Representing Recovery: Science and Local Control in the Framing of U.S. Pacific Northwest Salmon Policy

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Abstract

Framing is a process of highlighting certain facets of reality to make specific issues more prominent, consequential, and memorable. Framing is important in policy debates because it affects what counts as knowledge, which actors are empowered or disenfranchised, and the forum for decision-making. This paper presents a discourse analysis of framing processes in Pacific Northwest salmon recovery policy. Analysis of testimony from more than 100 witnesses to six U.S. Congressional committees identified two prominent frames: one based on scientific discourse and another based on local control discourse. Actors used these frames to define the problem, outline solutions, support their positions, and undermine the positions of others. Results reveal distinctions between stakeholder groups in the frames that they do and do not use in policy debate, and the discussion addresses reasons for these differences. The results imply that the policy community has limited potential for creative decision-making to address salmon decline.

Keywords: environmental policy, discourse analysis, natural resources, issue framing, qualitative methods

Introduction

"Science-based decision making is perhaps the single most important principle we have. Given the deep divisions that exist and the stakes involved, we must stick to the science. If we do not, we will be rudderless, adrift without direction, and lost."
Northwest Regional Director,
National Marine Fisheries Service

"[National Marine Fisheries Service] is unbridled by the democratic process or the principles of republican forms of governance. Ridiculous, you say? When NMFS and the U.S. Fish and Wildlife Service vote, who may vote them down? When they enforce the flawed and often ruinous law, who may veto them? To whom are these people accountable?"
Representative, Forest Products Industry

To anyone involved with environmental politics, the preceding appeals for science-based decision-making and democratic accountability likely will be familiar. In this case, the issue under discussion was management of threatened and endangered salmon in the U.S. Pacific Northwest, and the comments were made during testimony in formal hearings before U.S. Congressional committees. They clearly illustrate the divergent ways actors conceptualize the same policy issue. Diverse stakeholders are affected differently by different policy options — in this case, ranging from harvest restrictions to habitat conservation to dam breaching. To support their positions they draw upon different cultural themes in a process known as framing (Benford and Snow 2000; Cormier and Tindall 2005). Policy actors have many choices of how to represent their positions in public contests, and their ultimate strategies can have significant impact on the direction of policy.

This paper draws on sociological theories of framing in social movements and political communication to understand the main arguments used by stakeholders in a natural resource policy debate. To this we add concepts from social-psychological theories of discourse, which provide insights into the specific ways frames are constructed in speech. While many framing analyses look at broad (macro) themes, our focus is on the meso-level discursive strategies used by policy actors to build support for their preferred outcomes,

undermine the positions of competing actors, and depict the issues surrounding decisions about endangered salmon. We begin with a brief discussion of framing, followed by an explanation of why discourse analysis is a powerful tool for understanding framing. We then describe the texts analyzed in our study. Our analysis reveals that two main types of frames were used and that different actors invoked different frames. A variety of discursive practices was used to bolster the credibility of and create salience for each frame. We argue that the particular frames employed, and the rhetoric they entail, serves primarily to harden divides among stakeholders in this particular policy debate and does not contribute to successful resolution of the salmon issue.

What is Framing and Why Does it Matter?

In any policy controversy, there are multiple possible interpretations of what is wrong, what is relevant, and what should be done (Benford and Snow 2000; Coles 1998). Framing processes have drawn the attention of scholars in several areas of environmental policy, from endangered species (Mansfield and Haas 2006), to forest management (Cormier and Tindall 2005), to urban environmental policy (Browne and Keil 2000). In a classic definition, Entman (1993) noted that framing involves "selection and salience" of the dimensions of controversy. To frame, then, is to highlight certain facets of reality to make specific issues more prominent, consequential, and memorable.

As Fiss and Hirsh (2005, 30) observed, framing is an other-oriented, strategic effort to "influence interpretations of reality among various audiences." Those interpretations relate to the diagnosis of the nature of the problem, as well as prognosis, establishing the possible and desirable courses of action (Benford and Snow 2000; Entman 1993; Mooney and Hunt 1996). Diagnostic framing often attributes blame or responsibility, frequently by constructing victimization through "injustice frames" (Gamson 1992a, 1992b; Taylor 2000). Through prognostic framing, social movements articulate proposed solutions, strategies, or remedies.

To best serve their interests, in their diagnostic and prognostic frames, actors attempt to link their issues to wider cultural values and concerns, in a process some call frame resonance (Benford and Snow 2000; Coles 1998) and others refer to as cultural resonance (Kubal 1998). Whether resonance can be successfully established is determined by the "credibility" of the claims (i.e., their potential to be empirically validated), the credibility of the claims-maker, and the "salience" of the issue to the target audience (Benford and Snow 2000). For natural resource issues, the credibility of claims is often based on invoking science (Sarewitz 2004; Weingart 1999), and actors establish their credibility through endorsement of credentialed, ideally impartial, scientists (Mercer 2002). However, a variety of other social roles can be drawn upon; in addition to "scientist," actors can establish their credibility as members of other authoritative groups, such as American Indian tribes or members of affected local communities.

