peacekeeping (n, adj.)
peer review (n)
peer-review (adj.)
per se (roman)
policymakers
policymaking
predator-response (adj.) (e.g., predator-response behavior)
preexist, preexisting
present-day (adj.)
problem-solving (adj.)
problem solving (n)

R

rained
rainforest
ranchland
real time (n)
real-time (adj.)
reassemble
reexamination
rethinking
risk-avoidance (adj.) (e.g., risk-avoidance response)
runoff (n)
run off (v)
right-wing

S

savanna
scent mark (n)
scent marking (n)
scent-marking (adj.)
scientist-author (n)
seafloor
seedeater
semiarid, seminaurel
sensu (italics)
shortcut
short-grass prairie
Shortgrass Steppe LTER site
short term (n)
short-term (adj.)
shrubland
sine qua non (italics)
snowmelt
snowstorm
streambed
streamflow
streamwater (n, adj.)

T

table (lowercase in textual citations)
taxon, taxa (pl)
third world
time scale (n)
time-scale (adj.)
trade off (v)
trade-off (n)
tropics
toward (not towards)
twofold (for numbers 11 and higher, use a numeral: for example, 21-fold)

U

underfunding (n, adj.)
under way (not underway)
UK (adj.)
United Kingdom (n)
United States (n)

W

wastewater
Web site

wild-caught (adj.)

work force

workplace

worldview

Z

zookeeper

zoologist

Abbreviations and acronyms

Abbreviations and acronyms

- The common abbreviations in Table 1 (below) do not need definition, nor do SI units or chemical element symbols. Place the list of the abbreviations that were used in the document after the abstract.
- At the first mention of a term, government agency, or group that is later identified by its acronym, introduce the acronym parenthetically—that is, “National Science Foundation (NSF).” If the term, agency, or group is not mentioned later in the manuscript, there is no need to show the acronym.
- If a term, agency, or group is better known by its acronym than by its formal name, use the acronym but spell out the formal name in the parentheses after the first use of the acronym—for example, “LTER (long term ecological research) Network,” “NOAA (National Oceanic and Atmospheric Administration).”
- Acronyms and abbreviations are set without periods.
- Do not abbreviate the words “*company*” or “*corporation*” in text.
- Spell out state names in text.
- Use the percentage sign (%) in Overview and peer-reviewed articles, but spell out *percent* in features and columns.

Commonly used abbreviations and acronyms

A

AD (anno Domini)—*place before the year (AD 1991)*

Agric. (Agriculture, Agricultural)

a.i. (active ingredient)

ARS (Agricultural Research Service)

ASA (American Society of Agronomy)

avg. (average)

B

BA, BS (bachelor's degree of arts, sciences)—*no periods are used*

BC (before Christ)—*place after the year (4000 BC)*

BCE (before Common Era)—*if BCE is used in place of BC, use in conjunction with CE (Common Era), not AD; unlike AD, CE follows the year*

e.g., (for example)—*spell out "for example" in the text; use "e.g.," parenthetically (note the use of a comma)*

C

CI (Cereal Investigation)

coef. (coefficient)

conc. (concentration)

CSREES (Cooperative State Research, Education, and Extension Service)

CSSA (Crop Science Society of America)

cv. (cultivar)

D

d (day)

Dep. (Department)

diam. (diameter)

dry wt. (dry weight)

E

EC (Enzyme Commission)

ELISA (enzyme-linked immunosorbent assay)

Eq. (Equation, Equations)

Exp. (Experiment)

F

Fig. (Figure, Figures)

fresh wt. (fresh weight)

FY (fiscal year)—*followed by a space and the four-digit year (FY 2000)*

G

g (gravity constant)
GIS—*geographic information systems*
GPS—*global positioning system*

H

h (hour)

I

i.d. (inside diameter)
i.e. (that is)—*spell out “that is” in the text; use “i.e.,” parenthetically (note the use of the comma)*
Inst. (Institute, Institution)
Int. (International)

J

Jr. (Junior)—*use “Jr.” (with the period) in the text and in the author bio section, but drop the period (“Jr”) in references; “Jr.” is never preceded by a comma (“Joseph Smith Jr.”)*

M

MA, MS (master’s degree in arts, sciences)—*no periods are used*
max. (maximum)
min (minute)
min. (minimum)
mo (month)

