LITERATURE REVIEW EXERCISE

# Assignment Overview

In this assignment you will review some scientific literature that relates to a scientific question you identified in your Observations, Questions & Hypotheses exercise. For this exercise you are required to review two **ORIGINAL RESEARCH PAPERS** (more detail below). You are required to prepare a structured bibliography of the two papers with attached synopsis as a means of summarizing and reflecting your understanding of the literature’s pertinence to your chosen question.

It is critical for you to remember that it is extremely unlikely that you would find research papers that pertain exactly to your question and hypotheses. You may find articles that address certain aspects of your question, or that investigate your question in different locations with different species or social groups. These can provide important insights and perspectives to your question and hypotheses without addressing your exact question.

### Getting Started in Reviewing your Literature *– some important tips*

**1. Understand your topic**

You may find it beneficial to review some basic information about the underlying principles of your topic BEFORE you review the specific literature. For instance, if you question dealt with why leaves were falling off of a specific species of plant, you might wish to first read some general material on why leaves fall off of plants in the autumn in general. This could be found in a general biology or botany textbook (or on the web). You should feel free to consult your instructor or Rob Estes, the science librarian, for help in this regard.

**2. Modifying the Scope of your topic**

You may find from your initial literature search that you need to broaden or narrow the scope of your topic. Do not hesitate to consult with your instructor and/or Rob Estes about this. Consult with us early on – **before** you get frustrated in your search!

# Step 1: Reviewing the Literature

You are required to review two original research papers that pertain (to some degree) to your selected question and hypotheses. **Only peer-reviewed original (“primary”) research papers will be accepted**. These are published reports of actual research that the authors conducted (and would necessarily include a “Methods” section in the paper). Review articles (where the author only reviews research conducted and published in original research articles elsewhere) or book chapters will not be acceptable. However you may use general books and review articles to help you (1) develop a better understanding of your topic, (2) identify key words to use in searching databases for original research literature, and (3) identify original research papers themselves (e.g., they may be mentioned directly in a review article). Pay close attention to the description of original research papers presented in class.

These papers must appear in a peer-reviewed journal. Many such articles are accessible in electronic form (e.g., as pdf versions from the original journal) as well as print form.

Your ultimate goal in reviewing this literature is to begin to answer the question – “What is known about my chosen question and hypotheses?”. The best papers will obviously deal most directly with your exact question and hypotheses. However, it is usually the case that research has not been done in the exact geographic location or on the exact species that you use for your question. In that case you must look for research as closely related to your situation as possible and then consider how it might (or might not) apply to your situation.

I cannot stress enough how very important it is to **START EARLY!** Rob Estes, UWB Science Librarian, will cover in-depth literature search strategies on January 20 in class. Searching for and collecting literature can take time, especially if you have to order articles through document delivery (or even get sources through interlibrary loan). You should consult with me if you are uncertain as to the applicability of an article to this assignment.

When reading the papers, keep in mind that you do not need to understand every last detail in order to get the main messages and a clear overview of what was done and its implications and limitations.

# Step 2: Writing your Literature Review

Your final literature review written report will not be akin to a traditional literature review, which is usually presented as an often-lengthy text document. Rather, I will expect you to provide your literature review in the form of a summary of the major sections of the papers you are reviewing – **with a special emphasis on the material in the paper that relates specifically to your question and hypotheses.** You should write for an audience of your peers – fellow students with some background in science, but limited to no background in your specific topic.

You are required to hand in the two research papers that you use, along with your literature review. Thus, you should save them as pdf files or print them out as hard copies. You may submit the pdf files of the papers along with your literature review if you submit the assignment on Blackboard. Otherwise, provide hard copies of the papers as you hand in the hardcopy of your literature review. If any of your papers is unusually lengthy, contact me prior to printing them out.

The literature review will consist of four general parts and **your paper should be explicitly organized into these four sections (with clear headings) as shown in the outline box following this section of the handout.**

**1. Original observation, question and hypotheses** *(single spaced lines)*

This should be included in the same format as you submitted for your Observations exercise. Any comments made on this earlier submission should be taken into account.

**2. Reference List** *(single spaced within a reference; one line between each reference)*

You should provide a reference list that includes the two research papers that you are reviewing. I do not expect other papers but if you wish to include any background reading sources that you have used, feel free to do so.

Present these references in an alphabetized (by lead author’s last name), formal literature cited list as you would find in a scientific paper. You should use the CBE style manual (Council of Biological Editors) for your source list and for citing sources within your synthesis section – WITH ONE EXCEPTION. The CBE style manual suggests abbreviating the titles of journals in their source list citations. I do NOT feel it is a good idea to abbreviate journal titles – please write out the complete title. This avoids any possible misinterpretation in this day and age of myriads of journals. For good summary information on citing sources using the CBE style (acceptable for this class) see:

Note that most sources no longer use the old name, “CBE”, rather they use the newer name, “CSE” (Council of Scientific Editors). See the example box at the end of this handout and other research papers that we discuss in class for examples of how a Literature Cited section of a paper is assembled.

**3. Literature Summary** *(double-spaced throughout this section)*

For each of the two papers that you review, you should provide a summary of the material IN EACH MAJOR SECTION OF THE PAPER pertinent to both understanding (1) the overall paper and to (2) how it addresses your question and hypotheses. The four major sections of each paper to summarize include: Introduction, Methods, Results, and Discussion. I will expect it will take you about 1/3 to 1 page (double-spaced) of writing for each of the major sections to adequately summarize the material. Organize your summaries into clear sections with explicit headings.