Salience is conveyed through "experiential commensurability" and "narrative fidelity." That is, the claims ring true to the audience's own experiences and fit the dominant assumptions of society (Benford and Snow 2000). In efforts to make their claims salient, actors strive to make their agenda appear to encompass the needs or rights of others in society, through a process called frame extension (Coles 1998). One common strategy is to appeal to "master frames," which have broad scope and are applicable to many issues and social groups (Benford and Snow 2000). Such frames have been referred to as "meta-cultural themes" (Skillington 1997), "persistent ideological themes" (Mooney and Hunt 1996), a society's dominant cultural elements (McCaffrey and Keys 2000) or "discursive field" (Fiss and Hirsch 2005). A multitude of studies has explored frames in policy in general and natural resource policy in particular. These regularly highlight a limited number of master frames. One common master frame is that of scientific rationality (Mercer 2002; Roth et al. 2003). Other common frames include economic growth (Skillington 1997), social justice (Edwards 2006), and local knowledge (Brown 1992; Harrison et al. 1998).

Several authors have noted that framing in controversies is a dynamic process in which actors anticipate and respond to each others' frames (Benford and Snow 2000; Coles 1998). That is, actors are not only constrained (and enabled) by dominant cultural themes, but they react to other actors' specific formulations via counter-framing. While frame choice is selective and calculated (Cormier and Tindall 2005), various possible frames are more "available" to certain actors due to their social positions (Coles 1998). For example, the scientific frame is more available to those who can authoritatively draw on the credibility of science. It has frequently been noted that, in public debates about natural resource and environmental issues, dominant social groups use science strategically to bewilder locals who cannot claim scientific credibility or may not have access to scientific knowledge (Edwards 2006; Wynne 1996). However, non-scientists can still establish their credibility through other tactics, such as drawing on local knowledge or first-hand experience (Brown 1992).

Framing is important in policy debates, including debates about natural resources, because successful establishment can have substantial societal impacts. Two very different examples illustrate this point. In the first, Davies (1999) showed how religious fundamentalists were able to appropri-

ate the culturally prevalent notion of multiculturalism to argue for state funding of religious education in Canada. This tactical use of contemporary political values to diagnose the problem (unequal treatment by government) was very difficult for opponents to challenge because it was based on rhetoric of "inclusivity" that extended the frame to encompass the rights of all. Proponents established the credibility of their claims (empirical verification) by highlighting the state funding of some religious schools. Given a successful diagnosis, the prognosis — fund all equally — appeared to follow naturally.

In the other example, Bakir (2006) demonstrated how Greenpeace was able to strategically manipulate public opinion surrounding the deep-sea disposal of a decommissioned off-shore oil platform in the United Kingdom. In this case, Greenpeace successfully drew upon cultural suspicion of "big oil" and fear of toxics to create salience with the public. As there initially were no empirical data to challenge the credibility of these claims, Greenpeace succeeded in creating a widespread public outcry. When scientific evidence ultimately surfaced, which actually undermined the claims of environmental risk, Greenpeace reframed the issue as one of morality. The organization's deft action to frame and reframe the problem led to legislative bans on deep-sea disposal and considerable social expense to find alternatives.

Both of these examples illustrate the impact that successful framing can have on policy outcomes. The debate may turn on how the issue is framed, what counts as knowledge, which actors are empowered or disenfranchised, and which forum is chosen as a result of adopting particular framings.

Framing and Discourse Analysis

Often, framing studies investigate the broad themes stakeholders advance (Cormier and Tindall 2005; Mooney and Hunt 1996; Swart 1995). However, much of the frames' persuasive work is accomplished through specific discursive processes. Linguistic devices and rhetorical formulations can strengthen the speaker's position in subtle ways (Skillington 1997). Discourse analysis, though popular, often takes different forms that are poorly defined (Alvesson and Karreman 2000). The type of discourse analysis we adopt attends to the types of practices, such as metaphors, grammatical constructions, symbols, and descriptions used in written and spoken language actors use to convey meaning and persuade. The approach used here is most similar to the method as developed by Potter, Wetherell, and colleagues (Edwards and Potter 1992; Gilbert and Mulkay 1984; Potter 1996; Potter and Mulkay 1985; Potter and Wetherell 1987; Wetherell and Potter 1988). It focuses on the close empirical examination of specific language in naturally occurring contexts, with the

aim of illustrating the actions that language accomplishes as part of social practice in social contexts. Analysts identify discourses, sometimes called interpretive or discursive repertoires, which are statements, often constructed from culturally available master frames, which are deployed in a particular context.

Discourse analysts are often interested specifically in language use in "real-world" settings where the locus of inquiry is not an artifact of the research process (e.g., an interview). In this study, the policy actors would have engaged in the Congressional hearings process irrespective of the research, and the discourse is part of a naturally occurring social practice.