N

Natl. (National)
no. (Number; *Note that the abbreviation for number is **not** “nr.” Do use the “no.” abbreviation with a period after*)
NRCS (Natural Resources Conservation Service)

O

o.d. (outside diameter)
OTA (Office of Technology Assessment)

P

PI (Plant Introduction, Plant Identification)
PhD (doctorate)—*no periods are used*

R

Res. (Research)

S

s (second)

sp., spp. (species)—*use only for a genus name*

SSSA (Soil Science Society of America)

Stn. (Station)

T

TVA (Tennessee Valley Authority)

U

Univ. (University)

US (United States)—*spell out when using as a noun, use “US” (without periods) as an adjective*

US government agencies—*include US in abbreviations of US department names (“USEPA,” “USDOJ,” “USFWS,” and so on)*

USDA (United States Department of Agriculture)

USEPA (United States Environmental Protection Agency)

V

versus (v.)—*do not abbreviate (unless citing a court case) or italicize*

W

wk (week)

Y

yr (year)

Mathematics in type

Equations

- Put a space before and after most mathematical operators (the main exception is the solidus sign for division). For example, plus and minus signs have a space on both sides when they indicate a mathematical operation, but have no space between the sign and the number when used to indicate positive or negative position on the number line (e.g., $5 - 2 = 3$; a range from -15 to $+25$ kg).
- No space is left between variables and their quantities, or between multiplied quantities when the multiplication sign is not explicitly shown.
- No space is left between an expression and its power (or any superscripted or subscripted). No space is left after trigonometric functions. (Copyright © 1998. ASA.CSSA.SSSA, Madison, USA. *Publications Handbook and Style Manual*).

Numbers

- Spell out numbers one through nine, unless expressing a unit of measure. For example, “5 km” but “nine blackbirds.” For numbers above nine, use numerals.
- Follow the rule above for ordinal numbers, including centuries: “fifth century,” “11th century,” “21st century.”
- Do not use a comma to set off the thousand’s place (1000 through 9999), but do use internal commas for numbers 10,000 and up.
- When writing tables, the order is day/month/year: 2 January 2003.
- Express ratios in numerals.
- For decimal fractions less than 1.0, place a zero before the decimal point (0.7, not .7), unless the quantity never exceeds 1.00, as with levels of significance (“ $p < .04$ ”), probabilities, and so on.
- Use all digits in numeric ranges—6000-6009, **not** 6000-9.
- Spell out any number that begins a sentence.
- When two or more numbers in a sentence refer to the same category, and if one of the numbers is 10 or higher, use numerals for all items (“*That man has 3 shirts, 2 pairs of shoes, and 12 neckties*”).
- Use numbers for decades, with no apostrophe (“the 1950s,” not “the nineteen-fifties”).
- Standardize phone and fax numbers as follows: 202/628-1500.
- If a range of numbers in the millions is given, the word *million* must follow each number (“from 8 million to 12 million,” not “from 8 to 12 million”). The same rule applies to hundreds, thousands, billions, and so on.
- A singular noun always follows quantities of one or less (“0.75 *percentage point*,” “0.32 *second*”).

Units of Measure

- Express all measurements in standard SI units of measure (meters, not feet; kilograms, not pounds).
- Spell out the names of units when they are used in text without an accompanying numeric value (“The measurements were recorded in kilojoules”).
- In tables or figures, unit symbols may be used without accompanying numeric values to save space.
- When numeric values are given, use the unit symbol with a space between the number and the symbol, unless the value begins a sentence, in which case both the number and unit are spelled out.
- Ranges of numbers and their accompanying units are expressed with a single unit following the second number of the range (23 to 47 kV); however, the percentage sign (%) and other symbols that are closed up to numbers are repeated in a range (“from 33% to 47%).

Tables, figures, equations, and illustrations

BioScience style is to capitalize only the first word in figure and table titles (and subheadings), except for proper nouns. For figures, put panel labels in the upper left corner if feasible. Construct tables without vertical rules.

Please mark all figures, tables, illustrations, and equations with the author's name and number them all chronologically.

