Graduate Students

Graduate students who take the course are required to complete a term paper in addition to all other exams and assignments that are given during the course. The term paper will be a literature review of a forest or rangeland plant species. In consultation with the course instructor, students can select any forest or range plant. The species can be a community dominant or have major economic importance, or it can be a minor or even rare species in the community; the requirement is that the species must have its predominant distribution in a forest or rangeland ecosystem. The species can be distributed in western North America, eastern North America, the tropics, other temperate areas, etc.; i.e. anywhere in the world. Any one species can only be reviewed by one student in the semester.

The literature review must cover at least 4 of the 5 major topics covered during the course. These topics are: (1) photosynthesis, (2) water relations, (3) nutrient balance, (4) growth and development, and (5) abiotic and biotic factors in the environment. The overall goals of the literature review should be to discuss: (1) what is the range of variation that exists within that species for each topic; (2) to what extent can the species modify their plant functions to tolerate stress; and (3) how these functions and their stress responses may impact forest or rangeland management practices.

Graduate students must submit the name (genus-species and common) of the species they would like to study by Monday, January 30, 2012. The instructor will indicate if that species is acceptable by the next class meeting. Term papers are due at the beginning of class on Wednesday, April 25, 2012; late term papers will not be accepted and will be scored as a zero.

Papers will be graded using the following criteria and weightings:

1. **Content**: includes items such as completeness of the literature review, properly citing the sources of information, careful consideration of data and results, critical examination of problems and issues, creativity, and critical thinking. Content will be 80% of the total score.

2. **Style**: includes proper grammar, spelling, punctuation, citation formats, and other rules of formal scientific writing. Some writing tips and information on citing sources of information are on the following pages. Written papers must be typed or printed; handwritten assignments are unacceptable. Style will be 20% of the total score.

Undergraduate Students

Undergraduate students may gain extra credit that is equivalent up to 5% of their final grade by completing a term paper that is required for graduate students. Undergraduate students should follow all guidelines and requirements of graduate students except that undergraduate students need to submit the name of their species by Monday, February 13, 2012. If you have not chosen a species by this date, then you will not be able to get any extra credit. Extra credit papers are due at the beginning of class on Wednesday, April 25, 2012; late papers will not be accepted and no extra credit will be given.
Scientific Writing Guidelines

Below and on the following pages are: (I) a set of writing hints that should be followed as you prepare your paper; and (II) details on the format of citations that need to be followed for written papers.

I. Writing Hints
These writing hints are not a comprehensive list of rules for preparing papers, but are either “lessons I’ve learned the hard way” or items I’ve observed. The hints are in no particular order; follow them all with equal vigor.

1) Spell-check each document, then spell-check it again buy reading it carefully two bee sure that correctly spelled words are knot used in the wrong context.

2) The words “this” and “these” must always be followed by a noun. Like “there,” “this” by itself is too indefinite. If you are that indefinite, then you probably don’t know what you are talking about. Ponder the following sentence: “This is too short”. It tells you something is short, but doesn’t tell you what (this ladder? this person? this list of rules?). Often, the solution is to insert a noun (with or without adjectives) after the word “this”.

3) Use of “because” and “since”: If you are talking about cause-effect relationships or providing a reason for something, use “because.” If you are talking about the passage of time, use “since.” For example: “Because my major advisor in graduate school overworked me, I have not had a vacation since June.” Try rereading this sentence again, but switch “because” and “since.”

   Similarly, “while” indicates time and should not be used to indicate contrasts in an introductory phrase; use “although” or “whereas”. For example: “Whereas the results from my first experiment were significant, I could not write a summary of that experiment while I worked on the second experiment.”

   As above, “whereas” and “while” are not interchangeable words.

4) Use of the articles “a”, “an”, and “the”. When you refer to a specific item, use “the”. When you refer to an item in a more general context, avoid using “the”. You may use “an” if the item (i.e. noun) starts with a vowel or “a” if the noun starts with a consonant is acceptable. However, each noun (especially a plural noun) does not need to be preceded by an article. For example, the phrase “to better understand the functional dynamics” reads correctly with and without “the”. In scientific writing, brevity is preferred as long as clarity is maintained; thus the preference is to delete “the” whenever possible.

5) Do not use “and/or”. Often, the word “or” is sufficient because “or” means one, the other, or both. If you mean either one or the other but not both, then structure the phrase so that it reads “… either … or …”. Note that the word “and” is usually interpreted to mean both, although in certain contexts the word can imply a choice. If both are absolutely required, then structure the phrase “… both … and …”.

6) Use “then” when you are describing a sequence of items or events (such as “First this, then that.” Or “If this, then that.”). For contrasts, use “than” (for example, “This is greater than that.”).

7) Use “between” when comparing 2 items; use “among” when comparing 3 or more.