Other environmental policy applications have illuminated the utility of discourse analysis for exploring framing. These reveal how actors use discursive practices to obliquely empower some and disenfranchise others (Ozawa 1996; Wynne 1996). Framing a problem is often an unconscious act, but one with significant, tangible implications (Macnaghten 1993). In environmental policy debates, participants struggle over who should make decisions, what should count as knowledge, who should enjoy the benefits, and who should bear the costs. Often, such questions are openly debated, but equally often discursive practices hide important issues beneath rhetoric and unrecognized assumptions (Hornig Priest 1995; Ozawa 1996).

Although considerable attention has been paid by linguists to the functions of speech acts and formulations of texts, Benford and Snow (2000) noted that attention to the discursive features of frames would be a contribution to understanding the framing process. Of particular relevance to this study, Benford and Snow (2000) discussed how frames are generated and elaborated through discursive, strategic, and contested processes, such as the political arena. Similarly, in a critique and reformulation of framing theory, Steinberg (1998) argued that analysts should focus greater attention on discourse in action. To address this need, we use techniques of discourse analysis to examine how frames are constructed through public discourse in environmental policy development. One of our goals is to contribute to understanding the micro-level processes of framing in action via the tool of discourse analysis.

Purpose

This paper presents a discourse analysis of testimony given by 115 witnesses appearing before U.S. Congressional committees developing salmon recovery policy. The questions guiding the research were: a) how do policy actors frame the problems and solutions to salmon recovery in environmental policy; b) what discursive practices are employed

to establish the credibility and salience of frames; and c) are there differences between groups of policy actors in the frames used? Our analysis focuses on recovery of threatened and endangered salmon in the Pacific Northwest, one of the most intractable policy problems facing environmental decision-makers. Salmon policy offers a particularly fruitful case to study issue framing in environmental discourse because it involves a complex group of actors and many individuals and stakeholder groups will be significantly impacted by decisions. The scientific and political bases of potential policy options, such as removing hydroelectric dams or restricting commercial fish harvest, are hotly contested, so that all sorts of evidence is marshaled and rhetorical devices are employed to influence decision-making. This study contributes to the literature by empirically examining specific discursive strategies used by real-world actors to examine framing processes and by examining the differential use of frames by various policy groups.

Study Context: U.S. Pacific Northwest Salmon Recovery Policy

Within the seven Pacific salmon species, there are 14 populations listed as threatened or endangered in the Columbia River Basin (Federal Caucus 2000). The most widely agreed-upon causes of salmon decline are effects of the so-called "Four Hs": habitat, harvest, hatcheries, and hydropower. The Four Hs are particularly injurious because of the life cycle of the anadromous fish, which spawn in freshwater, migrate to the ocean, and ultimately return to their natal streams to reproduce (National Research Council 1996, 3).

From a public policy perspective, the "salmon problem" is the nearly complete failure of recovery efforts to address the effects of the Four Hs and restore salmon stocks to sustainable levels, despite legislative mandates, agency policies, market incentives, millions of dollars, and volunteer efforts. Although the Four Hs may be proximate causes of salmon decline, Lackey (2000) summarized the issues underlying the failure of the policy system. The issue is politically complex because there are a number of policy options that the public and decision-makers must consider. The policy community is polarized and positions are entrenched because there are conflicting social values, such as economic development and environmental preservation, which may be, or may be portrayed to be, partially or entirely incompatible. There are significant consequences for individuals and groups from the various policy alternatives. The costs of salmon recovery are great and immediate, whereas the benefits of recovery, if possible, are less well documented and not likely to be enjoyed for some time. Traditional decision-making models are ineffective in resolving controversies such as salmon recovery, where multiple, legitimate and deeply held social values are in competition. National and regional priorities are divergent, and finally, there is a problematic and ambiguous role for science.

At the time of the hearings we analyzed, the NMFS was barging fish around the dams but there were conflicting reports and recommendations from different scientific teams (Mann and Plummer 2000). One team comprised of scientists from state agencies, universities, and tribes, proposed to breach dams on the Lower Snake River, while the other (NMFS scientists) argued that other actions were necessary, including drawing reservoirs down to augment flows for fish, focusing on habitat, and reducing predation. It was a time of great uncertainty, with several competing restoration plans in various stages of completion, the likelihood of other species and runs being listed as endangered and clear evidence of declining returns of wild salmon.

Data and Analysis

The data analyzed for this study were gathered from testimony given during six hearings before U.S. Congressional committees dealing with salmon recovery policy in the Pacific Northwest conducted between 1998 and 2000[3]. Congressional testimony is rarely examined, but the forum represents a critical junction because decision-makers are present and this may be among the few situations where they are fully engaged. Therefore, the ability of different positions to establish the credibility of their claims is crucially important.

