

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

IUFRO-SPDC

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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

bri·co·lage

/ˌbrēkōˈləʒh, ˌbrɪkə-/

noun

(in art or literature) construction or creation from a diverse range of available things.

"the chaotic bricolage of the novel is brought together in a unifying gesture"

- something constructed or created from a diverse range of available things.

"bricolages of painted junk"



Translations, word origin, and more definitions

Bricolage



Growth in Number of Journals

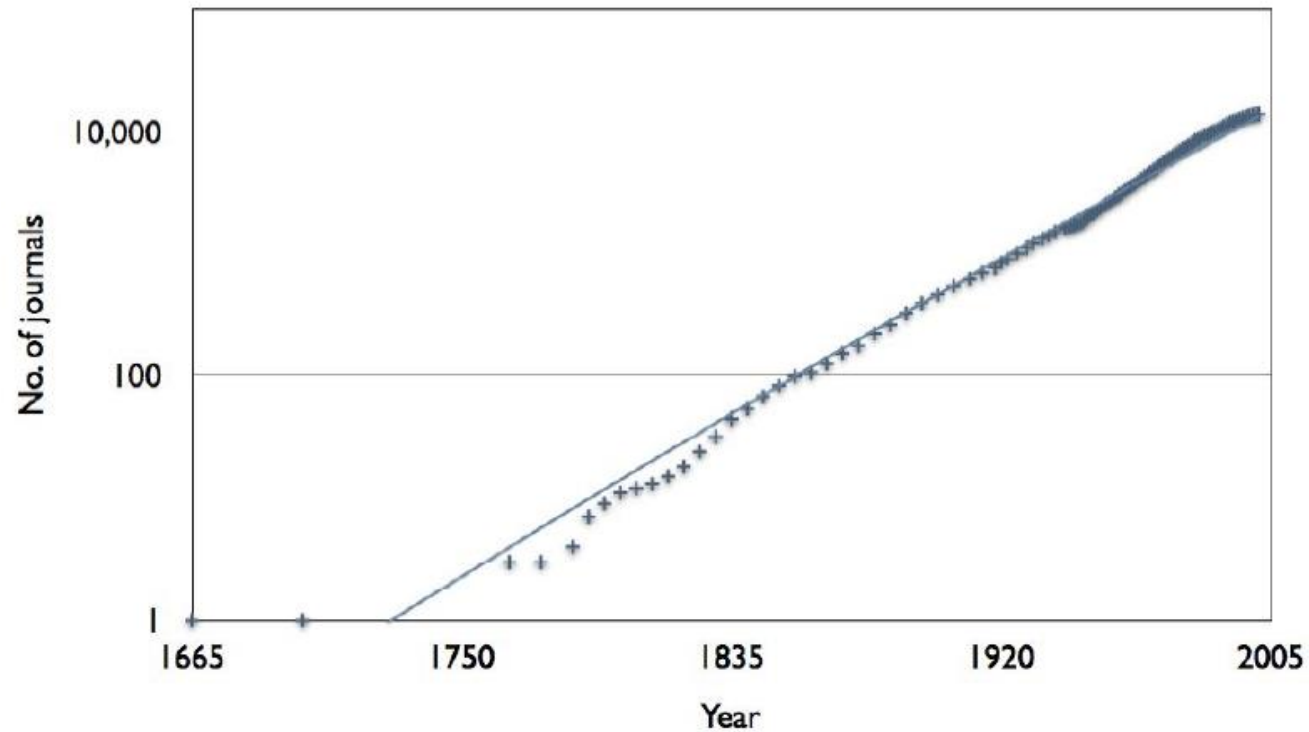


Figure 4: The growth of active, peer reviewed learned journals since 1665 (Mabe 2003)

