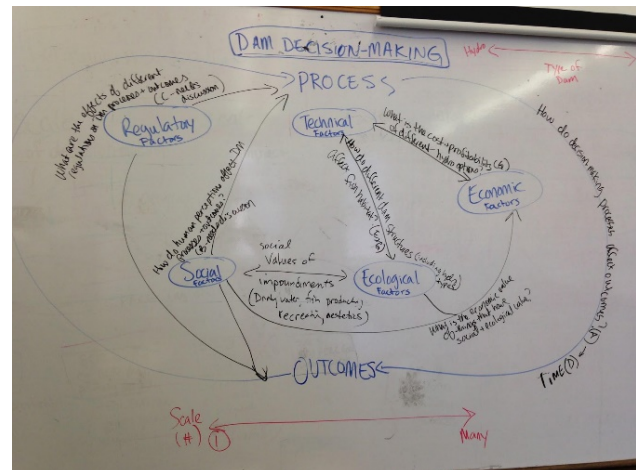


## Media Discourse Analysis Decision Criteria and Alternative Coding Methods and Trends

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### Research Summary

Dam decisions are complex and highly variable. Over its lifetime, a dam impacts many aspects of a river: ecosystem health, water quality, migratory fish passage, indigenous cultural heritage, and more. These factors are what we call "decision criteria". Although their lifetimes are long, dams are temporary pieces of infrastructure and may need to be removed someday. Dam projects with hydropower operations licensed through the Federal Energy Regulatory Commission (FERC) must be reassessed every 30-50 years by law. Decision criteria may influence how decision makers view the choice of "decision alternative" for a dam when the owner applies for relicensing through FERC. Decision alternatives are the different possible outcomes for a dam and typically include the status quo and a set of proposed changes for a dam - remove a dam, improve hydropower generation, improve fish passage, etc. Multi-Criteria Decision Analysis (MCDA) is a structured decision-making framework for balancing various decision criteria and alternatives to inform decision making. The decision criteria are weighted using decision maker preferences to determine appropriate decision alternatives for site-specific situations. Our goal is to use the findings from our Media Discourse Analysis (MDA) (McGreavy et al., 2017) to inform a [MCDA decision support tool](#) for the Penobscot watershed by assessing the most mentioned decision criteria and alternatives from media sources.



This photo shows the process and outcomes that occur within dam decision-making, relating a variety of factors together to show the intricate web that exists in this realm.

## Description of Research

The Future of Dams MDA effort involves a database of 1480 articles acquired from New England regional and U.S. national newspapers. Articles in the database were published from 1993-2016 and collected from the academic database LexisNexis using search terms “dam removal” and “remove the dam” (McGreavy et al, 2017). The collected news articles are being used in multiple ways across the Future of Dam project. In my work, I use news articles to identify decision criteria and decision alternatives for an MCDA study by noting the number of articles that contain root search terms (e.g., “hydro”, “generat”, or “remov”). This initial, quantitative content analysis informs my subsequent qualitative content analysis to refine the development of the MCDA approach. First, I determined the type of criteria and alternatives that are mentioned, by coding the words that are mentioned based on a previously created codebook of qualitative codes. I then compiled the results in a table that shows how different decision criteria and decision alternatives are mentioned together and separately in a matrix, which will eventually allow us to compare decision components (Figure 1).

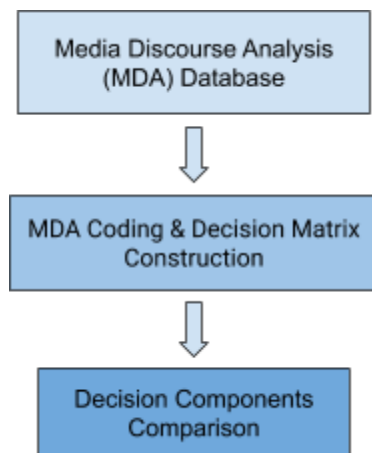


Figure 1. Linear visual of the coding process.

To accomplish the first step, Tyler Quiring and I created a codebook of decision criteria and

alternative roots and then committed the articles in MS Excel. Tyler also created a script to search through all of the article text, coding 1 if the root was present in the text, 0 if not. This frequency coding was done for a random sample of 10% of the news articles (n=150). Rafael Mata and I took a smaller group of the first 40 random sample articles and coded them using a set of sub-codes. For example, if Excel coded a 1 for the criteria “fish” we read through the article to identify the species of fish, replacing the 1 with the species name. Inter coder agreement (ICA) was then conducted between Rafael and I’s codes to ensure we were identifying the same mentions. I then created a decision matrix for these sub-codes with decision alternative rows and decision criteria columns. In each cell, I tallied the number of times that each decision criterion was mentioned in an article that also mentioned a specific decision alternative. For analysis, many of these criteria were combined based on similarity, giving us a more manageable number of criteria to work with (Figure 2).

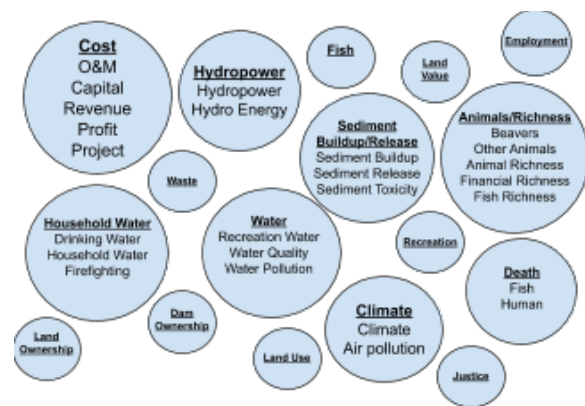





Figure 2. Visual of decision criteria grouping (circle size based on number of criteria grouped).

