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# Deliberating on Missouri River Water Diversions in Congressional Committee Hearings

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**Abstract:** We examine the discursive influence of competing interest groups and how and when U.S. federal legislators use empirical evidence to consider Missouri River diversion projects originating in the relief, recovery, and reform thinking behind President Franklin D. Roosevelt's New Deal. Twelve U.S. Congressional committee hearings that occurred between 1944 and 2006 are content analyzed to demonstrate the nature of instrumental arguments in legislative deliberations. Members of Congress in favor of diversion projects used more economic-based, instrumental arguments than interest group representatives sharing their views while members of Congress opposed to the diversion projects consistently used less science-based, instrumental arguments than did interest group representatives sharing their stance. As a percentage, more instrumental arguments were made in field hearings than in Washington, D.C. hearings. While more economic-based, instrumental arguments were made in Senate-related hearings than in House of Representatives related hearings, in the House more science-based, instrumental arguments were made than in the Senate.

**Keywords:** *evidence-based policy making, Congressional committee hearings, instrumental arguments, Missouri River, Garrison Diversion Unit*

Evidence-based policymaking, in which legislators draw on best available information from a wide range of reputable sources, has become part of the gold standard of modern policymaking practice in the first part of the twenty-first century (Cabinet Office 1999; Bullock et al. 2001; Michaels et al. 2014). Consequently, appreciating the nature of legislative arguments becomes essential to developing an understanding of water policy debates. To that end, we present a critical case in which we examine the nature of the arguments made by supporters and opponents of developing water management infrastructure concerning the Missouri River in the United States. We focus on instrumental arguments, constituting falsifiable, research-based reasoning intended to outline causal relationships between intervention and outcomes of the proposed policy as a function of the policy (Esterling 2004). As did Fisher et al. (2013b), we focused on statements involving science and economics as representing instrumental arguments.

## Why Look at Information in the Legislative Process?

Decision makers draw on information supportive of their stances in discussing specific solutions (Brewer 1973) and use it to further political ends when arguing with those presenting conflicting views (Weible 2008). Scientific information is used to contribute to a deeper and more accurate understanding of fundamental processes of the substance of policy and also as a tool in political deliberations (Caldwell 1984; Litfin 2000; Nicholson-Crotty 2005; Weible 2008; Montpetit 2011) because it is seen to lend political legitimacy (Smith 1992; Demeritt 2001; Keller 2009). In a similar vein, economic advice, specifically cost-benefit analysis, is used to evaluate policy alternatives (Weingast et al. 1981).

In the United States there is a premium placed on "rational" decision making. In Congress this plays out as valuing "a process in which alternatives are identified and the costs and benefits of major alternatives are considered before a choice is made" (Weiss 1989, 417). Science is used as an important means for legitimating government decisions because of a prevailing belief in the rationality of science among those closely associated with the policy process in the rationality of science (Jasanoff 1997; Konig and Jasanoff 2002; Keller 2009). Yet scientific evidence, even when it is highly salient, is not necessarily the basis of the arguments made by proponents and opponents of reform (Appollonio and Bero 2009).

## Environmental and Water Legislation

While much scholarship on environmental policy has scrutinized the emergence and implementation of landmark environmental legislation from the second half of the twentieth century (for example, see Sabatier 1975 on the 1970 Federal Air Quality Amendments and the 1972 Federal Water Pollution Control Act Amendments; Czech and Krausman 2001 on the 1973 Endangered Species Act; Stern et al. 2010 on the 1969 National Environmental Policy Act), we contribute to the literature by considering the evolution of deliberations originating in New Deal thinking about "harnessing" natural resources and alleviating unemployment (Pisani 2002). This is valuable because the way in which natural resources are managed is a function of legislation emerging from different eras of thinking about human relations to the natural world. It is vital to acknowledge the historical premises coloring deliberations about changes to the landscape (Kraft and Vig 2010).

Since the early 1820s Congress has recognized the federal government's responsibility to develop water resources (Ferejohn 1974). Historically, U.S. federal legislation pertaining to rivers has been among the most distributive of all policies (Krehbiel 1991), in which economic benefits are concentrated geographically, including expenditures for the projects' inputs, and costs are spread nationwide through general taxation (Shepsle and Weingast 1981). We examine Congressional deliberations because one of Congress' critical roles in interstate river governance is appropriating funding for federal dams (Seligman 2008). Authority over federal funding of infrastructure enabling cross-border diversions is key because the United States has maintained it has absolute sovereignty over territorial waters including boundary waters within its jurisdiction (Hearne 2007).