This study adopts a meso-discourse analytic approach (Alvesson and Karreman 2000). According to this approach, analysts examine discourse in context but also look for patterns and themes that may be relatively independent of micro-context and transferable to similar contexts (Zehr 2000). This approach acknowledges variation in language use across contexts and therefore empirical studies focus on how language use is context-dependent. However, it also focuses on the emergence of patterns that reflect broader themes across contexts. "A meso-discourse analysis would be somewhat more inclined to look for slightly broader and more general themes while still being careful to avoid gross categorizations" (Alvesson and Karreman 2000, 1141). The implication is that this study focuses on one instance of social text from many individuals, rather than having multiple units of analysis for each individual from difference contexts. Secondly, examining discourse at the meso-level implies a relatively large sample of individuals to look for broader patterns and themes.

For this paper, the testimony of 109 witnesses representing a diversity of perspectives was analyzed (see Table 1). The individual witnesses were categorized into groups based

on the self-identified social role that each declared in the introductory remarks of his or her testimony, that is, the witness' interest, position, and institutional affiliation. Although all individuals in society occupy a variety of different social statuses and roles (Inciardi and Rothman 1990), it is assumed for the purposes of classification that each witness prefaced his or her testimony by claiming a master status, the person's most important and defining social identity in that context (Stets and Biga 2003).

The transcripts were accessed through the U.S. Government Printing Office online access, downloaded to text files, and imported into QSR NVivo for analysis, which followed procedures outlined by Miles and Huberman (1994). A team-based strategy (MacQueen et al. 1998) was used to develop a codebook. Through several iterations, two analysts independently categorized samples of the testimony to develop a system to code the responses; hierarchical categories and subcategories of potential responses were developed. Intercoder reliability (ICR) verifications were accomplished using NVivo and the merge utility (Bourdon 2000). After final revisions to the coding scheme, an acceptable ICR was achieved (Rust and Cooil 1994) averaging 80%, depending upon coding category. Higher order categories and subcategories were used to classify witness interest role, policy options under consideration, alignment of the speaker toward the policy option, and specific rhetorical and representational practices used to frame the issues. For instance, an analyst might code a section of testimony as an academic scientist (role) using category entitlement (representational strategy) to identify upstream migration as the primary problem (diagnostic framing) and support removal of a hydroelectric dam (prognostic framing), characterizing the issue as essentially a scientific and technical problem (scientific frame).

Findings

The coding structure for the discourse analysis allowed for a wide range of potential frames, including scientific, democratic, procedural, ideological, economic, and injustice frames and was focused on identifying specific discursive strategies used to accomplish the core tasks of diagnostic and prognostic framing and to establish the credibility and salience of claims. The findings illustrate that two frames — science and local control — were clearly prominent and were employed much more often by witnesses than any other frames. This finding is based upon the number of witnesses using frames, the total amount of text coded as illustrating a frame, and the proportion of the witnesses' overall testimony coded as illustrating the frame. Thus, although there were examples of other frames identified, this paper focuses on scientific and local control frames. In the following sections the frames are analyzed using excerpts from the testimony to illustrate the discursive strategies used by witnesses to establish the credibility and salience of the frame.

Scientific Framing in Salmon Policy

Appeals to science appeared in the statements of more than half of the witnesses. Scientific framing provided justification to actors' claims about salmon policy by drawing on the broader cultural deference toward science as a source of social and cognitive authority. In general, scientific frames were associated with a traditional, positivist, ideal-type of science as a decision-making tool separate from other policy inputs. Although, in some cases, this was clearly lip service, those who relied heavily on science frames tended to employ

Table 1. Policy groups, number of witnesses, and use of scientific and local control frames in testimony before selected U.S. Congressional hearings on salmon recovery policy 1997 – 2000

Policy group	N	Scientific Framing		Local Control Framing	
		Diagnostic or Prognostic	Challenge Policy	Vilification or Injustice	Local Control
Environmental NGO	16	8	3	5	10
Agriculture / Irrigation / Ports	15	6	5	12	8
Elected federal official	13	2	4	8	9
Elected state government	11	2	2	8	11
Industry (Homebuilders, forest products, mining)	9	2	2	7	7
Local government	9	2	2	5	6
Science	7	7	1	0	0
Hydropower	6	3	1	2	3
Resource agency	7	6	1	2	1
Boat/fish industry	6	4	1	2	1
American Indian tribe	6	3	3	2	3
National Marine Fisheries Service (NMFS)	4	4	0	0	1
Total	109	49	25	53	60

discursive practices that resembled "externalizing devices" (Potter 1996; Woolgar 1988). Externalizing devices simultaneously serve to build up a claim's status and also limit the speakers' responsibility for the description. The function of these discursive strategies is to "draw attention away from concerns with the producer's stake in the description — what they might gain or lose — and their accountability, or responsibility for it" (Potter 1996, 150). This type of justification was first identified in a study of scientists' discourse by Gilbert and Mulkay (1984), who described one externalizing device, the empiricist repertoire, as a collection of grammatical constructions and styles that minimized the involvement of the scientists and transferred agency to data.

