

CITING INFORMATION and SCIENTIFIC WRITING

Scientific writing in general

- In scientific writing, scientists communicate the state of knowledge of a particular topic. In this type of writing, **every** statement of **fact** must be supported by a published source for this information. In general, value statements are avoided in this type of writing (i.e. chemicals are bad; humans are bad; etc.) unless they are backed up conclusively by data, and the criteria for defining 'bad' and 'good' are clearly defined and relevant.
- It is acceptable (and often desirable) to use the first person (words such as 'I' or 'we') when writing for a scientific audience. In addition, it is acceptable (and often desirable) to write in the active voice, rather than the passive voice. You may have been taught otherwise in other classes, and in other disciplines. However, scientists are trying to make their writing more clear, and they are trying to use more direct language (which includes using first person and active voice)! Please note the examples below:

The following sentences are clumsy:

It can be suggested that "reference A" and "reference B" present contrasting results.

Wilson (1998) conducted an experiment on the effects of planktivorous fish on benthic diversity in two lakes in Michigan. It was found that the diversity of benthos increased in the presence of low densities of planktivorous fish.

These sentences are more direct:

I suggest that "reference A" and "reference B" present contrasting results.

Wilson (1998) conducted an experiment on the effects of planktivorous fish on benthic diversity in two lakes in Michigan. She found that the diversity of benthos increased in the presence of low densities of planktivorous fish.

Citing your sources of information

- When you write a technical paper that uses information gathered and presented by others, it is critical for you to inform the reader of your information source. In scientific writing, you do so very simply: any statement of fact or theory obtained from another journal article or book is followed by the last name of the author(s) of the source and the year in which the source was published.
- HOW TO CITE IN YOUR TEXT: if you use information from a paper on yellow perch energetics written by William Taylor and Daniel Hayes that was published in 1990, you simply need to write "Hayes and Taylor 1990" in your text in parentheses after the statement that needs a citation. It might look like this:

At low temperatures, yellow perch mature later than at high temperatures (Hayes and Taylor 1990).

Or, you may present it like this:

Hayes and Taylor (1990) found that yellow perch mature later at low temperatures than at high temperatures.

- You may provide more than one citation for a statement of fact if several studies have supported the statement that you are trying to make. In this case, list the citations in chronological order (from earliest to most recent year of publication) and separate them with a comma. If two citations were published in the same year, then list them in alphabetical order.

- Any statement of 'fact' or information that is NOT common knowledge must be cited appropriately. Needless to say, this is not a cut and dry definition. You must think carefully about where you got your information, how you are using it in your writing, and when you need to acknowledge someone else for the idea/information.

SHOULD BE CITED: *"Certain zooplankton taxa have been found to be especially sensitive to acidification of lakes (citation(s) here)."*

DOES NOT NEED TO BE CITED: *"Zooplankton are an important component of pelagic lake foodwebs."*

For this review paper, use this as a rule of thumb: If the statement reflects general knowledge presented in course materials, then it does not need to have a citation associated with it. Any information beyond that which is general to course material should be cited.

- Pay particular attention to any time that you use a number or piece of data in your paper; these sentences almost always need to be cited.
- The purpose underlying a lot of scientific writing is for YOU to synthesize the material into a NEW presentation of the material (i.e. gathering information from multiple sources, and integrating them). That means that you should cite information from several sources within each of the paragraphs that you write. Try to avoid writing a paragraph in which you get all of your information from one source. If you do, you CANNOT just put the citation at the end of the paragraph, you must cite every sentence! See the following paragraph as an example of this:

"The common carp (Cyprinus carpio) is one of the most widely distributed freshwater fish in the world (Costa-Pierce et al. 1993). Although its original range was restricted to parts of Asia east of the Danube river, carp are now found on every continent except for Antarctica (Costa-Pierce et al. 1993). Introduction to new areas was due mostly to the carp's popularity as a food fish and the fact that it is easy and cheap to raise in large quantities despite poor water quality and primitive aquaculture techniques (Costa-Pierce et al. 1993)."

- In some cases, you will need to discuss a paper in more than one sentence. Rather than cite every sentence you may do something like the following:

"In a study conducted on Lake Mendota in Wisconsin, Soranno et al. (1997) found that internal nutrient loading to lakes was large and it changed quite dramatically from year to year. The authors found that internal loading due to entrainment was particularly dynamic. This study was one of the first to quantify this important source of nutrients to the epilimnion of lakes. Some earlier studies (Effler et al. 1986; James et al. 1990) had documented entrainment in lakes, but they were based on data collected weekly or biweekly, which is too coarse to pick up many of the fine-scaled entrainment events. "

Literature citation format

At the end of your paper, you must list all of the sources that you cite in your paper in a *Literature Cited* section, and you must include enough information on those sources to enable a reader to find the sources. You may read other sources in the process of your research, but if you do not cite them in your paper, then they do not belong in the *Literature Cited* section. The *Literature Cited* section is simply a list of all of the references that are cited in the paper. These are listed in alphabetic order, based on the first authors' surnames. For more than one article by an author or a group of authors, the articles should be listed in chronological order. Look at the *Literature Cited* sections in some of the articles and books that you encounter while working on this assignment. There is no need to underline or *italicize* journal names or book titles.

Because literature sources come in several different forms (e.g., journal articles, books, book chapters, etc.), you must use several different citation formats in your bibliography. Examples of the six most common formats are given below:

- (1) **Journal article citation:** Journal articles are articles from the 'primary scientific literature' which means that they have been peer-reviewed and present original research. Examples include the following journals: Ecology,

Ecological Applications, Limnology and Oceanography, Canadian Journal of Fisheries and Aquatic Sciences, Hydrobiologia, Freshwater Biology. (Note that articles from the following sources are considered to be from the popular press and do not count: Discover, Audobon, National Geographic, Smithsonian, etc.).

Carpenter, S. R. and D. M. Lodge 1986. Effects of submersed macrophytes on ecosystem processes. Aquatic Botany 26(1): 341-370.

- (2) **Book citation:** You do not need to provide the page number from a book that you use; rather, you can just cite the whole book. However, you should cite the whole book only if every chapter is written by the same author. If each chapter is written by a different author, then you cite the author of that particular chapter that you use, and use (3) for your citation.

Moyle, P.B. and J.J. Cech, Jr. 1988. Fishes: an introduction to ichthyology. Prentice-Hall, Englewood Cliffs, NJ.

- (3) **Chapter from a book:** Often, scientific books are 'edited' by a certain group of authors, but each chapter is written by a different group of authors. In this case, you cite the authors of the particular chapter that you are using.

Smale, M.A. and W.W. Taylor. 1987. Sources of back-calculation error in estimating growth of lake whitefish, pp. 189 - 202 in R.C. Summerfelt and G.E. Hall, eds. Age and growth of fish. Iowa State University Press, Ames, IA.

- (4) **M.S. thesis or PhD Dissertation:** Theses and dissertations are not necessarily peer-reviewed, but they are viewed as part of the scientific literature. You cite them as you would a book.

Kelly, N.F. 1995. Evaluation of the ecoregion concept as an inland lake management tool for lower Michigan. M.S. Thesis. Michigan State University. 60 pp.

- (5) **Government document:** Government documents come in a wide variety of different forms. You should only use them in a literature review paper if they present actual research results. In general, similar to a journal article, you need to cite the author(s), the year, and the title. In addition, you need to provide a DOCUMENT REPORT NUMBER and THE ORGANIZATION/AGENCY that published the report, and finally, THE CITY/STATE WHERE IT WAS PUBLISHED. Use a format similar to the one below.

Getsinger, K. D., J.D. Madsen, R.M. Stewart, T.J. Koschnick, M.D. Netherland, A.G. Staddon, D.R. Honnell and C.S. Owns. 2001. Whole-lake applications of Sonar™ for selective control of Eurasian watermilfoil. ERDC/EL TR-01-7 Final Report. U.S. Army Corps of Engineers, Washington D.C.

- (6) **Article in an electronic journal (ejournal):** Some journals are now only available on-line (they are not printed and placed in the library; these are considered to be Ejournal). These are almost always peer-reviewed.

Joyce, Michael. "On the Birthday of the Stranger (in Memory of John Hawkes)." Evergreen Review 5 Mar. 1999. 12 May 1999, <<http://www.evergreenreview.com/102/evexcite/joyce/nojoyce.html>>.

Below is more detailed information on some of the requested information. Most of the above citations include the following items:

1. **AUTHOR(S).** For all the above formats, the first piece of information is the author of the A) article, B) book, C) book chapter, or D) Website text. The first author should be listed by surname, followed by a comma and his/her first and second initials. If two or more authors are responsible for the source, the remaining author(s) should be listed with their initials followed by their surnames. IN THE TEXT of your paper, you should use the Latin term *et al.* to refer to sources with more than two authors, but NOT in the bibliography. For example, an article by C.C. Jones, A.L. Hooper and F.R. Furdgeon in 1987 could be cited as follows in the text: "Swimming speed of trumpetfish increases with size (Jones *et al.* 1987)", but all three authors must be listed in the bibliography ("Jones,

C.C., A.L. Hooper and F.R. Furdgeon. 1987..."). Sometimes, 'et al.' is published in italics, and sometimes it is not. You may do it either way.

2. **YEAR.** For all the above formats, the second piece of information is the year in which the article, book or book chapter was published. For books, look for the copyright date.

3. **TITLE.** The third piece of information is the title of the A) journal article, B) book, C) book chapter or D) web document. It is especially important to give the book chapter title first in format type 3. You will give the book title later in this citation format. Only the first word and proper nouns should be capitalized in the title.

4(A). **JOURNAL NAME, VOLUME NUMBER and ISSUE NUMBER.** The next information in the journal article citation format (A) or for an e-journal is the name of the journal in which the article was published, followed by the volume in which it appeared and the page numbers on which it was printed. A volume is a group of issues of a particular journal, usually all of the issues from one year or from a portion of a year. Some citations will have an additional number in parentheses following the volume number such as 52(2):133-137. The extra number is the number of the issue in the volume which contains the article (the second in this example). The issue number **MUST** be provided if each issue starts its page numbering with 1. However, if issues within a volume do not restart from page 1, then the issue does not need to be included in the citation.

4(B). **PUBLISHER.** The company or institution that published the book follows the book title in format 2. The city (and state; or country) that houses the home office of the publisher is given with the publisher's name.

4(C). **BOOK INFORMATION.** For a chapter from a book that contains a collection of chapters or papers by different authors, it is important to include the name of the book authors or editors, the book title, the book publisher and the pages that include the chapter cited. The page numbers of the chapter are given immediately after the chapter title. The editors of the entire book are listed next. All of the names in this list are given with initials first, followed by surname. The second title in this citation is the title of the book which contains the cited chapter. Finally, it is important to give the publisher and publisher's address, as in the regular book citation format (2).

Conventions for names of species

When you refer to a species in a written document, you should provide the scientific name of the species along with the common name at the first time you refer to it in the text of the report. Thereafter in the report, you can simply use the common name. Alternatively, you can simply use the scientific name of a species throughout the text; however, this often becomes cumbersome. When you use species names, you must italicize only the binomial (scientific) names of species (e.g., *Salmo salar*, but not *Salmo salar*; and Atlantic salmon, but not *Atlantic salmon*). Do not use capital letters at the beginning of common names unless the common name includes a proper noun. For example, Atlantic salmon, coho salmon, American shad and longnose gar are all correct, but Rainbow darter, Brook Trout, sea Lamprey, and iowa darter are incorrect. For binomial scientific names of species, the first letter of the genus name is always capitalized and the first letter of the species (trivial) name is never capitalized. So *Salmo salar*, *Oncorhynchus mykiss*, *Notropis texanus*, and *Moxostoma hubbsi* are all correct, however *Salmo Salar*, *oncorhynchus mykiss*, *notropis Texanus* and *Moxostoma Hubbsi* are all incorrect. For references to the scientific name of a species after the first use in a document, you can abbreviate the genus by the first letter of the genus, follow by a period, e.g. *S. salar*, *N. texanus*.

Finding literature sources on aquatic topics

A number of electronic literature search tools are available at the MSU Library and from the MSU library homepage to help locate journal articles and books located at the MSU library. These tools will be essential to completion of your paper.

SEARCHING FOR BOOKS:

QUICK SEARCH - CATALOG: (<http://www2.lib.msu.edu/>) This is the electronic catalog of the collections held in the MSU Libraries. You can use it to a) search for volumes (books or journals) by title, author, subject or keyword, b) find the call number for a volume that you want to find, c) find the location of a volume that you want to find (e.g. in the main library or at the KBS library or one of the departmental libraries on campus), or d) find out if a volume that you want to locate is checked out or on reserve. This is an extremely easy and helpful system, and can be accessed from any of many computer stations in the library or by ethernet from remote computer laboratories. Although it is extremely powerful, it has its limitations. It does not have the ability to search through journals to locate particular articles on a particular subject or by a particular author. A search for the keyword "TROUT" in this catalog may give you a list of books that are in the library that address some aspect of trout, but it will not search through volumes of the Journal of Fish Biology for any articles in that journal that address some aspect of trout.

SEARCHING FOR JOURNAL ARTICLES:

The following are examples of two search engines that are available online from the MSU library from the 'E Resources' section. However, to actually find the journal article, you may have to go to the library if it is not available online.

AQUATIC SCIENCES AND FISHERIES ABSTRACTS [Available from the MSU library page. To get there, type in 'Cambridge Scientific Abstracts' in the 'find other E Resources' section and go from there].

Includes journal articles published from 1978 – current.

This is a service that MSU Libraries first acquired in 1993, and it makes the job of searching for articles on subjects of aquatic biology extremely easy. This is an electronic search system that contains a large database of virtually everything in aquatic biology and fisheries that has been published since 1978. The original database was established from several older, print-version abstracting services, and some from other databases from the U.S. and other countries. This electronic database will allow you to search by keyword, taxonomic names, author names and various combinations of these through this huge database. For example, you might search for articles that have these keywords: ANGUILLA AND TAXONOMY for a paper on the species status of American and European eels (*Anguilla* spp.).

Remember that this service will give you the citation information for any articles that match your selection criteria, but it will not give you the call number for the particular book or journal in the MSU Library. You will need to use MAGIC for that to find the location in the library, or determine if the journal is available online..

ISI WEB OF SCIENCES DATABASE [Available from the MSU library page under the 'Web of Science' section, then under the section on 'searchable database products', click on 'Web of Science' again].

Includes journal articles published from 1987 – current.

This is a literature reference service that allows for several unique methods of searching for references on a particular subject. It is available in printed and electronic form. One use of it is the Author Index. For example, suppose you are studying metabolic rates of salmon, and you learn from Moyle and Cech (1988) that a person named J.R. Brett published an important paper on this topic in the Journal of the Fisheries Research Board of Canada in 1972. If you look up Brett, J.R. in the Author Index for 1991, the index will list all of the articles published by J.R. Brett in 1972 (perhaps there were two others in the Journal of Fish Biology), and for each of these articles, it will list the author, year, journal name, volume number and page numbers for any article published in 1991 or late 1990 that cited Brett's 1972 article from JFRBC. This is a very handy way to find articles on a particular subject that have been published in recent years.

To determine if a journal is available online through the MSU library, from the library web page click on 'E resources' and then on 'journals'. You can type in the name of the particular journal of interest, or list all the online journals starting with a particular letter.