From the coding of 40 media articles within the MDA database, our current decision matrix shows that the broader code “cost” is the most mentioned criterion (n=49) showing up most frequently with the alternative “Legislation - Regulation” (n=23). The criterion “hydropower”

was the second most frequently mentioned (n=29) term, also showing up most often with “Legislation - Regulation” as the decision alternative being considered. Decision criterion “fish” was third most mentioned (n=28) showing up most frequently with the decision alternative “Legislation - Regulation” (Figure 3).

Criteria	Overall No. Mentions
 Cost	49
 Hydropower	29
 Fish	28

**Figure 3.** Results for top decision criteria mentions (Raffier, Fox, & Klein, 2019).

It is also worth noting that “dam ownership” was mentioned much more than “land ownership” and we saw no mentions of “Retrofit - new hydropower”, “Retrofit - increasing hydropower”, or “Retrofit - structural” for decision alternatives.

## Discussion of Work

MDA is useful in understanding how newspapers may characterize dam decisions, which is important because these articles are part of the public record and inform the meanings that can be made about dams and rivers (Benson, Quiring, McCreavy, & Raffier, 2018). The matrices created from the decision criteria and alternative coding help account for multiple aspects of a decision at once to support the decision-maker in arriving at the most suitable decision using MCDA. By using this MDA-based decision matrix to inform our MCDA decision support tool, we are ensuring one prevalent perspective (news media characterization) on dam decision-making is included in our analysis and set of resources we plan to share with stakeholders. This decision matrix allows us to see what alternatives are being considered the most in the news media. Similarly, it helps to

visually identify trends in the kind of criteria mentioned in the context of specific dam decisions. We can also compare the results from this work to another qualitative analysis of stakeholder opinions from a series of interviews done by members on the Future of Dams team. This MDA work will contribute to the analysis by adding another layer of depth to the comparison. These analyses help contribute to how the decision landscape surrounding dams is being presented to the public, which can be biased, filtered, and framed differently from what stakeholders actually think. By using MDA in connection with MCDA, we can better understand the complex perspectives surrounding dam decisions.

## Biography

[Kaitlyn Raffier](#) is an undergraduate student at the University of Maine who graduated May 11th, 2019 with her BS in Ecology and Environmental Science and her BA in Economics. She currently works as a research assistant under PhD student, Emma Fox, and Associate Professor Dr. Sharon Klein helping collect cost data to inform their Multi Criteria Decision Analysis model. Kaitlyn has played a large role in science communication on the Future of Dams team creating multiple [fact sheets](#) about dams in Maine. Kaitlyn also has an interest in database management and design and wishes to keep working in the renewable energy sector upon graduation.

## Collaborators

- [Tyler Quiring](#) is a Ph.D. candidate studying Environmental Communication in the Department of Communication and Journalism at the University of Maine.
- [Dr. Sharon Klein](#) is an [Associate Professor](#) in the University of Maine’s School of Economics. She is an interdisciplinary energy researcher, and studies community energy initiatives, community solar, small-scale

hydropower, and decision making using Multi-Criteria approaches.

- [Emma Fox](#) is a [Ph.D. candidate](#) in Ecology and Environmental Science at the University of Maine's School of Economics. She is interested in participatory processes and building better tools to support renewable energy and natural resource decision making.
- [Brawley Benson](#) is a fourth-year international affairs student at the University of Maine. He is interested in decision making processes around dams in terms of conflict and cooperation.
- Rafael Moore Mata is a graduate of the University of Maine (2018).

### Recent Work

- Kaitlyn Raffier, Emma Fox, Dr. Sharon Klein. Says Who? A Dam Decision Matrix Comparison Between Stakeholders and News Media. 2019. Presentation
- Benson, Brawley. Evaluating Sustainable Decision Making on Water Resources: Comparing Cooperation around the Aral Sea and Penobscot River. 2019. University of Maine Honors Thesis.
- Kaitlyn Raffier, Tyler Quiring, Dr. Sharon Klein, Emma Fox, Dr. Bridie McGreavy. Using Mixed-Method Media Discourse Content Analysis to Inform MCDA about Dams. 2018. Presentation.
- Benson, B., Quiring, T., McGreavy, B., & Raffier, K. (2018, April). How discourse shapes dam decision making: News stories

as sites of meaning. Poster presented at the UMaine Student Symposium, Bangor, ME.

- Quiring, T., McGreavy, B., Gottschalk Druschke, C., Lundberg, E., & Randall, S. (2017, November). "Are dams set in stone?": How things come to matter through media. Paper presented at the National Communication Association Conference, Dallas, TX.
- Druschke, C. G., McGreavy, B., Randall, S., Fisher, A., Lundberg, E., & Quiring, T. (2016, September). The undamming of America: Media discourse about dam removal and hydropower decision making in the Northeastern USA. Poster presented at the Under Western Skies conference, Calgary, AB.

### Citations

McGreavy, B., Quiring, T., Roy, S., Wilson, K.A., Souza, S., Hart, D., Gardner, K., Gottschalk Druschke, C., Ashcraft, C.M., Fultineer, S., Jansujwicz, J., Klein, S., Mo, W., Vogler, E., Gold, A., & Uchida, E. (2017, Aug. 21). How do we decide what to do with dams? Dynamic Design Planning (DDP) to shape collaboration for sustainability science. Presentation at the Resilience Conference, Stockholm, Sweden.

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