Granting Agency to Science

One strategy in the empiricist repertoire involved attribution of agency to data or studies. This discursive repertoire was located in the text by grammatical constructions that shifted the responsibility for the speaker's commentary away from the individual or group and on to "facts" (Potter 1996). In many cases, scientific evidence was used to establish the significance of the problem (e.g., habitat loss versus predation) in diagnostic framing. Just as often, however, appeals to science were used in a prognostic way, either to argue for a specific outcome or for a more general role for science as the guide to developing solutions.

All NMFS representatives, university scientists, and management agency staff — as well as nearly all tribal representatives — used the science frame to grant agency to science. Some, such as representatives of conservation organizations, used this discourse to support one policy option (dam breaching) while opposing another (barging). Idaho state legislators, academic scientists, and agriculture and irrigation representatives opposed flow augmentation as a policy option by attributing agency to data. In contrast, agriculture, forestry, and mining interests attributed agency to data to support their preferred policy option, incremental reforms to the hydropower system such as improved fish passage measures. In other words, the scientific evidence presented, or the interpretation of the same data, was marshaled for specific — sometimes contradictory — purposes.

The following excerpts illustrate how groups framed dam breaching as a scientific issue by attributing agency to data or studies. The first passage comes from the fisheries policy representative for an American Indian tribe and the second from an environmental conservation advocate:

Recent studies indicate a positive probability of recovery with breaching of the dams would occur, but NMFS continues to maintain status quo and the continued expenditures to maintain the studies, ap-

prove construction of unproven methods on the very problems that continue to destroy the runs and the dams.

Fourthly, we need to keep our options open. Dam removal is an uncomfortable thing to advocate. But the science says it makes some sense. What we can't do is take any option off the table right now. We have to send them through the same scientific filter.

Although some actors stated directly that science should determine policy, more often the implication was created through subtle rhetorical practices, as in the two passages above. Both diagnostic and prognostic framing tasks are accomplished in these passages, as the speakers identify the problem (dams) and solution (dam breaching), through a construction where "studies" are "indicating" or "science" is "saying" that dam removal is the preferred recovery alternative. In the second passage, the speaker distances himself from the "uncomfortable" option of dam breaching, but is rhetorically "forced" reluctantly to admit that it "makes some sense" because of science. This invests the representations with the cognitive authority of science, and was preferred by stakeholders who advocated recovery alternatives such as dam breaching that enjoy little political support. Note also what the speakers did not say. In the first passage the speaker did not name specific scientists, but rather the global "science" was used.

Opponents of dam breaching also made diagnostic and prognostic claims by attributing agency to data. For example, a forest products industry representative claimed that the breaching recommendation was based on "20 year old data," with the implication that newer data either are not available or would not support breaching. Regardless, the prognosis is presented as a decision in the scientific realm. A city mayor likewise asserted that there is "no evidence to support" dam breaching, and in fact, the situation "cries out for NMFS to be investigated for their lack of scientific study." Perhaps the most elaborate example was from Idaho's governor, who was "surprised to find," upon examining salmon return data himself, that "most of the decline in salmon returning to the river system occurred in the decades before we began building dams, and it seems that somehow we have been able to maintain returning numbers." From this he concluded that the focus on dam removal was "ignoring several essential truths about salmon recovery." The point is that various stakeholders were adept at marshalling scientific evidence itself, or general appeals to "science shows," to support opposing decisions.

Constructing Scientific Consensus and Corroboration

Another externalizing device was the discursive con-

struction of scientific consensus and corroboration. With this strategy stakeholders sought to create the impression of agreement among independent (impartial) actors. Yearley (1996) noted that policy actors mobilize scientific authority by enlisting dozens or even hundreds of scientists as co-authors of a report or letter, thus providing the image that consensus has been reached. In the context of salmon recovery, stakeholders drew attention to scientific consensus to shift claims from appearing arbitrary or individualistic. For example, one conservation advocate stated, "We believe like the independent Science Advisory Board, that the time has come to look at returning portions of the river to conditions more closely approximating the conditions in which the salmon evolved." The persuasive power of this statement would not be as great if the consensus were constructed only among the organization's "grassroots members throughout the nation" because the policy position is clearly linked to the group's interests. Thus, to enhance the status of the statement, the speaker corroborated the consensus with support of an "independent" and science-based group. It is also interesting to note the subtle rhetorical tactic used by the speaker that the conservation group believes "like the independent Science Advisory Board" that dam breaching is a preferred alternative; this discursively constructs the conservation group as "following" the science.

An alternative usage of consensus and corroboration was to denigrate a stakeholder group, NMFS in the next example, by representing the group as outside of the sphere of scientific consensus:

> The Shoshone-Bannock Tribes had a biological analysis of the proposed harvest of salmon presented to NMFS since early spring. This was approved by them [NMFS], but when the Shoshone-Bannock Tribes were preparing their tribal regulations, NMFS all of a sudden had a problem. We had to scramble and go through the process to have a technical review by the Technical Advisory Committee. The Technical Advisory Committee did not see any conflict with our proposal but NMFS did; consequently, no consensus.

By rhetorically placing NMFS outside of a consensus that is corroborated by the "Technical Advisory Committee," the federal agency's decision-making was characterized as arbitrary, unpredictable, and not science-based.