## Diverting Water from the Missouri River

Diverting water from the Missouri River has been a longstanding goal in North Dakota, at one time the United States' most rural state (United States 1975). Arthur A. Link, Governor of North Dakota and Chairman of the North Dakota Water Commission explained in his 1975 testimony in Bismarck, ND before the Conservation, Energy, and Natural Resources Subcommittee of the Committee of Government Operations: "A Missouri River diversion in our State has been the object of well over a half century of effort by many public-spirited North Dakotans. Over the years, State administrations have consistently supported and worked for the development of the project. Our entire congressional delegation has consistently supported the project, as have the State's major farm organizations" (United States 1975, 6-7).

The Missouri River constitutes 96% of the state's surface water (United States 2006) and is the state's primary reliable water resource other than limited groundwater supply (Bartlett 1988). With an economy where agriculture is a key component and a semi-arid climate with annual rainfall in the range of 8 to 16 inches, the appeal of very stable water supplies is understandable. This is particularly true in light of the adverse consequences experienced in the state from extreme weather conditions, such as occurred in the drought associated with the Depression of the 1930s (United States 1975).

The origin of the Garrison Diversion is tied to the 1944 Pick-Sloan Act, which authorized a series of large dams, operated by the U.S. Corps of Engineers, on the Missouri River mainstream between Fort Peck, Montana and Sioux City, Iowa, including Garrison Dam in central North Dakota. Lake Sakakawea, which impounds the water behind the Garrison Dam, is the third largest

reservoir in the United States, after Lake Mead at Hoover Dam and Lake Powell at Glen Canyon Dam (Billington and Jackson 2006). In 1957 the Bureau of Reclamation recommended diverting water from the Garrison Dam and Lake Sakakawea to irrigate over one million acres along with other water development in central and eastern North Dakota. In 1965 Congress enacted legislation for the Garrison Diversion Unit for 250,000 irrigated acres and for municipal and industrial use, fish and wildlife habitat, and recreation. In 1984 construction was halted because of concerns about the Diversion Unit's environmental impact, interbasin water transfer from the Missouri River Basin into the binational (U.S. and Canada) Hudson Bay Basin, land acquisition, and irrigation economics. The passage of the Garrison Diversion Unit Reformulation Act of 1986 authorized the 1984 Garrison Diversion Commission's recommendations including irrigating 130,940 acres, none of which drain outside the Missouri River Basin. The decision by President George H.W. Bush's administration not to fund the Garrison Diversion Unit Project for fiscal year 1991 spurred the Secretary of the Interior to form a task group to develop a policy on funding the authorized project. The Garrison Diversion Reformulation Act of 1986 was further amended by the Dakota Water Resources Act of 2000 (Garrison Diversion Conservancy District 2014). In sum, in successive iterations the extent of irrigation proposed for the Garrison Diversion Unit has been downscaled.

Diverting water from the Missouri River was introduced to Congress on the presumption it was a socially efficient policy (United States 1944a; United States 1944b). As such the expectation was that it served "national interests by creating new opportunities to meet society's aspirations for public policy" (Esterling 2004, 76). The large-scale infrastructure construction was seen as the means to generate jobs for returning World War II veterans in dam construction and in the farming of irrigable lands made possible by dam construction (United States 1944a; United States 1944b). When the predecessor to the Garrison Diversion, a Missouri River based irrigation project, was not initiated at the outset, subsequent and progressively smaller iterations of the project failed to satisfy increasingly demanding benefit-cost evaluation criterion (Caldwell 1984). As one congressional staff member familiar with public works programs noted, "The logic in this program was lost long ago" (Grier 1983).

## Congress and Congressional Committee Hearings

Esterling (2004) rejects the "textbook" depiction of Congress predicated on the portrait of the U.S. legislative process as a direct democracy having little regard for policy expertise. In his revised depiction of Congress, citizens may be willing to encourage their representatives to use expertise in policy deliberations and members of Congress who deploy expertise in researching and developing policy are rewarded professionally for doing so.

We look to Congressional committees because within the U.S. Congress, the committee system is the primary means by which information is assembled, analyzed, and disseminated (Arnold 1990). Members of Congress seek out committees where they can serve their constituents' interests directly, including "channeling additional federal money into ventures that benefit them [constituents]" (Weiss 1989, 413). Consequently, the bias in committee recruitment is in favor of those who advocate for the specific mission of a committee (Weiss 1989).

The initial screening of information is important in deciding the final outcome (Schneier and Gross 1993). As Jones and Baumgartner (2004) note, the most pronounced effect of information flows often occur early in the policy process. Information provided through testimonies has often been overlooked as a factor in determining Congressional action since it is not necessarily the most influential consideration (Schneier and Gross 1993; Burstein and Hirsh 2007). There is no consensus an unambiguous connection exists between information presented at Congressional hearings and Congressional action. Those rejecting such a linkage point out that not much information is provided at hearings, rather hearings are theatrical events for advertising and position taking in which witnesses are chosen for reasons of politics and what is said by them is known in advance. Furthermore, members of Congress may already be familiar with the information provided at hearings,

particularly if the issue being discussed is important, has been on the agenda for a while, or the legislator is a long-time member of Congress (Mayhew 1974; Diermeier and Feddersen 2000; United States 2006; Burstein and Hirsh 2007; Oleszek 2011).

These criticisms suggest why hearings might be dismissed as symbolic gestures (Oleszek 2001) and public relations maneuvers (Olzak and Soule 2009) and why there is a lack of agreement among scholars about the precise role of Congressional hearings (Truman 1951; Huitt 1954; Talbert et al. 1995). Yet hearings raise the profile of an issue (King et al. 2007), framing it for the press and the public (Maguire 2013) and are an essential component of the process of agenda setting (King et al. 2007). Arnold (1990), Baumgartner and Jones (1993), Burstein and Hirsh (2007), Liu et al. (2011), Gruszczynski and Michaels (2012), and Fisher et al. (2013a) note hearings are key sources of information in the U.S. legislative process. Fisher et al. (2013b) in particular explain how hearings provide a venue for clashing scientific, political, and economic interests.

Esterling (2004, 257) contends, based on qualitative interviews and statistical evidence, that hearings reflect what committees do behind the scenes and therefore "serve as an empirically valid window on the overall legislative process." He proposes that these hearings "present a useful forum for testing hypotheses about legislative debate, since they are public, fully transcribed, typically focus on a specific policy topic, and committee members and their staff often have the background knowledge and specialization sufficient for informed discussion" (Esterling 2004, 253). Thus, analyzing public hearings provides a means for learning how policy issues are framed and what types of arguments and evidence are presented (Appollonio and Bero 2009).

## Constructing the Hypotheses

Esterling's approach (2004; 2007; 2009; 2011) to argument construction in legislative bodies is predicated on members of Congress benefitting from active interest groups' expertise on the effects of policies. That proponents and opponents of a policy each form a coalition supportive of their respective views is a feature of what Dahl (1961) and Truman (1951) identify as a pluralist understanding of how the political process works. For example, Cheon and Urpelainen (2013) use renewable electricity generation to demonstrate the importance of the countervailing effects on environmental policy created by competing interest groups. Yet, while legislators are consistent actors in Congressional deliberations, competing interest groups and their countervailing effects (Cheon and Urpelainen 2013) have not always been ubiquitous in all Congressional arenas. For example, when the dams on the main stem of the Missouri River were proposed in the 1944 Flood Control Act, there was far less organized support and opposition than emerged subsequently about the Garrison Diversion (United States 1944a; United States 1944b; United States 1975; United States 1998).

To understand the discursive influence of the competition between active, opposing interest groups integral to Esterling's conceptualization, we pose the following hypotheses:

> *H1*: The number of instrumental arguments made by members of Congress will not vary as a function of argumentative competition between interest groups in favor or opposed to Missouri River related diversion projects.
>
> *H2*: In hearings when interest groups provide testimony, elected officials' use of instrumental arguments will be consistent with the arguments of interest groups who share their positions.

Esterling (2004) speculates that because Republicans are more concerned about aggregate wealth than Democrats they will be more often the targets of instrumental arguments than Democrats. To test this we pose our third hypothesis:

> *H3*: More instrumental arguments will be employed in committee hearings taking place in Republican-majority Congressional chambers than in Democratic-majority Congressional chambers.

We anticipate the venue of the hearing, whether it is held in the U.S. Capitol Complex in Washington, D.C. or outside Washington, D.C., will affect the extent to which instrumental arguments are presented. To test this we pose our fourth hypothesis:

> *H4:* Field hearings will include fewer instrumental arguments than hearings held in Washington, D.C.

While field hearings and Capitol Hill hearings involve some different administrative considerations, much of the procedural requirements are the same (Heitshusen 2007). Field hearings provide local venues for federal legislators to demonstrate to their constituents that they identify and empathize with them (Esterling 2007), their "fiduciary behavior" is consistent with constituents' policy outcome preferences (Bianco 1994, 12), and their thinking and response to issues are in accord with whom they represent (Fenno 1978). As such, field hearings would seem to be venues where it would be understandable to emphasize the external effects and intrinsic desirability (Caplan 1977; Webber 1984) of the federally funded works proposed.

Based on previous scholarship, we anticipate a difference between Senate and House committee hearings in the amount of instrumental arguments presented. Esterling (2011) and Mucciaroni and Quirk (2006) found evidence-based arguments were more prevalent in Senate committees than in House committees. To test this we pose our fifth hypothesis:

> *H5*: Senate hearings will feature a greater number of instrumental arguments than hearings in the House of Representatives.

## Methodology

Using content analysis, we systematically measure the information witnesses present during Congressional hearings (Esterling 2004; Burstein and Hirsh 2007; Keller 2009) through the use of the transcripts from hearings (see Huitt 1954; King 1993; Esterling 2004; Burstein and Hirsh 2007; Keller 2009). Content analysis has a long tradition in public policy research, especially for probing Lasswell's definition of the symbolic meanings of politics (Lasswell and Leites 1949; Edelman 1964; 1971). In the past, most content analyses focused on framing public policies based upon media depictions rather than on the processes followed by policymaking institutions (see Huitt 1954; King 1993; Burstein and Hirsh 2007; Newton 2008; Harris 2010; Tzoumis 2001).

Table 1 lists the 12 Congressional committee hearings we content analyzed. These hearings encompass all legislative committee hearing deliberations about construction of Garrison-related water management infrastructure projects in the U.S. Congress. To ensure we obtained documentation for all of the relevant hearings, we searched the *LexisNexis* Congressional database and the *Library of Congress* database. The earliest hearings we analyzed centered on implementing the Flood Control Act of 1944, authorizing multipurpose dams on the Missouri River. Hearings from the 1950s through the 1980s focused on irrigation projects authorized by the Flood Control Act of 1944 that had not been implemented yet. The hearings of 1998 and 2006 considered implementing elements of the Garrison Diversion not yet developed. Although our data is time-series in nature, we analyze the hearings as a set, examining how instrumental arguments are made in hearings pertaining to one group of projects.

The texts of the Congressional hearings listed in Table 1 were obtained from a variety of sources. Post-1980 hearings were obtained through the web site of the U.S. Congress. Pre-1980 digital copies of hearings were more difficult to come by. Consequently, we either obtained and digitized physical copies ourselves or obtained digitized copies from university libraries. We then coded for statements made by speakers in reference to proposed water infrastructure projects in an Excel spreadsheet. In all, 3,212 statements from written and oral testimonies were coded for the presence and type of either scientific information about the biophysical world or economic information related to policy.

To test for the reliability of the coding scheme employed, a second coder content analyzed 10% of a random sample of pages from each hearing document, which accounted for 34% of the total number of statements coded in the analysis. Krippendorff's alpha was used as the reliability statistic; given that measure accounts for both the overall congruence of rater agreement and the probability that coding disagreements are the result of chance alone (see Krippendorff 2003). Our Krippendorff's alpha of $\alpha = .968$ indicates that our coding exhibited very high reliability.

## Defining Instrumental Arguments

Table 1 lists the percentage of statements by hearings that were science-based and economic-

**Table 1.** Proportion of instrumental arguments that were science-based and economic-based by Congressional committee hearing.

| Hearing Year[a] | Chamber with which Committee Associated | Science-based Statements | Economic-based Statements | All Statements |
|---|---|---|---|---|
| 1944 | House | 0% (0) | 0.80% (3) | 377 |
| 1944 | Senate | 0% (0) | 0.55% (1) | 183 |
| 1957[1] | House | 0.56% (1) | 7.39% (13) | 176 |
| 1960 | House | 0% (0) | 7.50% (9) | 120 |
| 1961 | Senate | 0.56% (1) | 10.67% (19) | 178 |
| 1963 | Senate | 0% (0) | 9.10% (25) | 275 |
| 1964 | House | 1.05% (5) | 4.53% (21) | 474 |
| 1965 | Senate | 0% (0) | 24.0% (6) | 25 |
| 1975 | House | 44.19% (171) | 5.17% (20) | 387 |
| 1989[1] | Senate | 0.47% (1) | 17.21% (37) | 215 |
| 1998[2] | House[2] | 5.85% (10) | 12.87% (22) | 171 |
| 2006[1,2] | Senate[2] | 31.58% (84) | 7.14% (19) | 266 |

[a] Specific hearings are listed in the References section as "*United States. Year*."
[1] Field hearing; no superscript indicates held in Washington, D.C.
[2] Chamber controlled by Republicans; no superscript indicates controlled by Democrats.

based. We coded statements as science-based instrumental arguments if they referred to broad science constructs, such as water quality, or to particular measures, such as concentrations of nitrates in the Missouri River. We coded statements as economic-based instrumental arguments if they referred to specific benefits, such as the creation of jobs or tax base growth, or impacts of the proposed projects, such as the economic impacts of flooding or the loss of tax revenue from flooded farmland. We coded each statement for the stance of the witness, witness affiliation, whether the statement was made within the hearing or in submitted materials, and argument type.

The following is an example of a science-based instrumental argument from a House of Representatives Hearing (United States 1975).

> *The FES [Final Environmental Statement] also indicates that the Red River presently has an average total dissolved solids concentration of 350 milligrams per liter with ranges from 200 to 550 milligrams per liter. Although there are questions about the reliability of the Missouri River data, even if this data is accepted as reliable, it is apparent that the water quality of the Red River will be degraded by Garrison.*

The following is an example of an economic-based instrumental argument, from a Senate hearing (United States 2006a).

> *The Bureau is risking a large federal cost with little benefit. It is completely unclear that this project is justified based on the analysis to date. Furthermore, the benefits determined by*

*the Bureau are likely to be greatly distorted by the unrealistic population and industrial use projections.*

In preparing the data for analysis we aggregated the data to percentages of science-based and economic-based arguments used by each speaker within each hearing. For the first hypothesis in which we posit that members of Congress will not alter the amount of instrumental rationale used as a function of interest group competition, we created a ratio of interest group competition by subtracting the number of groups testifying in opposition to these manipulations from the number of groups testifying in support of the manipulations, and then dividing by the sum total of all interest groups in each hearing. This nets a ratio of interest group competition that ranges from -1 (all interest groups testifying were opposed to the manipulation) through 0 (equal number of interest groups for/against the manipulation) to +1 (all interest groups testifying were in favor of the manipulation). The caveat is that we did not disaggregate groups into categories based on numbers of members or political influence. For the other hypotheses, dichotomous variables were created to indicate the presence (coded '1') or absence of either scientific- or economic-based arguments.

## Results

We begin by testing Hypothesis H1, that the number of instrumental arguments made by members of Congress will not vary as a function of argumentative competition between interest groups in favor or opposed to Missouri River related diversion projects. What we uncover, as shown in Table 2, is that the substance of the instrumental argument matters. The use of science-based instrumental arguments by members of Congress was negatively correlated with our interest group competition variable ($r = -0.898$, $p < 0.001$). This indicates that when groups in favor of diversion-related projects dominate the hearings (the competition variable approaches +1), use of science-based instrumental arguments by Congressional members decreased. Conversely, as our competition variable moves in the opposite direction (closer to -1, indicating more dominance of groups opposed), use of science-based arguments increased. The presence of interest group competition on this particular policy issue influences the extent to which members of Congress engage in science-based reasoning within the hearings. Hypothesis H1 is thus rejected for science-based, instrumental arguments.

Examining the correlation between use of economic-based instrumental arguments by members of Congress and interest group competition paints a different picture. Though a moderate correlation was found between economic-based instrumental arguments and interest group competition ($r = 0.324$, $p = 0.331$), the correlation was not statistically significant, which might be attributed in part to the small sample size in our data. Thus we reject Hypothesis H1 as it relates to economic arguments.

**Table 2.** H1 – Pearson's *r* correlations between interest group competition and use of instrumental arguments by members of Congress.

| Instrumental Arguments by Members of Congress | Interest Group Competition Ratio |
|---|---|
| Science-based | -0.898 ($p < 0.001$) |
| Economic-based | 0.324 ($p = 0.331$) |

We turn now to H2, that in hearings when interest groups provide testimony, elected officials' use of instrumental arguments will be consistent with the arguments of interest groups who share their positions. As before, we consider separately science-based and economic-based instrumental arguments. Table 3 presents the breakdown in the proportion of science-based instrumental arguments by members of Congress and interest groups. Proponents of the projects, whether serving as members of Congress or representing interest groups, employed a very low proportion of science-based, instrumental arguments. That said, there was still a significant pattern of relationship in the proportion of science-based arguments used between the two groups ($\chi^2 = 5.710$, $p < 0.05$), with members of Congress using more than double the science-based statements (2.89%) than interest group representatives (1.00%). The use of science-based arguments by opponents of the projects was

also significantly different between the groups ($\chi^2 = 13.110$, $p < 0.01$), with representatives of interest groups opposed to the projects employing three times the percentage of science-based arguments (52.29%) compared to members of Congress opposed to the projects (17.65%). On the whole, this is evidence that H2 is rejected, as little overlap appeared to occur in the use of instrumental arguments, whether in terms of proponents or opponents of the projects.

**Table 3.** H2 – Proportion of science-based arguments by members of Congress and interest groups.

| | Positive | Negative |
|---|---|---|
| **Members of Congress** | 2.89% (10) | 52.29% (137) |
| **Interest group representatives** | 1.00% (2) | 17.65% (6) |
| Chi-Square test for column differences | $\chi^2 = 5.710$, $p < 0.05$ | $\chi^2 = 13.110$, $p < 0.01$ |

Table 4 presents the breakdown in the proportion of economic-based instrumental arguments by members of Congress and interest group representatives. Those in favor of the projects employed more economic-based arguments than did those opposed, and a significantly higher ($\chi^2 = 11.258$, $p < 0.01$) proportion of economic-based statements were made by members of Congress (13.58%) compared to representatives of interest groups sharing their stance (6.18%). Both members of Congress and representatives of interest groups opposed to diversion-related projects employed a low proportion of economic-based arguments with no significant difference between them ($\chi^2 = 0$, $p = 1.0$). The lack of significance is explained by there being only one economic-based statement by interest groups opposed to diversion-related projects and Chi-square tests need more than one value in a cell to compute. That said, H2, as it relates to economic-based arguments, is rejected.

In summarizing our findings about Hypotheses 1 and 2 we can say the dynamic between the arguments of members of Congress and those of interest groups is more nuanced than we anticipated. For example, in H1 there was no systematic relationship between economic-based instrumental arguments by members of Congress and interest group competition. In H2 there was no systematic consistency in the use of instrumental arguments between members of Congress and representatives of interest groups on the same side of the issue. Importantly, we consider the likelihood that systematic differences might exist between North Dakota legislators and legislators from outside the state; to that end, we conducted additional analyses of the use of instrumental arguments. We found only small differences (one fewer statement by North Dakota legislators) in the case of science-based instrumental arguments and no differences in the case of economic-based instrumental arguments.

**Table 4.** H2 – Proportion of economic-based arguments by members of Congress and interest groups.

| | Positive | Negative |
|---|---|---|
| **Members of Congress** | 13.58% (47) | 2.94% (1) |
| **Interest group representatives** | 6.18% (26) | 4.58% (12) |
| Chi-Square test for column differences | $\chi^2 = 11.258$, $p < 0.01$ | $\chi^2 = 0$, $p = 1$ |

We turn next to Hypothesis 3; more instrumental arguments will be employed in committee hearings taking place in Republican-majority Congressional chambers than in Democratic-majority Congressional chambers. Table 5 presents the use of scientific and economic instrumental arguments employed in Congressional committee hearings with either majority Democratic or Republican memberships. There was a significant difference ($\chi^2 = 115.757$, $p < 0.01$) in the proportion of science-based statements when Republicans controlled a Congressional chamber (27.41%) compared to when a Congressional chamber was under Democratic control (8.02%).

This pattern of relationship holds for the use of economic-based instrumental arguments in Congress ($\chi^2 = 5.646$, $p < 0.05$), with Republican control associated with the use of more economic statements (10.35%) than when there is a Democratic majority chamber (6.83%) (Table 5). As stated previously, we coded statements as economic-based instrumental arguments if they referred to specific benefits, such as the creation of jobs or tax base growth, or impacts of the proposed projects, such as the economic impacts of flooding or the loss of tax revenue from flooded farmland.

**Table 5.** H3 – Proportion of science and economic-based arguments by majority party.

| | Science | Economic |
|---|---|---|
| **Democratic** | 8.02% (179) | 6.83% (154) |
| **Republican** | 27.41% (94) | 10.35% (41) |
| Chi-Square test for column differences | $\chi^2 = 115.757$, $p < 0.01$ | $\chi^2 = 5.646$, $p < 0.05$ |

As indicated previously in Table 1, Democrats were the majority party in the Congressional chamber associated with the hearings we analyzed in all but the last two instances: during the 1998 House session and during the 2006 Senate session. We created a variable that captured the proportion of Democrats in each chamber during the time frame of each of the hearings. Subsequently we correlated this measure with the proportion of both science-based and economic-based instrumental arguments. We found no significant correlation between the proportion of Democratic members of Congress and either the proportion of science-based instrumental arguments used in the hearings ($r = -0.067$, $p = 0.828$) or the proportion of economic-based instrumental arguments ($r = 0.277$, $p = 0.360$). This is a noteworthy caveat in thinking about the relationship between use of instrumental arguments and party control. Given this data, we cannot say with confidence whether H3 is rejected or not; rather, it is likely that the relationship between partisanship and instrumentalism is more complex than our data allow us to test.

We turn now to Hypothesis 4, which posits that field hearings will include fewer instrumental arguments than hearings held in Washington, D.C. Of the 12 hearings we analyzed, three were field hearings. Turning first to science-based instrumental arguments, we find that field hearings included a significantly higher proportion of science-based arguments ($\chi^2 = 11.640$, $p < 0.01$, 13.09%) than did hearings held in Washington, D.C. (8.54%) (Table 6). Likewise, a significantly higher proportion of economic-based instrumental arguments were made in field hearings ($\chi^2 = 17.127$, $p < 0.01$, 10.50%) than in Washington, D.C., based hearings (5.75%) (Table 6). Consequently we reject Hypothesis 4.

**Table 6**. H4 – Proportion of evidence-based arguments by location of Congressional committee hearing.

| | Science | Economic |
|---|---|---|
| **Field** | 13.09% (86) | 10.50% (69) |
| **Washington, D.C.** | 8.54% (187) | 5.75% (126) |
| Chi-Square Test for Column Differences | $\chi^2 = 11.640$, $p < 0.01$ | $\chi^2 = 17.127$, $p < 0.01$ |

Our fifth hypothesis states that committee hearings in the Senate will feature a greater number of instrumental arguments than those in the House of Representatives. The first column of Table 7 presents the use of science-based instrumental arguments in the committee hearings of the House and Senate. A significantly higher proportion of science-based arguments are made in the House than in the Senate ($\chi^2 = 8.927$, $p < 0.01$). Comparing the use of economic-based, instrumental arguments between the two chambers, shown in the second column of Table 7, reveals the opposite; a significantly higher proportion of economic-based instrumental arguments are made in the Senate compared with the House ($\chi^2 = 18.329$, $p < 0.01$).

**Table 7.** H5 – Proportion of evidence-based arguments by Congressional chamber.

| | Science | Economic |
|---|---|---|
| **House** | 10.97% (187) | 5.16% (88) |
| **Senate** | 7.53% (86) | 9.37% (107) |
| Chi-Square Test for Column Differences | $\chi^2 = 8.927$, $p < 0.01$ | $\chi^2 = 18.329$, $p < 0.01$ |

## Discussion

The results of our analyses suggest the need for a nuanced understanding of the presence and use of instrumental arguments in Missouri River diversion-related debates. While elected officials may see the value of demonstrating a rational approach to decision making (Esterling 2011), instrumental statements do not dominate the discussion. The use of instrumental arguments falls far short of being pervasive in the Congressional committee hearings we examined.

### Argumentation by Members of Congress and Interest Group Competition

Cheon and Urpelainen (2013, 894) point to "competing interest groups" having "potentially complex counteracting effects on policy" formation. We recognize the discursive influence of competing interest groups (Esterling 2004) in how the competition of interest groups concerned with Missouri River diversion projects correlates with how frequently members of Congress made science-based statements within the hearings examined. This seems to confirm Esterling's (2004; 2007; 2009; 2011) suggestion that members of Congress benefit from or at least consider what active interest groups share about their informed understanding of the effects of policies. Yet there was no systematic relationship between interest group competition and economic-based, instrumental arguments made by members of Congress within the hearings we examined. This difference may reflect that many legislators were more confident in making economic-based arguments than science-based arguments.

### Comparing the Arguments of Members of Congress and Representatives of Interest Groups

Jones et al. (1993) observe that witnesses in Congressional committee hearings tend to be selected because they share the views of members of the Congressional leadership. Yet we find representatives of interest groups presenting testimony do not employ the same instrumental arguments as the members of Congress with whom they are aligned. While members of Congress may benefit from the active interest groups' expertise on the effects of policies (Esterling 2004; 2007; 2009; 2011), by no means are the arguments they make identical to the arguments of interest groups with whom they share an overall position. With one noteworthy exception, elected officials used more instrumental arguments, science-based and economic-based, in supporting their positions than did interest group representatives who shared their views. The one remarkable exception was among those opposed to diversions; interest group representatives used science-based arguments three times more often as a percentage of total arguments than did members of Congress who shared their views. Caldwell (1984, 852) notes that much of the "active public" opposed to water diversions from Garrison Dam and the reservoir behind it was from people living outside North Dakota who weighed the scientific evidence more heavily than legal rights or historical promises.

Caldwell (1984) considers that the leading consideration in the downsizing of Garrison Diversion projects was economics followed by scientific analysis. While science may be at the core of what makes up evidence (Caldwell 1984; Michaels et al. 2014), in our study science-based arguments form a low percentage of all arguments made. For proponents of the projects, science-based arguments made up a lower percentage of arguments vis-à-vis economic-based arguments, while the opposite was true for opponents. Much to the frustration of scientists, science is one consideration among many that weighs into decision makers' deliberations (Michaels and Tyre 2012). Nonetheless, economic arguments can prove persuasive in debates related to the environment.

Fisher et al. (2013a), in their study of national climate change politics, found that the economic implications of regulating greenhouse gases provided the basis for the largest share of consensus among actors in the 109th and 110th Congress.

### Instrumental Arguments and Majority Political Party

Park et al. (2010) investigated how different issues are framed in political debates using Congressional hearings on climate change. They noted that Democrat-controlled Congressional sessions were more likely to feature hearings on climate change than Republican controlled sessions. In hearings during Democrat-controlled sessions, pro-environmental political actors and mainstream scientists tended to provide testimony. In contrast, representatives from business and industry were featured when Republicans were in the majority and their testimonies challenged climate change science and highlighted the adverse effects on economic growth and international relations from policies addressing climate change. In our study, while both science-based and economic-based statements were more prevalent in Republican than Democratic controlled committee hearings, there may be other viable explanations in addition to which party was in the majority.

One of the most striking indicators of the pervasiveness of making instrumental arguments comes from our evidence that, as a percentage, more instrumental arguments were made in hearings held outside of Washington than those held on Capitol Hill. When playing to the hometown crowd, as field hearings make possible (Fenno 1978; Bianco 1994; Esterling 2007; Heitshusen 2007), elected officials apparently found value in presenting instrumental arguments.

## Future Research Directions

Our work is part of a recent and growing trend that goes beyond tracking the number of U.S. Congressional hearings on a particular topic to measuring both the quantity and content for topics of interest. For example, Mueller et al. (2004) tracked how many hearings there were per year on communication-information policy. The strategy of exploiting the digitization of Congressional committee hearings using computer assisted content analysis has been particularly attractive to researchers investigating policy change in regard to such contemporary concerns as internet neutrality (Cheng et al. 2012), biofuels (Holleman 2012), and climate change (McCright and Dunlap 2003; Park et al. 2010; Fisher et al. 2013a; Fisher et al. 2013b). In contrast, we have demonstrated the utility of this approach for more than six decades of what was originally framed as a solution to the forthcoming employment needs of returning World War II soldiers. There is further scope in future research to use time-series analysis to examine whether, and if so, how, the use of instrumental arguments in legislative deliberations has changed over time.

The nature of our data set made it possible for us to investigate a little-explored dimension of Congressional committee hearings -- a comparison between the arguments put forth in field committee hearings and those presented at hearings in Washington, D.C. A beneficial next step would be to explore the dynamics between policy change and the framing of argumentative strategies employed in Congressional committee deliberations across policy issues with different Congressional 'life spans' and venues for hearings. Additionally, it would be worthwhile to test the relationship between the academic and professional backgrounds of the legislators and their level of confidence in making science-based arguments compared with economic-based arguments. Equally valuable would be to test the hypothesis that those outside a region impacted or potentially impacted by federal decision making are more willing to form opinions based on instrumental evidence than those impacted or potentially impacted.

Another promising research direction is to probe more deeply than was done in this paper into the dynamic between the arguments presented by members of Congress and the arguments of allied interest groups and competing agencies behaving much like competing interest groups. Revisiting how the 1944 Flood Control Act came about in light of the ways Congress viewed and processed the information members of Congress received from the Bureau of Reclamation and the U.S. Army Corps of Engineers would be revealing, given the sometimes competing agendas of the agencies.

Employing the advocacy coalition framework to do so, with its emphasis on considering how coalition actors behave to influence policy processes directly or indirectly and on learning within coalitions, may prove instructive (Jenkins-Smith et al. 2014).

A valuable parallel to this investigation would be an associated media content analysis to investigate whether the weighting of instrumental arguments (scientific or economic) is transferred from Congressional hearings to those working in the media. While Congressional hearings are often organized spectacles (Jones et al. 1993), little research has examined the interplay between information presented in hearings, particularly instrumental information, and uptake of that information by the mass media. Thus we believe that a fruitful next step in research would be to examine fully how mass media engages with information presented in hearings.

## Conclusion

Instrumental arguments played a vital role in the rational discourse that occurred over the deliberations in Congressional committee hearings about diverting water from the Missouri River. This was true whether the arguments were made on Capitol Hill or in field hearings, where a key aspect of the proceedings was that they took place on elected officials' home turf with an audience of constituents.

Further, our results reveal there are different dynamics at work between members of Congress and interest groups when it comes to science-based arguments compared with economic-based arguments. We demonstrate the lack of congruence between the choice of argumentation by elected officials and by members of interest groups and the inconclusive relationship between choice of instrumental arguments and which political party is in the majority. While more economic-based instrumental arguments were made in the Senate than in the House of Representatives, more science-based instrumental arguments were made in House related committee hearings than in Senate related committee hearings. Instrumental arguments did not constitute the majority of arguments made in the Congressional committee hearings examined. Nonetheless, our findings suggest that considering who makes the arguments and under what circumstances can provide useful insights into the dynamics of deliberative policy making. Understanding the use of instrumental arguments, notably science-based and economic-based ones, is particularly important in water policy where considerable analysis, including in environmental sciences and economics, is undertaken to underpin deliberative policy making.

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