Print vs E Journals

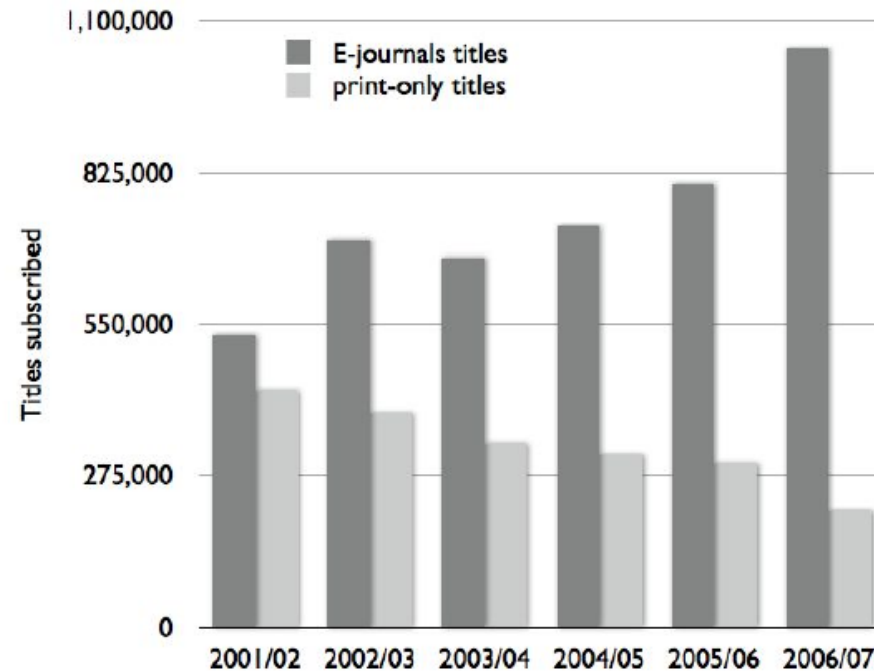
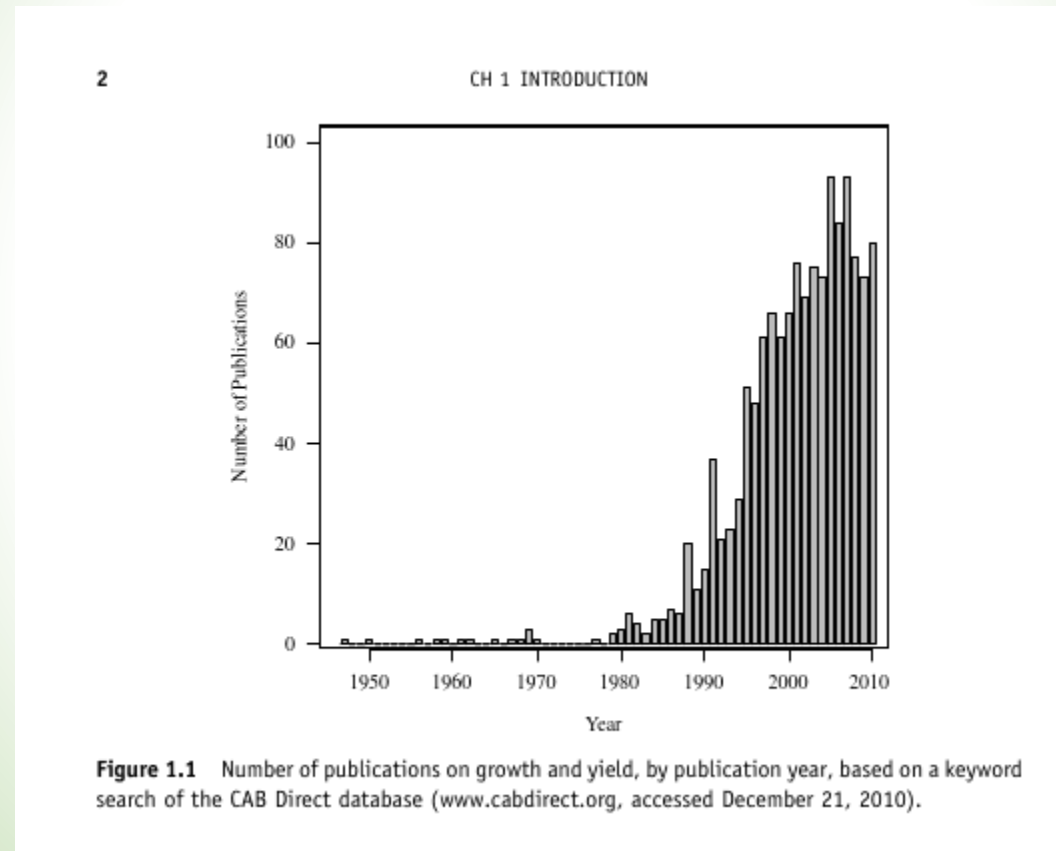