Tables

- A List of Tables is required on a separate sheet immediately following the Table of Contents. The caption of the table must appear on the List of Tables exactly as is used on the table.
- Keep all tables as simple as possible. They should be intelligible without reference to the manuscript.
- Each table should begin on a separate unnumbered page.
- The table follows the page on which it is first cited.
- Tables are numbered consecutively in Arabic numerals, i.e., Table 1, Table 2, etc. The table cited must always follow with a short summary of what the table is identifying, signifying or trying to convey.
- This convention includes titles (captions), headings, footnotes, etc. If a table must be continued on the next page, repeat the table number followed by the word continued, e.g., Table 9.5 (Continued). Repeat column headings also.
- Where a table is taken or adapted from another source, that source should be indicated below the table, e.g., Source: Smith (1976). The source is identified in the literature-cited section of your document.
- A table is cited in the text of your document as follows: Seventy five percent of respondents had a college degree (Table 1). Table 1 identifies the results of our survey.
- Place table notes at the end of the table, in this order: symbol indicators (no numbering), general notes, specific notes, and sources. Indent all notes, with run over lines flush left.
- General notes include any information that applies to the entire table, such as additional comments about data and definitions of terms. General notes begin with “*Note:*” (always singular, always italic).
- Specific notes apply to discrete parts of the table and are indicated by roman lowercase letters. The order of notes should be alphabetical and should correspond to the order in which a reader would encounter notes, reading from left to right, top to bottom.
- Source notes are expressed in author-date format if a list of references is given with the document. The full citation is included in the reference list. Source notes

begin with “*Source:*” (always singular, always italic). If material is adapted from another source, please credit it to that source in source notes.

Figures

- Photographs, maps, drawings, diagrams, and similar illustrative materials are designated as figures.
- As with the List of Tables, a List of Figures is required on a separate sheet immediately following the Table of Contents (but should be placed after the List of Tables).
- The figure follows the page on which it is first cited. Figures are numbered consecutively in Arabic numerals, i.e., Figure 1, Figure 2, etc.
- A figure is cited similar to a table; an example follows:
The conceptual framework used in this study is illustrated in Figure 1 and was adapted from Smith (1971).
- Figures should be easily comprehended without reference to the text.
- Where a figure is taken or adapted from another source, that source should be indicated below the figure, e.g., *Source:* Reed (1975). The source is identified in the “References cited” section.
- Axis labels and unit designators should be clearly marked, and all data should be in the same unit of measurement.
- If the figure is a photograph, please include a photo credit.

Equations

- When mentioning an equation in the text, refer to it as *equation 3*, **not** *equation (3)*, or simply (3).
- When “equation” is spelled out in text it is lowercased and there are no parentheses around the equation number.
- Displayed equations are indented.
- Not all displayed equations need to be numbered; number only if the displayed equation is referred to later in the text. If numbered, the number is put in parentheses, flush right.

Illustrations for project cover

- Artwork submitted for publication should be of the highest quality, if electronic, with a minimum resolution of 600 dots per inch (dpi) for black and white line art and 400 dpi for color at 4 by 6 inches for figures intended to run within the article. Use the same resolution at 8 by 11 inches for figures intended for the cover.
- Images for the cover of *BioScience* should have a vertical orientation. Multiple panels in a figure are labeled with lowercase letters in bold face.

Quotations

- The initial letter of a quotation may be changed to a capital or lowercase letter—without brackets—to make the quotation fit syntactically within the passage in which it appears.
- Make sure each quotation is properly attributed to its author.
- Periods and commas usually go within closing quotation marks, or exclamation points generally go outside the closing quotation mark (only when they are part of the quoted matter do they go inside).
- Use ellipses to indicate a missing word, phrase, or sentence within the quote.
- Do not use ellipses at the beginning or end of a quotation.
- Avoid wherever possible the use of *sic* in quotations. If a quotation contains an obvious misspelling, correct it. If the grammar is wrong, it can be corrected with a bracketed change: “The principle...were” may be edited as: “The principle[s]...were” or “The principle... [was].”
- Quotation marks should not enclose words or phrases after the expression *so-called*.
- For direct quotations of at least one complete sentence, include a page number (along with author and year) in the in-text citation.

References

The authority or source of any materials used, opinions for quotations expressed, and/or ideas borrowed must be given credit or acknowledged by you in the text or in literature cited. Make sure that all references cited in the text, tables, and figures are also listed in the references cited section. All references listed in the references cited section must be accurate as to author, title, date of publication, volume, page numbers, etc.