You do not need to connect your summary material explicitly to your question and hypotheses in this summary portion of this literature review, because that is the object of the “synthesis section” (below). You do need to make sure that the material from the paper that you will discuss in the synthesis section is addressed in this summary. Be sure to write your summary (and the following section below) as if your classmates were the primary audience.

**DANGER:** You must be very careful not to simply use the paper’s abstract (or summary) or text in the paper itself for your summary. This exercise is meant for you to summarize things IN YOUR OWN WORDS! I am looking for YOUR summary of each source, with an emphasis on things relevant to your question. If I find you using published material (or such with only minor changes), I will consider this a serious case of academic misconduct. See the class handout on Academic Honesty for further details. **NO QUOTATIONS ARE ACCEPTABLE** in this assignment – you MUST synthesize things in your own words! I am requiring that you submit full copies of your source research papers and I will check for such instances of misuse.

**4. Synthesis** *(double-spaced throughout this section)*

You should include a 1 - 2 page (double-spaced) synthesis of the body of literature you have reviewed – **specifically as to how it pertains to your original observation and question**. You should strive to answer the question of what is known about your question in a synthetic and meaningful way. This section (as opposed to the summaries above) should contain critical analysis of the literature and studies reviewed. However, be sure that your analysis is focused very directly on the connection between the literature and the question. In other words, I don’t want to see criticism of things like small sample sizes in some study unless you bring out how this study design limitation restricts your ability to extrapolate from those results to your question.

In your synthesis you must cite your sources in the same formal way in which they are cited in scientific papers. To see how sources are cited look at the papers assigned for reading. We will discuss how citation in the text is done in class as well. The research papers that you are using for this assignment should provide even further examples. The boxed section at the end of this handout provides even more guidance on this.

#### **Outline of Literature Review Paper Structure**

Your name, class number (BES 301), date, and assignment title should be at the top

**1. Original observation, question and hypotheses**

Observation:

Question:

Hypotheses:

**2. Reference List**

**3. Literature Summary**

Paper 1 (include the citation at the top of the summary)

Paper 2 (include the citation at the top of the summary)

**4. Synthesis**

# Step 3: Submitting your Literature Review

You should submit your Literature Review by the START of class on February 15. You must submit your Literature Review and copies of the two original research sources used in your report. You may submit all of these electronically on Blackboard. If you do so you **MUST follow these format and naming conventions for the files submitted**: Literature review: submitted as an MS Word document; named with your last name and “BES301 lit review” – for example: “Gold BES301 lit review.doc”

Research papers: submitted as pdf files; each named with your last name and paper number – for example: “Gold paper1.pdf” and “Gold paper2.pdf”.

If you submit the materials in person as hardcopies, you MUST clip all of these items together so I know which research papers go with which literature review!

#### **Format of an Example Reference List**

Galen, C. 1990. Limits to the distributions of alpine tundra plants - herbivores and the alpine skypilot, *Polemonium viscosum*. Oikos 59: 355-358.

Kuitunen, M. and T. Tormala. 1994. Willingness of students to favor the protection of endangered species in a trade-off conflict in Finland. Journal of Environmental Management 42: 111-118.

VanWoert, N.D., D.B. Rowe, J.A. Andresen, C.L. Rugh, R.T. Fernandez, and L. Xiao. 2005. Green roof stormwater retention:effects of roof surface, slope, and media depth. Journal of Environmental Quality 34: 1036-1044.

Note that the entries in the reference list are presented in alphabetical order by the last name of the first author. All authors are listed. A hanging paragraph format is used so it is easy for the reader to find a reference to a particular author from the text of your paper.

***Remember, that Latin names of species must always be in italics!***

#### **Citing Literature in the Text of Your Paper**

The papers you utilize as sources should be cited at appropriate locations within the text (where you are using that information). The papers should be cited parenthetically **if possible**. In other words, make your main point and then cite the paper in parentheses afterward rather than directly referring to the paper. You should see papers we used in class or those in the journals “Ecological Applications” or “Ecology”. These are available in the UWB library. For example:

***Use:***

Large woody debris in lowland old growth forests has been shown to provide sustained levels of inorganic nitrogen to streams throughout the summer and winter months (Burke et al. 1997).

***Rather than:***

Burke and others (1997) did a study that showed large woody debris is important in providing inorganic nitrogen to streams throughout the entire year.

Direct references to authors is not forbidden, just try to use such construction less frequently. When citing a paper, you should list the authors and the year of publication and nothing else (no page numbers, etc.)! The CBE style manual material referenced above (.pdf file on the UWB library web site) also has guidance on how materials should be cited in the CBE style. For one author list the last name and year; for two authors list both names and the year; for three or more authors list the last name of the first author and use the Latin abbreviation “et al.” to indicate “and others” as shown in the example above. The abbreviation et al. is NOT appropriate in the Literature Cited section (there all authors must be written out). Multiple authors should be cited within parentheses in chronological order (from oldest to newest – see example below). Also note that only last names are used in citations within the text – no initials.

**Examples:**

Low temperatures were shown to limit reproduction in marmots in the Rocky Mountains (Allen 1998).

Log decomposition greatly accelerated soil development in a lowland old growth forest of southwestern Oregon (Barnes and Lask 1995).

Human trampling is most evident in stressful ecosystems (Newman 1968; Barnes 1984; Daly and Smith 1992; Poldt et al. 1998).

#### **Grading Breakdown (40 Points total)**

1. General paper format and structure – 4 points
2. Presentation (clarity, spelling, grammar, etc.) – 4 points
3. Content – 32 points

1. Original observation, question and hypotheses – 3 pts

2. Reference List – 3 pts

3. Literature Summary – 14 pts (7 pts / paper)

4. Synthesis – 12 pts