8) Purge the word “there” from your vocabulary. The word indicates a location (i.e. “here” vs. “there”) and cannot be the subject of a sentence (it’s too indefinite). Sentences that have “there” as the subject can always be rewritten without this word (and usually the sentence is simpler).
9) Be careful with the use of “it.” It is an overused pronoun. It is an acceptable indefinite pronoun (as opposed to “there” or “this” as #1 and #2 above describe it), or it represents a specific subject (similar to the pronouns “he” and “she”). Its overuse coupled with the ability of it to be either indefinite or specific tends to make the use of it less clear than it should be. It should not be used if it can be easily replaced with a noun or if the sentence can be rewritten without it. It also often makes sentences more wordy (see #18 and #19).

10) Use the word “can” sparingly. Always try rewriting a sentence without the word. If a choice is clearly involved, then go ahead and use “can”. However, if you are using the word because you are not sure about something, then find out so that you are sure. This same rule applies to “may”.

11) Be analytically consistent in your use of terms. Always refer to something (an object, a concept, a type of data or set of measurements, etc.) in exactly the same way using the exact same words. Scientific writing has to precisely convey information; it does not necessarily have to entertain. Forget what your English teacher told you about using similar terms to keep your reader from getting bored; in scientific writing, readers may think that a different (but similar) term indeed means something different, and thus they will get confused. Don’t worry if the text is somewhat dull and repetitive; your goal is to excite the reader about your data and ideas but not confuse them along the way.

12) Do not use colloquial terms or phrases in formal scientific writing. In other words, most of us should not write as we speak! Colloquial terms and their appropriate replacements include:

<table>
<thead>
<tr>
<th>Colloquial term</th>
<th>Formal term</th>
</tr>
</thead>
<tbody>
<tr>
<td>though</td>
<td>although</td>
</tr>
<tr>
<td>and so</td>
<td>thus</td>
</tr>
</tbody>
</table>

See Katz (2009), Lanciani (1998), and Mack (1986) for more comprehensive lists.

13) Use of “that” and “which”: If the information in the clause that follows is needed, use “that”. If the information is ancillary, use “which” and set the clause off by commas. For example: (1) “The truck that crashed carried water.”—you are referring to a specific truck, the one that crashed! (2) “The truck, which carried water, crashed.”—the fact that the truck carried water is not essential, but the author thought that you would like to know it!

14) Use of commas: Overuse of commas is a more common affliction than under use. Commas should be used:

(a) To separate independent clauses (i.e. before conjunctions such as “and”, “but”, etc. when they join 2 clauses that are complete sentences).
(b) To separate introductory words (e.g. “for example”, “however”, “in contrast”) or introductory phrases (e.g. phrases that begin with “although”, “because”, etc.).
(c) To indicate ancillary information (see also #3).
(d) When a list contains 3 or more items, place a comma between the end of the 2nd to last item and the conjunction (i.e. “and” or “or”).

Note the absence of a rule that says: Always insert a comma before the word “and”!

15) The correct punctuation and structure for enumerated lists is: “colon, open parenthesis, number, close parenthesis, text, semicolon, repeat [open parenthesis, number, close parenthesis, text, semicolon] until the penultimate item in the list, the word ‘and’, open parenthesis, number, close parenthesis, text, and period”. For example: “The following is the correct way to punctuate and structure an enumerated list: (1) place text for the first item here; (2) place text for the second item here; (3) repeat until the penultimate item; and (4) then add and and end the list.”
16) With few exceptions, do not change the tense of verbs within a sentence or within a paragraph. If you start in the present tense, then stay in the present tense. Usually when you change tense, you caused problems!

17) Paragraphs:
   a) Purpose of paragraphs: Paragraphs act as visual cues that let readers know that you are going to talk about something different. Do NOT disappoint or confuse your reader: make sure that:
      (1) Each paragraph presents and explains one and only one major idea.
      (2) You do not scatter one major idea across many paragraphs.
   If you have more than one major idea in one paragraph, then break that paragraph into more than one.
   If you have a major idea scattered among several paragraphs, then bring the appropriate text together into one paragraph. NOTE: “Major ideas” is a relative term; the point here is to use visual cues to strengthen your writing rather than work against it.
   b) Paragraph length: Although the length of a paragraph varies, use the following:
      (1) A paragraph should have a minimum of 3 sentences. Paragraphs with only 1 or 2 sentences either are not major ideas (in which case the information should be deleted or put into a different paragraph) or are very poorly developed major ideas (in which case, do more thinking and writing, in that order).
      (2) Maximum length is more difficult to define, but see 5.a. above. As a guideline, if a paragraph is longer than 1 page, then it is probably too long.
   c) Paragraph structure: The first sentence of each paragraph should summarize the major idea in that paragraph. The rest of the paragraph should elaborate on that first statement, provide logical arguments to support the statement, etc. This technique will provide you with a number of benefits:
      (1) Your writing will stay focused around a particular topic, and you will be less likely to digress.
      (2) If you can’t write a 1 sentence summary, delete unnecessary information or break the paragraph into two.
      (3) To determine if the flow of ideas is logical and to help organize your thoughts and the text, you only need to read the first sentence of each paragraph.