In-text citations

- Short quotations are included in the text in quotation marks. These references should appear in the References cited section of the manuscript
- Cite references in the text as follows: “*In their study of acid rain in the Northeast, Mahoney and Ricky (1993) found...*” or “*Acid rain afflicts the Northeast (Mahoney and Ricky 1993).*”
- Some instructors may require a page number for the reference also. If so, then the reference is shown as (Verneer 1968, pg. 72).
- Quotations over three or four lines should be single spaced and set off from the text by indentation. Quotation marks are unnecessary. The source of the quotation is indicated in the line preceding the quotation, e.g., *Jason (1990) stated:*

- Do not use commas between the author and year, but do use a comma between different citations for the same author and between different authors (e.g., *Mahoney 1993, 1994, Rickey 1995*). Multiple citations are listed in chronological order and use lower case letters to indicate separate papers by the same author in the same year (e.g., *Zar 1973, Giles 1994a, 1994b*). The letter “a” indicates that this particular reference was cited first in the text.
- For authors with the same last name, list the surname followed by their initials (e.g., *Wilson EO 1999, Wilson DS 2007*).
- For citations with three or more authors, give the first author’s surname followed by “et al.” and then the date: (Stromberg et al. 1994). Note that there is no comma between the name and “et al.”
- For organizations listed as the author in the References cited section, use an acronym for the in-text citations (NSF 2004), and spell out the organization’s name in the Reference cited section, preceded by the acronym in brackets: [NSF] National Science Foundation. 2004.
- For citations of US government agencies, use “USDOI,” “USFWS,” or “USCB” (because in References cite, we use the official name of the departments, which includes “US”).
- All in-text citations must match the reference section—make sure that each citation has an entry in the reference section and that all references are cited in the text. The style of *BioScience* is to delete references without an in-text citation.
- Citations of unpublished data are not allowed. If the chosen data come from an identifiable source, treat the data as a personal communication. If the data are the author’s own, no in-text citation is necessary.
- Personal communications are cited parenthetically in the text; they are not entered in the References cited section. Show name, affiliation, and date of the communication (*Thomas Chapin, Department of Biology, University of Maryland, College Park, personal communication, 15 October 2009*).
- A figure or table is called out where a source is cited, list the figure callout first, followed by a semicolon and the citation (e.g., *figure 3; Sparks et al. 2008*).
- Unpublished manuscripts:
 - Manuscripts that have been accepted for publication may be used as references.
 - If the date of publication is known—that is, if the manuscript is in the press—list the year of publication in “References cited” and in the in-text citation (e.g., *Foster and Aber 2003*). In such cases, list the year in the References cited section after the author’s name and enter “Forthcoming” after the publisher, if it is a book (e.g., *Foster DR, Aber J, eds. 2003. Forest in Time. Ecosystem Structure and Function as a Consequence of 1000 Years of Change. New Haven [CT]: Yale University Press. Forthcoming.*), and for a journal article where the volume and page numbers would be listed, had the article already been published (e.g., *IWC. 2003. Report of the scientific committee. Journal of Cetacean Research and Management 5 [suppl.]. Forthcoming.*).
 - If the date of publication is not ascertainable, use “forthcoming” in the in-

text citation: “(Heip et al. forthcoming).”

- Cite a full reference in the text as follows (*when a References cited section is not used*):
 - One book that addresses the issue of design of protected areas is *Continental Conservation: Scientific Foundations of Regional Reserve Networks*, by Michael Soulé and John Terborgh (Island Press, 1999).
- For in-text citations of court cases, please note the use of punctuation: (*Dycus v. Sillers*, 557 So.2d 486 [1990]) or (*Jeffries v. East Omaha Land Co.*, 134 U.S. 178 [1890]). (See Dykaar and Schrom 53[4] 2003, pp. 428-433.)

References Cited

- Entries in the References cited section are listed alphabetically. If a particular author has multiple entries, written alone and with coauthors, the order of the entries is as follows:
 - Works written solely by the author in question are listed first; if there are several such publications, list in order by date of publication, oldest first.
 - Two-author references go before references with three or more authors, regardless of the date; references with two authors are arranged alphabetically.
 - References by three or more authors are arranged by date, oldest first.
 - For a book with more than 10 authors or editors, use the first author’s name followed by “et al.”
- For journal articles or a chapter in a book, list the entire range of page numbers, for example: 1464-1467, **not** 1464-67.
- For journal articles in general, do not list the issue no., only the volume no.: BioScience 53: 703-714. If a season is listed, capitalize the season in parentheses: (Spring), etc.
- For book titles, technical reports, and online articles, use title or headline capitalization (i.e., all words in the title are capitalized except prepositions, articles, and coordinating conjunctions [unless any of these are the first or last work in the title], for example, “On the Origin of Species”; use an initial capital letter for journal article titles, book chapters, and meeting papers, for example, “The historic roots of our ecologic crisis. Science 155: 1203-1207.”
- Use an initial capital for the first word after a colon, for example, “Smithsonian science: First class on a coach budget.”
- Do not list the total number of pages in a book.

Examples of references cited

Book

Ehrlich PR, Ehrlich AH, Holdren JP. 1977. *Ecoscience: Population, Resources, Environment*. WH Freeman.

Book (edited)

Bartonek JC, Nettleship DN, eds. 1977. Conservation of Marine Birds of Northern North America. Academic Press.

Book (edition)

Peterson's. 1994. Peterson's Guide to Four-Year Colleges. 24th ed. Peterson's.

Book (volume)

Semlitsch RD, Ryan TJ. 1998. Migration, amphibian. Pages 221-227 in Knobil E, Neill, JD, eds. The encyclopedia of Reproduction, vol. 3. Academic Press.

Chapter in a book

Kauffman EG. 1984. The fabric of Cretaceous marine extinctions. Pages 151-248 in Beggren WA, Van Couvering JA, eds. Catastrophes and Earth History. Princeton University Press.

Dissertation

Clegg L. 1978. The morphology of clonal growth and its relevance to the population dynamics of perennial plants. PhD dissertation. University of Wales, Bangor, United Kingdom.

In-press reference

Samson DA, Werk KS. 2003. Size dependent effects in the analysis of reproductive effort in plants. American Naturalist. Forthcoming.

[Show year only if the author is reasonably certain about time of publication.]

Journal

Pool R. 1989. In search of the plastic potato. Research News 245: 1187-1189.

For references to the journal *Philosophical Transactions of the Royal Society*, use "Philosophical Transactions of the Royal Society of London, B"

Master's thesis

Bhan S. 1997. Growth of grass shrimp in a contaminated and uncontaminated site. Master's thesis. New Jersey Institute of Technology, Newark.

Newspaper

Knowlfsky N. 1998. Oil spill has massive effects on vegetation. New York Times. 29 March, p. B2.

Presented papers

Kleinman RLP, Hedin RS, Edenborn HM. 1991. Biological treatment of mine water—an overview. Paper presented at the Second International Conference on Abatement of Acid Drainage; 16-18 September 1991, Montreal, Canada.

Report

[USEPA] US Environmental Protection Agency. 1992. Characterization of municipal solid waste in the United States: 1992 update. Office of Solid Waste and Emergency Response. Report no. EPA/530-R-92-019.

Web site

- In parentheses, show the date the site was last accessed—the date you checked to make sure the site was still online—and the URL, separated by a semicolon. Do not use ending punctuation.
- If the web page has a title:
[USFWS] US Fish and Wildlife Service. 2000. Box score, endangered species. (7 January 2000; www.endangered.fws.gov/boxscore.html)
- If the web page has no title:
[CITES] Convention on International Trade in Endangered Species of Wild Fauna and Flora. (7 January 2000; www.cites.org/CITES.eng/append/species.html)
- Do not use “<http://>” in entries with “www”; retain “<http://>” if the web page address does not include “www.”

DRAFT

Part IV: Assembly

Paper

1. A good quality bond paper is required—not less than twenty-pound weight. Use the same kind and quality of paper throughout the report.
2. The paper must be regulation letter size, 8 1/2 x 11 inches. Diagrams, maps, or figures requiring more than one full page should be placed at the end of the document as an appendix.
3. A blank sheet of paper is placed at the front and back of each copy of the finished report (between the covers and the report).

Non-print materials

The inclusion of complex multimedia objects in a Senior Project is a possibility. Students who are interested in adding multimedia components to their projects are encouraged to work with their faculty advisor, or contact either Karen Beaton (Senior Projects Coordinator) or Marisa Ramírez (Digital Repository Librarian) in the Robert E. Kennedy Library.

