CITING SCIENCE TO SUPPORT RECOMMENDATIONS: USE OF REFRENCES ACROSS 12 PUGET SOUND SALMON RESTORATION PLANS

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INTRODUCTION

- Policy-makers and environmental managers are often urged to make decisions based on science alone. In reality, the presentation of that science is just as important, as is the inclusion of of other kinds of information, such as:
  - Cost
  - Potential effectiveness
  - Community opinion
- To understand how scientific information was utilized, this study investigated the application of cited references across twelve salmon restoration plans from Lead Entities in the Puget Sound region

RESEARCH QUESTIONS

What kinds of evidence are used in lead entity salmon restoration plans?

- What kind of source is the reference from?
- How current is the reference?
- Is the research from consultants?
- Is the reference presenting natural or social science?
- Is the research applicable in a more local or more broad context?

How is that evidence used to support claims about the following:

- **Status and Trends** – Current status and/or trends in salmon health and population demographics
- **Limiting Factors** – Factors that affect the salmon population. Could include current barriers to growth/recovery or information about salmon needs/factors that promote growth
- **Project Priorities** – Explicit recommendations for projects/areas to focus on
- **Community Support** – Community opinion/reception to proposed actions
- **Planning Process** – Descriptions of required plan drafting processes

METHODS

Phase 1: Qualitative Coding* of Reference Type

- Two coders were assigned to each of the twelve plans, each coding the plan separately
- Coders entered information for each reference (row) under the following categories (columns) in Excel spreadsheets
  - Citation (as listed in reference section)
  - Year published
  - Consultant or non-consultant
  - Source type (ex. scientific book, federal agency)
  - Natural or social science
  - Local or more broad context
- Inter-coder reliability process: Coders then compared their spreadsheets to check for inconsistencies, which were discussed and resolved in order to create a finalized spreadsheet that was as accurate as possible

Phase 2: Qualitative Coding of Reference Use

- Similarly to phase 1, two coders coded each plan separately, then came together to resolve disagreements
- For each reference, the coder located its in-text citation(s), and read the sentence, paragraph, headings, and sub-headings the citation(s) were found in to provide context
- Using this context, the coder would try to determine what kind of claim the reference had been used to support
- The following final main categories for claim type were determined, through an iterative tweaking process between the research lead and coders
  - Status and Trends
  - Limiting Factors
  - Project Priorities
  - Community Support
  - Planning Process
- If a reference was used in support of a particular claim, the coder would add a "1" in the row of that reference and column of that claim type in the Excel spreadsheet. All claim types that the reference was not used to support were marked with a "0" for that reference.
- Disagreements were discussed and resolved. This was a very involved process that required discourse, iterative rule-creation, best judgement, and compromise

*In this context, "coding" refers to inputting data into Excel spreadsheets, not computer programming

Plan Title	Citation	Year	Consultant	Source	Journal	Qu	ns/ss	vertical/ho	status/tren	status/tren	limiting fac	priority prc	community	planning p	other	other - description
LE7	Beamish, R.J., and C. Mahnken. 2001.	2001	0	1	1	1	4	0	0	1	0	0	0	0		
LE7	Beamer, E.M., A. McBride, R. Hender	2006	0	6		1	3	1	0	0	0	0	0	0	Background info	

Figure 1. Sample of finalized spreadsheet for a lead entity plan. Green highlights indicate information that coders initially agreed on, orange highlights are places where there was an initial disagreement that was resolved.

RESULTS

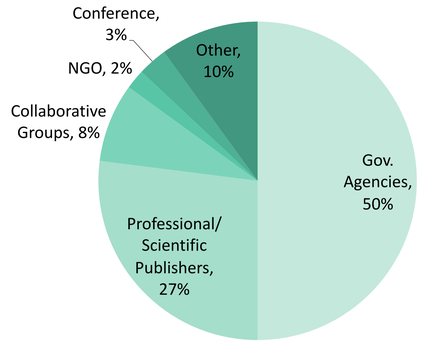

Figure 2. References by source type.

- The vast majority of references were government agency reports
- Professional/scientific publishers (peer-reviewed scientific journals, scientific books, universities) were the second most common source type
- The mean recency of all references was 10 years, with a median of 6 years
- 13% of all references were from consultants
- 34% of references provided information specific to local contexts (watershed)
- 97% of references were natural science, with <1% of references being social science

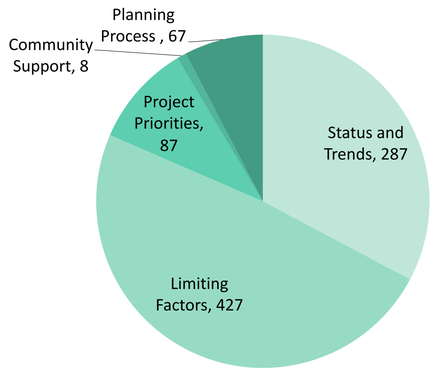

Figure 3. Number of references used to support each type of claim.

- Most references were used to support claims about limiting factors or status and trends
- Far fewer references were used to support claims about project priorities, planning process, and community support

CONCLUSION

- Very little of the information referenced in these plans pertained to social science (<1%)
- The majority of references were also used to describe either limiting factors or current status and trends for salmon populations, with far fewer being used to suggest project priorities or to discuss community reception
- This indicates that the plan authors were mainly concerned with examining the problem at hand (declining salmon populations) and what was causing it (limiting factors)
- Comparatively, far less time was spent discussing benefits and drawbacks of possible solutions, such as community reception or financial feasibility, or recommending projects/areas to prioritize
- Future research might explore whether or not there is a relationship between what kinds evidence is used/how evidence is used and what plans go on to be the most successful in securing funding

ACKNOWLEDGEMENTS

A big thanks to our research team: Amanda Davis, Lexi Ehresmann, Joshua Murray, Myah Pacheco, Clare Tupper and Mason Ward. Funding provided by Center for Urban Waters.

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