18) Be concise.

19) Be precise.

20) Be consistent and logical in how you format text, tables, and figures:
   a) Tables and figures are always numbered in the same order that they are referred to in the text: the 1st table referred to is “Table 1”, 2nd table referred to as “Table 2”, etc.
   b) Use the same words in both the text and tables/figures. For example, if you are talking about the rate of plant growth, be sure that the table/figure has something labeled “Growth rate”. If you are comparing Bromus and Agropyron, be sure that the data in the table/figure is labeled “Bromus” and “Agropyron”, not “cheatgrass” and “crested wheatgrass” or “BRTE” and “AGCR”.
   c) The style of headings and subheadings varies from journal to journal; be sure to check the journal’s “Instructions to Authors”. Lacking instructions, be consistent: if you center and capitalize all letters in a 1st order heading, be sure that all other 1st order headings are centered and capitalized. Remember why you are using headings: you are telling the reader that you are now starting a new section (e.g. METHODS) – if you are not consistent with the style, you’ll only confuse the reader.

21) Calculators and computers can easily give you as many decimal places as you want. Do NOT, however, report all the decimal places from your output or calculations. Generally 2 or 3 significant digits are adequate for most scientific writing. If differences between numbers are large, then you could probably report 2 significant digits. Four or more significant digits can be reported IF your measurement techniques and your sample size support that level of precision. NOTE: The term “significant digits”
does not mean number of decimal places. The following 5 numbers all have 3 significant digits: 123,000; 12,300; 123; 1.23; and 0.000123 – if you express all these numbers in scientific notations, they are all 1.23 x 10some power, i.e., 3 digits and some power of 10.

22) Avoid using gerunds and participles (i.e., the “-ing” form of a verb used as a noun or adjective, respectively). Gerunds and participles usually make sentences wordier than they need to be. For example, participles in the sentence “The questions contemporary plant ecologists are asking are the same questions that scientists have been asking for many years.” can be removed and the sentence written more directly as “The questions contemporary plant ecologists ask are the same questions that scientists have asked for many years.”

23) Use correct SI units.

References
The following are some reference materials about scientific writing. Items with an asterisk are available through UNR’s electronic journals and electronic resources (i.e. on-line books).

Some good reference books:

Some good reference articles:

Instructions to Authors for journals often have good information. Examples include:
Ecology and other journals of the Ecological Society of America:
http://esapubs.org/esapubs/preparation.htm#For
New Phytologist: http://www.newphytologist.com/view/0/authors.html
Rangeland Ecology and Management: http://www.srmjournals.org/

II. Citation Formats
To reference a source of information in your case study, two steps are typically involved in scientific writing. First, you indicate in the text where you got the information from. Second, you compile complete information on your references into an independent section called “Literature Cited”. Below are some details compiled from various journals’ “Instructions for Authors” that you should follow.

1) Format to indicate in the text where you got the information from:
   a) Journal articles, books, and book chapters
      Immediately after the information, citations in the text should indicate the author's last name and the year of publication, both in parentheses. Examples: “(Carlin 1992)”; “(Brooks and Carlin 1992)”. If there are more than two authors, only the first should be named, followed by "et al." If two or more references are to be cited, list citations in year order (then in alphabetical order if same year) with each citation separated with a comma. Example: “(Brooks and Carlin 1992, Carlin 1992, Abbey 1997)”.

   b) Web sites
      Immediately after the information, citations for the web site should include the publisher of the web site and the year the information was posted, both in parentheses. If the year the information was posted is not available, then use the year that the web site was accessed. Example: “(Blackwell Publishing 2004)”. If two or more web sites are to be cited, list citations in year order (then in alphabetical order if same year). If web sites and printed literature are to be cited, then list citations in year order (then in alphabetical order if same year).

2) Format for complete reference information in “Literature Cited” section
   References at the end of the paper should be listed in alphabetical order by the first author's last name or web site publisher’s name. If there is more than one work by the same author or team of authors in the same year, add the letters “a”, “b”, etc. to the year both in the text and in the list of references in order to differentiate the different citations.

   a) Journal articles
      Journal articles should include: name(s) and initial(s) of all authors; year; full title; journal title; volume number; first and last page numbers. Example:

   b) Book chapters
      Book chapters should include: name(s) and initial(s) of all authors; year; title of article; editor(s); title of book; edition; volume number; publisher; place of publication; page numbers. Example:

   c) Books
      Citations for books should include: name(s) and initial(s) of all authors; year; title; edition; publisher; place of publication. Example:
d) Web sites
Citations for web sites should include: publisher’s name; year; title of web page; URL; date accessed. Example: