Tips for Conducting an Effective Literature Review
(How we know what we know)

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What is a literature review?

• An account of what has been published on a topic by accredited scholars and researchers
  • A separate piece summarizing current knowledge
  • An annotated bibliography
  • An introduction to a paper, thesis, or dissertation

• Purpose is to convey to your reader what knowledge and ideas have been established on a topic
  • Must be defined by a guiding concept
  • It is not just a descriptive list of the material available, or a set of summaries

• It is NOT a book report
Requires two important Research Abilities

• **Information Seeking**
  • The ability to scan the literature efficiently, using manual or computerized methods, to identify a set of useful articles and books

• **Critical Appraisal**
  • The ability to apply principles of analysis to identify unbiased and valid studies.
A Literature Review must do the following

• Be organized around and related directly to the thesis or research question you are developing
• Synthesize results into a summary of what is and is not known
• Identify areas of controversy in the literature
• Formulate questions that need further research
Questions to ask yourself

• What is the specific problem, research question, or thesis that my literature review helps to define?

• What type of literature review am I conducting?
  • Am I looking at issues of theory?
  • methodology?
  • policy?
  • quantitative research (e.g. on the effectiveness of a new procedure)?
  • qualitative research (e.g., studies )?

• What is the scope of my literature review?
  • What types of publications am I using (e.g., journals, books, government documents, popular media)?
  • What discipline am I working in (e.g., genetics, growth and yield, silviculture, ecology, hydrology)?
Questions to ask yourself

• How good was my information seeking?
  • Has my search been wide enough to ensure I've found all the relevant material?
  • Has it been narrow enough to exclude irrelevant material? Is the number of sources I've used appropriate for the length of my paper?

• Have I critically analysed the literature I use?
  • Do I follow through a set of concepts and questions, comparing items to each other in the ways they deal with them?
  • Instead of just listing and summarizing items, do I assess them, discussing strengths and weaknesses?

• Have I cited and discussed studies contrary to my perspective?

• Will the reader find my literature review relevant, appropriate, and useful?
A Literature Review is akin to an exercise of bricolage
Bricolage
Growth in Number of Journals

Ware. 2009. An overview of scientific and scholarly journal publishing. International Association of Scientific, Technical and Medical Publishers

Figure 4: The growth of active, peer reviewed learned journals since 1665 (Mabe 2003)
Print vs E Journals

Figure 6: The total numbers of electronic and print-only journal titles subscribed to by the 115 UK universities (Source: SCONUL, from RIN 2009)

Ware. 2009. An overview of scientific and scholarly journal publishing. International Association of Scientific, Technical and Medical Publishers
Growth and Yield Publications

Figure 1.1 Number of publications on growth and yield, by publication year, based on a keyword search of the CAB Direct database (www.cabdirect.org, accessed December 21, 2010).

Weiskittel et al. 2011 Forest Growth and Yield. Wiley-Blackwell
Amid this growth, how do you effectively:

- Find relevant literature
- Know when to stop searching
- Organize your literature
- Structure your review
- Know what/who to include
- Know what/who to leave out
Search Strategies

• Keyword Searches
• Author Searches
• Species Searches
• Snowball Approach
Search Engines

• Free General Search Engines
  • Google/Bing/Yahoo
  • DuckDuckGo

• Free Scholarly Search Engines
  • Google Scholar
  • USFS Tree Search (http://www.treesearch.fs.fed.us/)
  • USDA National Agriculture Library (Agricola) (http://agricola.nal.usda.gov/)
  • Global forest information service
  • ResearchGate (Social Media)

• Subscription Search Engines
  • CAB Direct
  • Wildlife and Ecology Worldwide
  • Biological Abstracts
  • Academic Search Premier
  • Science Citations
  • Scopus
Snowball Searches

1) Start with a relevant article
2) What papers do they cite? (Looking backwards)
3) What papers cite them? (Looking forwards)
4) Keep iterating between steps 2 and 3
Example

(The plight of the helpless grad student)

• Regenerating eastern hemlock (*Tsuga canadensis*)
  • Species under threat due to several exotic pests
  • NB is near the northern limit of range
  • Occurs in small patches/groups 0.04 – 0.15 ha in size
  • Limited seedling/sapling regeneration

• What is known about the issue of hemlock regeneration?
  • Limits to regeneration
  • Silvicultural methods to encourage regeneration
Key word search

• Eastern hemlock regeneration
  • Google: 165,000 hits
  • Google scholar: 18,800 hits
  • Biological Abstracts: 65 hits
  • Treesearch: 28 hits
Natural Regeneration of Eastern Hemlock: A Review

Eastern Hemlock (Tsuga canadensis) | The St. Lawrence ...
Snowball Approach (looking backward)

• 81 citations
  • Spanned 1900 – 1999
  • 14 titles appear promising
  • 7 authors I know and respect

• Of the 14 promising titles, 9 were useful
  • 72 new unique references
  • 14 proved useful

• Follow up on the authors I knew
  • 6 new useful references
Snowball Approach (looking backward)

• The 29 new references produced 7 more new useful papers
  • Those 7 papers produce 3 new papers
• So in three rounds of just reading references, I found 39 papers
Snowball Approach (Looking Forward)

• What papers cited this work
  • Google
  • Science Citations
Google gives a list of who cited this work.

**Natural Regeneration of Eastern Hemlock: A Review**

[PDF]

About 105,000 results (0.28 seconds)

[Web Images News Maps Videos More ▼ Search tools]

[PDF] Natural Regeneration of Eastern Hemlock: A Review
www.nrs.fs.fed.us/pubs/gtr/gtr_ne267/gtr_ne267_014.pdf
by DL. Goerlich - Cited by 27 - Related articles

**Eastern Hemlock** (Tsuga canadensis) | The St. Lawrence...
slawrencelowlands.wordpress.com/.../eastern-hemlock-tsuga-canadensis
Nov 5, 2012 - The eastern hemlock (Tsuga canadensis) is a long-lived coniferous tree native ... Hemlocks very rarely regenerate in open areas (Goerlich and...)
Snowball Approach (Looking Forward)

• Google had a list of 27 papers that cited my original
  • 7 proved useful
  • Snowballing backward
    • 5 new useful papers
    • Those papers only produced 1 new paper

• Now have 52 useful papers

• Look at who cited of all the new papers
  • Identified only 2 new useful papers
  • They produced no new papers

• 54 papers located in about 90 minutes of time
So now we have all these papers! How do we possibly organize them?

• Bibliographic software
  • Endnote (Commercial product)
  • Zotero (GNU product)

• I use Zotero
  • Free!!!!!
  • Free MSWord cite-while-you write plugin
  • 1000s of reference format styles
  • Ability to link to electronic content
  • Multiple hierarchical keyword search
Zotero ([https://www.zotero.org/](https://www.zotero.org/))

- Two versions
  - Stand alone
  - Firefox Browser plugin
Titles contained within Proceedings: symposium on sustainable management of hemlock ecosystems in eastern North America

Description: Contains 31 papers and 20 poster presentations addressing hemlock silviculture, ecology, forest health, wildlife relationships, and marketing and utilization.

Keywords: silviculture, forest health

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XML: View XML

Citation:
Now the work begins

• Those 54 papers need to be read
  • Notes made
  • Keywords added to your database
  • Literature outlined
    • Topics/papers arranged around the outline

• Approach writing as a construction project
  • You don’t worry about the carpet color before the house is framed
  • As you read an article, you don’t have to worry about how you are going to use it (many you won’t)
  • But you do need to evaluate and systematize the data, information, and knowledge
13 Questions to ask about each article, report, or book

1) Has the author formulated a problem/issue?
2) Is it clearly defined? Is its significance (scope, severity, relevance) clearly established?
3) Could the problem have been approached more effectively from another perspective?
4) What is the author's research orientation (e.g., interpretive, critical science, combination)?
5) What is the author's theoretical framework (e.g., psychological, developmental, feminist)?
6) What is the relationship between the theoretical and research perspectives?
13 Questions to ask about each article, report, or book

7) Has the author evaluated the literature relevant to the problem/issue? Does the author include literature taking positions she/he does not agree with?

8) In a research study, how good are the basic components of the study design (e.g., population, intervention, outcome)? How accurate and valid are the measurements? Is the analysis of the data accurate and relevant to the research question? Are the conclusions validly based upon the data and analysis?

9) In material written for a popular readership, does the author use appeals to emotion, one-sided examples, or rhetorically-charged language and tone? Is there an objective basis to the reasoning, or is the author merely "proving" what he/she already believes?
13 Questions to ask about each article, report, or book

10) How does the author structure the argument? Can you "deconstruct" the flow of the argument to see whether or where it breaks down logically (e.g., in establishing cause-effect relationships)?

11) In what ways does this book or article contribute to our understanding of the problem under study, and in what ways is it useful for practice? What are the strengths and limitations?

12) How does this book or article relate to the specific thesis or question I am developing?

13) Is the piece primary, peer reviewed literature? Have you cited original sources?
Useful resources

- http://www.writing.utoronto.ca/advice specific-types-of-writing/literature-review
- http://guides.library.ucsc.edu/write-a-literature-review