Certainty of Science

The excerpts we have presented illustrate how actors present their scientific conclusions and recommendations as certain. In fact, it was extremely rare for anyone to admit to scientific uncertainty when invoking the science frame. In

using basic declarative sentences, the contingent, social and political aspects of scientific practice were lost, and science was "redescribed" as conforming to the universal, disinterested stereotype (Mercer 2002). Nevertheless, the examples also show that conclusions actors claim to be based on science can be diametrically opposed. The examples we have shown relate primarily to discussions about dam breaching, but the same occurred for other management alternatives discussed. For example, the Governor of Idaho argued for barging salmon around dams, because "the National Academy of Sciences in their report...has described transport as the best interim solution." The NMFS director said his decision to barge fish reflected "the best scientific information available. It is consistent with the findings and recommendations of the Snake River Recovery Team, the National Academy of Sciences and the recent report of the Independent Scientific Advisory Board." On the other hand, a representative from an environmental NGO asserted that "the fish barging program is an invention of NMFS and they cling desperately to it...despite overwhelming scientific evidence that it will not bring the fish runs back, despite the total lack of evidence indicating that barging could achieve the 2 to 6% smolt-adult ratio that is necessary to restore the runs." A state agency representative likewise concluded that the "available science indicates that sustainable recovery requires an in-river solution" and that the region simply needed to "come to terms with this biological reality." In each case, the conclusions — put forth as based on science — are definitive and certain.

Local Control Framing in Salmon Policy

Clearly, salmon recovery involves not only scientific and technical dimensions, but also social and political dimensions. Conflicts over divergent social values are fundamental to the salmon recovery policy debate. Within the congressional hearings, approximately two-thirds of the witnesses drew on cultural themes, popular political conceptions, or personal experience to frame issues using democratic principles. While sometimes this frame took the form of calling for inclusivity and collaboration, mostly it was cast as the need for local control, often accompanied by two related themes — vilification of federal agencies and injustice.

Local Control

Although the congressional hearings were formally about ways to recover declining salmon, many witnesses actively reframed the issue as one of local control. This permitted them to avoid discussing details about salmon and instead focus on issues of process and rights. A major concern of environmental policy communities in the American West is decision-making access for local constituencies. The relationships between federal environmental management agen-

cies and local and regional stakeholders became progressively more contentious during the 1990s as controversies over resource management stimulated the development of social movements to reform federal land management policy and increase local control of public lands. Krannich and Smith (1998, 677) noted that "the emergence of the 'Wise Use,' 'country supremacy,' and 'home rule' movements reflects a broadening social conflict over public lands management and a growing demand for increased local control over resource management decisions." Hence, this effort of witnesses to reframe salmon by aligning with this master frame has considerable cultural resonance.

Sometimes local control frames were constructed by appeals to "broad based involvement," the need for a "democratic process," or "constructive collaboration." However, more often the concern was cast as one of rights, particularly water rights. Local control was used to accomplish prognostic framing by arguing that whatever specific policy action be undertaken, that the effort be led by the "locals." A central feature of this strategy was the construction of "local" and the rhetorical representation of the federal agencies as outside of the sphere of the local space. For instance, a legislator from Washington state supported state recovery efforts using the local control discourse: "Only one issue counts for the State, and that's local control. We must persuade federal authorities that we can handle this problem ourselves." The mayor of Pasco, Washington, articulated the sentiments of many when he said that NMFS proposals for flow augmentation were merely "an attempt to wrest control of water in the west to further their own ends." One interesting tendency was for members of the U.S. Congress to employ this discourse, as when a Congresswoman from Washington said, "We're seeing the Federal Government moving to control water levels which then control water rights." She failed to point out that she herself is a member of the federal government, which permits her to maintain her solidarity with local interests intact.

Some witnesses extended the local control frame beyond just water rights to encompass state sovereignty and "control over our own destiny." This is exemplified in the statement from a representative of the pulp and paper industry that "We cannot allow Federal agencies to overturn state water law, undermine Idaho's water supply, and damage our food supply." The speaker extends the frame further to encompass "our" (the nation's) food supply as in jeopardy. Many speakers claimed to speak for everyone in the region, through constructions like "We Northwesterners believe..."

Most of the representatives of local or regional grassroots or collaborative efforts used the local control discourse, but in a slightly different way. These speakers tended to frame local efforts in a virtuous light, which was accomplished by two main strategies. First, they depicted local people as well-intentioned, caring, cooperative, and "determined to do all that is necessary." The chair of the Washington State Salmon Recovery Funding Board encapsulated this in his statement that "the single biggest asset this State has right now is the energy and enthusiasm of the people living in these watersheds; their knowledge of what needs to be done to restore habitat friendly to salmon and the work that they've been doing, in some cases 15-20 years."