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SECTION 3: APPENDIXES

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Appendix A: Sample Outline

THE MEASUREMENT OF THE RECREATIONAL BENEFIT AT LOPEZ RESERVOIR DETERMINED BY THE TRICE-WOOD METHOD

- I. Abstract
- II. Acknowledgements
- III. Preface
- IV. Table of Contents
- V. Introduction
 - A. The Project Area
 - B. Background into the Thrice-Wood Method
 - C. The Estimated Economic Benefit of Recreation at Lopez Reservoir
- VI. Procedure
 - A. Collection of Data
 - B. Classification of Data
 - 1. Visitors' Origin
 - 2. Number of Visitors per Party
 - 3. Length of Stay
 - C. Average Cost of Travel per Visitor Day
 - D. Adjusted Figure for the Average Cost of Travel in Relation to Predicted Cost
 - E. Computation of the Monetary Value of Recreation at Lopez Reservoir
- VII. Results and Analysis
- VIII. Discussion
- IX. Conclusion
- X. References Cited
- XI. Appendixes

Appendix B: Example Title Page

Enter Senior Project Title

A Senior Project
presented to
the Faculty of the Natural Resources Management & Environmental Sciences
Department
California Polytechnic State University, San Luis Obispo

In Partial Fulfillment
of the Requirements for the Degree
Bachelor of Science

by

Name of Author(s)

Month, Year

© Year Name of Author(s)

Appendix C: Sample Copyright Page

© 2009 Donald D. Bergan

Appendix D: Example Authorization for Reproduction Statement (optional)

AUTHORIZATION FOR REPRODUCTION OF SENIOR PROJECT

I hereby grant California Polytechnic State University and its agents the non-exclusive license to deposit and make accessible my Senior Project now or hereafter known. I certify that, if appropriate, I have obtained and attached hereto a written permission statement from the owner(s) of each third-party copyrighted matter to be included in my Senior Project, allowing open access and distribution.

I certify that the version I am submitting is the same as that approved by my advisor.

I agree to waive any privacy rights granted by FERPA or any other law, policy or regulation, with respect to this work, for the purpose of publication.

I retain all ownership rights to the copyright of this work. I also retain to use in future works (such as in articles or books) all or part of this work.

Signature

Date

Appendix E: Sample Title and Abstract

CAL POLY - CDF EUCALYPTUS ENERGY PLANTATION ON THE CENTRAL COAST OF CALIFORNIA

by

Donald D. Bergan

Abstract

This study was conducted to determine the growth and mortality results from the Cal Poly - CDF Eucalyptus Energy Plantation located on the Central Coast of California near the City of San Luis Obispo.

On the 17.5 non-irrigated biomass energy plantation, fertilization had little effect on survival and growth. The main factors on survival and growth were water (seasonal rainfall), location of plot, species, and spacing. Due to low amounts of rainfall after plantings, survival of newly planted seedlings was low. The best spacing for growth is 3 feet by 12 feet. The best productivity came from the species E globulus and E viminalis. Plots located on the lower level of the plantation, where soil depth and moisture amount is best, showed the best growth results.

Appendix F: Examples of Proper Use of Common and Scientific Names in a Professional Document

Blythe Ranch

The Blythe Ranch site is about 8 miles northwest of Paso Robles; descriptive characteristics are listed in Table 1. The predominant vegetation is a woodland mixture of individual trees and small stands of coast live oak and blue oak with an occasional valley oak (*Q. lobata* Nee) and it is interspersed with small areas of chaparral and open grassland. The soil under the two oak species is distinctly different even when the trees are in close proximity of each other with the coast live oak soil being decidedly sandier than the blue oak soil.

A resident herd of about 20 cattle grazed the site continuously during the study. Wildlife typical of the coastal area is abundant including mule deer (*Odocoileus hemionus*), pocket gopher (*Thomomys bottae*), ground squirrels (*Spermophilus beecheyi*), and several flocks of wild turkeys (*Meleagris gallopavo*).

Appendix G: Sample of Tabular Use of Common and Scientific Names

ANGIOSPERMS

SALICACEAE

<i>Salix lasiolepis</i> Benth	Arroyo Willow
<i>Populus fremontii</i> Watson	Fremont Cottonwood
<i>Populus trichocarpa</i> Torrey & Gray	Black Cottonwood
<i>Populus tremuloides</i> Michaux	Quaking Aspen

JUGLANDACEAE

<i>Juglans hindsii</i> Jepson	Hinds Walnut
<i>Juglans californica</i> Watson	California Black Walnut

BETULACEAE

<i>Betula occidentalis</i> Hooker	Water Birch
<i>Alnus rhombifolia</i> Nuttall	White Alder
<i>Alnus rubra</i> Bongard	Red Alder
<i>Corylus cornuta</i> (Candolle) Sharp	California Hazelnut

Appendix H: Acknowledgements

Acknowledgements

I would like to thank the faculty and staff in the Natural Resources Management & Environmental Sciences Department of California Polytechnic State University. This project was made especially possible with the help and dedication of Ellen Calcagno, Dr. Scott Sink, and Dr. Norm Pillsbury. I appreciate all of the time and work they put into helping me complete this manual, using only the most effective recommendations, tools, and resources.

My hope with this manual has been to guide students, with any project type, to complete a well written and formatted professional document which they might be proud to show peers and prospective employers in the future.

Sincerely,

Chelsea A. Bangert

Senior Project Manual Editor

Natural Resources Management & Environmental Sciences Department

Cal Poly State University, San Luis Obispo, CA

Appendix I: Sample Timeline for Study Plan

Timeline of Activities

Presence/Absence Study of Red Fox in Northern Cayucos

		7/1/09 - 7/6/09	7/7/09 - 7/12/09	7/13/09 - 7/17/09	7/19/09	7/20/09 - 7/24/09	8/09	8/09	8/09	8/09	9/5/09	9/8/09 - 10/13/09	10/15/09 - 11/30/09	12/19/09 - 1/7/10	2/1/10 - 3/1/10	4/1/10
	ACTIVITY/TASK LIST															
<i>Before Data Collection</i>	Write-up SP proposal															
	Fill-out necessary paperwork															
	Set-up meeting with SP advisor, discuss project															
	Final approval of SP															
	Set-up weekly meetings with SP advisor															
	Refer to SP manual for proper instructions and format for SP progression															
	Preliminary research of topic area															
	Library research															
	Phone contact															
	Preliminary fieldwork with advisor supervision															
	Develop formal outline and introduction to project															
	Formal outline and introduction approval by advisor															
	Obtain necessary equipment															

Appendix J: Sample Executive Summary

Executive Summary

The Environmental Assessment (EA) prepared for Hearst Development Phase III, 18-hole golf course and associated facilities, presents and analyzes the potentially significant environmental impacts associated with the Hearst Development proposal. The proposed project site is located north of Cambria on the West side of Highway 1 in San Simeon, adjacent to San Simeon Point. This document addresses the project's environmental setting and environmental consequences under the environmental impact section of the document, and the project alternatives (Full Project, No Project, or Reduced Project) and mitigation measures that reduce the severity of impacts to less than significant levels.

The proposed golf course will provide recreation areas and facilities to meet the increasing demands of tourists who visit the North Coast area. The County of San Luis Obispo has required an Environmental Assessment for this project in accordance with the high magnitude designation of the project's impact areas.

Through interdisciplinary team analysis, all possible issues were scoped in order to determine the top eleven most significant issues impacting the planning area. Eleven issues were chosen to focus on the greatest range of impacts that could occur on the project site. These include: water resources, biological resources, visual resources, traffic/circulation, soils, geology, hazardous materials, public safety, cultural resources, air quality, and agricultural resources.

After analysis of each issue, a description of alternatives is provided detailing three different development scenarios. These include:

- Project - this alternative assumes that the project will be developed as proposed by the Hearst Corporation.
- No Project - this alternative assumes that no proposed development take place, but does take into account the plan for future development of that area for recreation purposes.
- Reduced Project - this alternative incorporates mitigation measures with the full project so as to significantly reduce the environmental impacts within the project area.

Under the reduced project alternative, mitigation measures for any environmental impact requiring mitigation not already established in the project description have been included. Cumulative impacts will be included as a separate section and will discuss on and off site cumulative impacts for during and post construction activities. Cumulative impacts have been considered for each of the alternatives outlined in the Environmental Assessment.