Figure 6: The total numbers of electronic and print-only journal titles subscribed to by the 115 UK universities (Source: SCONUL, from RIN 2009)

Growth and Yield Publications



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



eastern hemlock regeneration



Web

Images

News

Maps

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Search tools



About 165,000 results (0.28 seconds)

[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

Natural **Regeneration** of **Eastern Hemlock**: A Review. Daniel L. Goerlich and Ralph D. Nylandi. Abstract. Successful **regeneration** of **eastern hemlock** involves a.

Eastern Hemlock (Tsuga canadensis) | The St. Lawrence ...

stlawrencelowlands.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 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



eastern hemlock regeneration



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Search tools



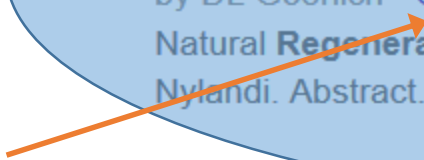
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Google gives a list of who cited this work

Eastern Hemlock (Tsuga canadensis) | The St. Lawrence ...

stlawrencelowlands.wordpress.com/.../eastern-hemlock-tsuga-canadensis/ ▾

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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/>)

- Two versions
 - Stand alone
 - Firefox Browser plugin

Pacific Southwest Rocky Mountain Southern Research Station

Help

All Treearch publications were written or produced by Forest Service personnel and are in the public domain. You can also locate Treearch publications by geography and/or full text searches using [GeoTreearch](#).

GeoTreearch

Publication Series: General Technical Report (GTR)

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](#)

Publication Notes:

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Citation:

McManus, Katherine A.; Shields, Kathleen S.; Souto, Dennis R.; [Editors] 2000. Proceedings: symposium on sustainable management of hemlock ecosystems in eastern North America. Gen. Tech. Rep. NE-267. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 237 p.

My Library NBDNR shelterwood

-3/2 law of self-thinning 3D modelling 3PG model 3-P sampling 3P sampling 6-tree sampling 14C dating 35mm photography 1980 eruption impacts Abies

All Fields & Tags

Title	Creator
Thinking like a scientist about real-world problems: The Cornell Institute for Research on Ch...	Williams et al.
Out-of-roundness in Douglas-fir stems	Williamson
A simple technique for laying out sample plots	Wilson
Numerical expression of stocking in terms of height	Wilson
Evaluation of three thinnings at Star Lake	Wilson
Thinning as an orderly discipline: A graphic spacing schedule for red pine	Wilson
Cover plus: Ways of measuring plant canopies and the terms used for them	Wilson
Combining search techniques and stand visualization to explore and analyze forest inventor...	Wilson
Analysis of the spatial distribution of foliage by two-dimensional point quadrats	Wilson
Inclined point quadrats	Wilson

Info Notes Tags Related

Item Type: Journal Article

Title: Thinking like a scientist about real-world problems: The Cornell Institute for Research on Children Science Education Program

Author: Williams, Wendy M.

Author: Papierno, Paul B.

Author: Makel, Matthew C.

Author: Ceci, Stephen J.

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>
- <http://unimelb.libguides.com/content.php?pid=87165&sid=651752>
- <http://writing.wisc.edu/Handbook/ReviewofLiterature.html>
- Cals, J. W. L., and D. Kotz. 2013. Effective writing and publishing scientific papers, part III: Introduction. *J. Clin. Epidemiol.* 66(7):702.