Second, they claimed there is no need for direct federal involvement (other than as the source of funds), because local efforts have "made great progress," accomplished "visible success," and become "models for salmon recovery." Locals were characterized as frugal and efficient. The credibility of these claims was often based on local empirical (though not scientific) evidence — examples of projects that had "succeeded spectacularly," in the words of the holder of a federal grazing allotment. These rosy assessments — when counterpoised to the dire predictions or draconian proposals of others — served to challenge "expert" knowledge with people's own direct experiences (Harrison et al. 1998). As the director of the North Olympic Salmon Coalition asserted, "those who know the watersheds have a record of finding problems, identifying solutions, developing the projects and creating the design and implementation partnerships necessary to recover salmon habitat."

When state and local government officials framed the issues as a matter of local control during congressional hearings — which they almost universally did — they carefully constructed a prime decision-making role for themselves while simultaneously attempting to garner significant federal funds to carry out recovery efforts. This was frequently accompanied by aligning themselves with grassroots efforts. For example, a member of the Washington legislature described the local witnesses as people who have spent "hundreds of thousands of private dollars, individual landowners giving up their time, giving up there land, and giving up their incomes to help restore habitat." The Governor of Washington argued that the state "needs federal funds," but also to "control our own destiny... we believe that we here in the State of Washington, and in all the states of the Pacific Northwest, can do a better job of salmon recovery than a federal judge or the federal agencies." He went on to say that the best approach to allocating funding would be to put it where "communities are coming together" in collaborative projects.

Local control frames were notably absent from testimony of scientists, NMFS staff, and agency representatives. However, agricultural groups and those with water rights interests relied heavily on the local control framing. Specifically, these witnesses employed this rhetorical strategy to oppose flow augmentation and dam breaching, which would

harm them. For example, a witness representing irrigation interests employed this frame when he said, "We watch with bewilderment how NMFS and an army of Federal agencies have totally abandoned cooperative spirit of working with local officials and the resource users." Northwest businesses with clear economic interests also opposed federal authority using local control. A representative of a homebuilders association testified, "The Association embraces the Tri-County process because builders felt it was important that the economic and environmental destiny of this region must be determined locally, not by a federal agency." Rather than just employing an economic frame, these witnesses were extending the local control frame to encompass others, not just their own interests and thereby enhance their credibility and salience.

Vilification

Local control was established not only by proclaiming rights and abilities of local stakeholders, but also by distancing from federal agencies, primarily the NMFS. Gamson (1995) identified this type of strategy as "adversarial" framing. It undermines opposing positions by highlighting ignorance and/or the social interests of opposing parties (Mercer 2002). Approximately 45% of witnesses criticized the federal agencies, including virtually all representatives of agriculture/irrigation, ports, and extractive industries, and more than half of the state government representatives. In many cases, the rhetoric was so sharp that it can only be labeled as vilification, particularly in the testimony of representatives from industry and agriculture. NMFS was made out to be comprised of insensitive, bungling, self-interested, mean-spirited bureaucrats. For example, one witness described the agency as "unreasonable, unscientific, and unrealistic," having "knowingly misused and misinterpreted the data." Another witness testified that a NMFS representative had told him that the agency "did not really care what the cost and inconvenience of NMFS's proposal might be to the public." Another expressed "alarm" at "the building power of small regulatory agencies to circumvent and reinvent the law of the land to meet very narrow goals." He accused the administration of "cynically" using "the law to further their own dark ends over the very particular rights of individuals and states." To him, "it is time to muzzle the hounds." If these speakers can successfully frame the issue as one of corrupt or evil agency employees, they can make a stronger case that the recommendations of those staff members need not be heeded. Vilification thus serves an important rhetorical function for actors who cannot challenge the agency claims on scientific grounds (McCaffrey and Keys 2000).

While many criticisms directly impugned the motives of NMFS staff, others were somewhat indirect. Some witnesses called attention to apparent double-standards, for example that NMFS "looks equally with one cow stepping on a redd [salmon spawning area] as compared to 99% mortality inflicted by the dams." Another said, "NMFS actually has no idea if they are helping or hindering, they think this is going to work, but have we seen any results?" Such discourses serve to undermine the scientific credibility of the agency.

Injustice

Vilification goes hand-in-hand with injustice frames, as the former identifies the culprit and the latter identifies the victim. In the case of salmon, federal agencies are the culprits and northwesterners are the victims. Approximately half of the people who employed vilification discourses also used discourses of injustice, and almost all injustice claims were accompanied by vilification. A Farm Bureau representative summed this up by saying, "Idaho and some of its hardest working citizens are basically under siege by the federal government. They are under attack by what I consider to be insensitive, insulated Federal bureaucrats who have two primary agendas — self-preservation and central control and regulation of any economic activities involving land, water, or air." Members of various industries argued that their economic livelihoods were being disproportionately impacted by salmon management decisions made by distant bureaucrats. For example, one irrigator claimed that his industry uses only "7% of the water but we feed the world." He viewed "all our achievements" as being in jeopardy. To one federal legislator, this "punishes those who do most to provide habitat for wildlife." Tribal representatives also objected to having to "jump through hoops" that violate treaty rights while "NMFS continues to protect industry and other causes of the demise of the salmon."

