Content Analysis to Document Publicly Valued Ecosystem Services of Rivers and Streams

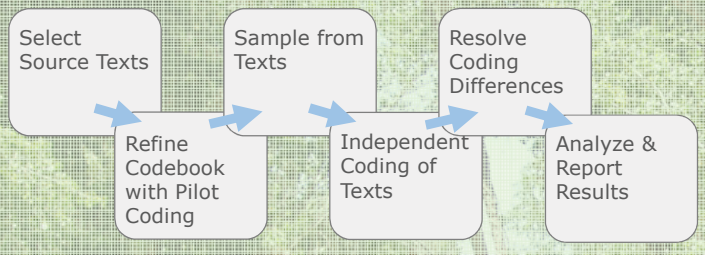
Matthew A. Weber[1], Shannon Caplan[1,2], Paul L. Ringold[1], Karen Blocksom[1]

[1]US EPA Western Ecology Division, Corvallis, OR; [2]Oregon State University, Corvallis, OR

Introduction

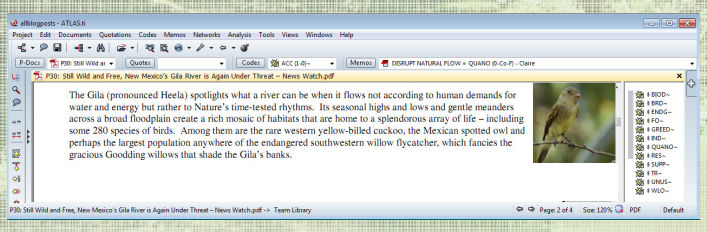
What do people care about? Few empirical efforts are directed towards in-depth understanding of the specific ecological attributes relevant to people, helping to define features to monitor, model, map, or value. To address this gap, we systematically analyze secondary texts about rivers and streams to glean information on such attributes as well as the variety of motivations for interest in rivers. The results document which attributes and motivations exist in these texts and which are most prevalent. The technique used, content analysis, is an established method to quantitatively analyze qualitative data and could be applied to a range of additional ecosystem services research questions.

Project Phases



Methods

Paragraphs in selected river and stream texts were coded based on classification rules documented in a codebook. These classes, or codes, enable us to track the frequency of river attributes and motivations for caring about them as embodied in source texts. The codebook was developed to be inclusive while also providing detail to capture nuances between common codes. Coding was done by two independent persons having no involvement in study design or analysis. Two sources of texts were included in the sample: the Water Currents blog hosted by National Geographic; and New York Times articles indexed under subject terms "rivers", and "creeks & streams". Two full years were included in the sampling interval, 2010 and 2011.



Coding with ATLAS.ti software. Coders highlight paragraphs to generate quotation units and then link one or more codes. The software then facilitates querying and other analysis tools.

Results

Thus far 66 texts have been coded from two sources, involving over 1,000 paragraphs and 2,500 code occurrences. Main code categories and frequency distributions per paragraph are shown below.

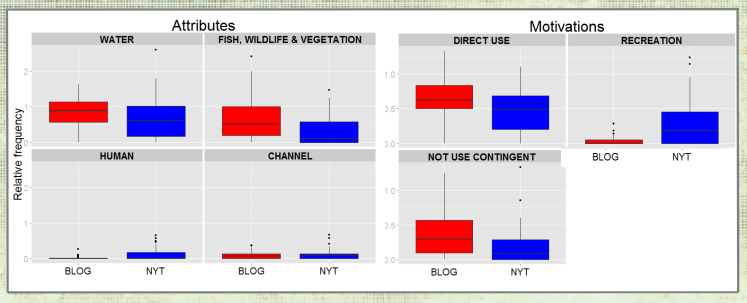
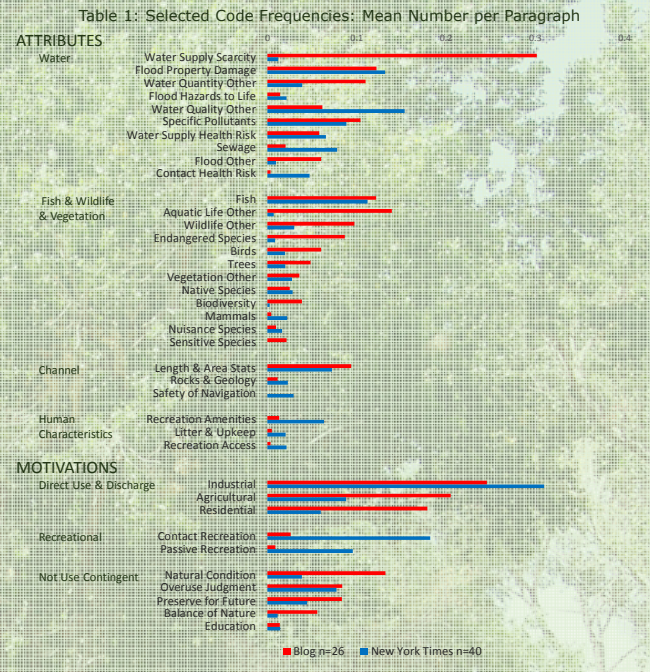


Table 1: Selected Code Frequencies: Mean Number per Paragraph



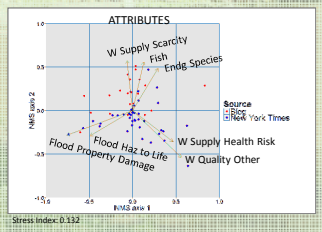
Statistical Analysis

Nonparametric Multivariate Analysis of Variance (MANOVA) tests were run to investigate potential sources of code frequency variability within the attribute and motivation code families. Text source was highly significant. Unravelling codes that differ can be assisted by examining Table 1 as well as Nonmetric Multidimensional Scaling (NMS) plots below.

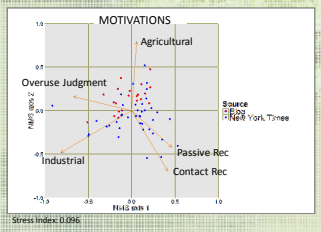
Tables 2 & 3: Multivariate Analysis of Results

ATTRIBUTES	Deg. of Freedom	F Statistic	p-value
Source	1	2.149	0.021
Year	1	1.407	0.151
Source X Year	1	0.643	0.806
Residuals	57		
Total	60		

MOTIVATIONS	Deg. of Freedom	F Statistic	p-value
Source	1	5.281	0.001
Year	1	1.943	0.060
Source X Year	1	0.413	0.887
Residuals	57		
Total	60		



Stress Index: 0.132



Stress Index: 0.096

Main Points

- The most prevalent attribute codes were Water Supply Scarcity, Flood Property Damage, and Fish. Ecological considerations such as Biodiversity and Native Species also appear but with less frequency.
- The most prevalent motivation codes were the three Direct Use & Discharge codes: Industrial, Agricultural, and Residential. Taken as a whole, the codes Not Contingent on Use were about half as common.
- Text source is strongly associated with varying code frequencies. Year shows limited importance. Thus, future studies should account for both source and year in their sampling designs.
- Continuing analysis is exploring correlations between attribute and motivation code families. This is important in providing insights into what features are important to which beneficiaries.

Acknowledgments: Tony Olsen, Claire M. Ostanovich, and Brian M. Wilson.

Prepared for: A Community on Ecosystem Services Conference. Dec. 8-12, 2014, Washington, DC.

Background photo: Upper Santa Cruz River, AZ