Discussion and Conclusion

Congressional testimony revealed a struggle to define the issues and solutions to endangered salmon management via framing (Benford and Snow 2000; Coles 1998). We found clear evidence that stakeholders strove to align their interests with two primary master frames: one based on scientific discourse and another based on local control discourse. Actors used these frames to define the policy problem (i.e., diagnostic framing), outline solutions (i.e., prognostic framing), support their positions, and undermine the positions of other actors (McCaffrey and Keys 2000; Swart 1995).

Scientific frames are prevalent in many policy controversies, especially within natural resources, where scientists themselves are an important stakeholder group and are employed or enlisted by other stakeholders (Bocking 2005; Eden 1996; Sarewitz 2004). Science frames have appeal due

to the status of science as highly credible in U.S. society. They were used almost universally by witnesses with scientific credentials. In this case, the prominence of scientific framing is also likely a reflection of the sample of witnesses, which included a sizeable number of academic researchers, resource agency managers, and conservation organization advocates, who are inclined toward scientific discourse (Sarewitz 2004). Scientific framing was employed by academic scientists, federal agency scientists and managers, conservation groups, American Indian tribes, and agriculturalists.

Scientists and agency managers have socialization and training that allow them to better articulate science frames. As Magill (1988), Brunson (1992), and others have pointed out, scientific training cultivates (and/or selects for) particular views on the role of science, primarily those views that privilege scientific knowledge and expertise, and it is thus not surprising that these actors would rely on scientific frames without recognition or reflexivity about the implicit normative assumptions.

Representatives of conservation organizations were among those witnesses that relied heavily on science to frame issues. This is perhaps because, as Yearley (1992, 514) observed, the environmental movement is "doubly bound to science, by epistemological affinity and common descent." That is, environmentalists rely on science to identify "facts" about ecological problems in the natural world (e.g., climate change, salmon decline) and environmental organizations have historic ties to scientific associations, most notably natural history societies.

The appropriate role for science in natural resource decisions is hotly debated within and outside the scientific community (Freyfogle and Newton 2002; Oreskes 2004; Sarewitz 2004). In the salmon testimony, science frames were invoked both to diagnose problems and propose solutions. On closer analysis, the division between diagnosis and prognosis is problematic from a discourse analytic perspective because diagnoses can be presented that imply prognoses (or at least narrow the list of possible solutions), even when this is not overtly stated. Likewise, prognoses suggest diagnoses. For example, those who claimed that dam removal is the "scientific" solution are clearly suggesting that dams are the most important (or only) problem that matters. As Skillington (1997, 508) notes, such "indirect formulations" are more deniable by the speaker and less subject to the challenge of "vested interest." Such discourse "symbolically naturalizes particular ideologies and power relations." If such a frame is adopted by decision-makers, it clearly limits the people and type of knowledge that will be considered relevant to the decision.

Scientific frames were frequently invoked to challenge the claims of opponents, as has been seen in other studies

(Bocking 2005; Mercer 2002; Sarewitz 2004). Scientifically "objective" data were used to draw diametrically opposed conclusions. Alternative conclusions are available due to different actors privileging different data (Herrick 2004) or employing different assumptions about methodologies (Mercer 2002).

For those without access to resources and power, a dominant weapon is rhetoric (Davies 1999). In policy disputes, local voices often enter late in the process, and therefore must react to the dominant frame already established (Coles 1998). In the case of salmon, the dominant frame was science, and other actors had to decide whether to try to debunk the science (McCaffrey and Keys 2000) or to reframe the issue. Many chose to align with the local control master frame to reframe attention away from the scientific issues.

Local control framing was employed by state and county government officials, representatives of irrigation and agriculture, mining, forestry, and homebuilding industries, American Indian tribes, and conservation organizations. Some of these actors (e.g., government officials) have socialization and training that would seem to encourage the use of local control framing. Perhaps the most interesting finding here is that the "local control" framing strategy was not limited to stakeholder groups that could construct a credible claim to being local; rather, a group might support a policy position that coincided with that group's own economic or political interests by invoking local control to show solidarity with a "truly" local group that shared the same policy perspective (e.g., a multinational agribusiness industry argues for "local control" by aligning their position with the "local family farmer"). This has been demonstrated in other studies to be an effective "frame extension" or "universalizing" technique (Coles 1998; Davies 1999). That is, in practice, local control was based on discursive construction of "local" rather than other merits of the policy position.

Conservation organizations, which relied heavily on the science discourse, also regularly employed the local control discourses. This finding is consistent with Yearley's (1992) discussion about "green ambivalence about science." Although conservation groups are bound to science, many "greens" at least partially blame science and technology for creating today's problems and find themselves in a paradox when advocating for "science-based decision-making" because scientific knowledge about environmental problems is (or can be effectively portrayed to be) limited and uncertain and environmental groups in the U.S. have endured decades of political setbacks using scientific framing.

Similarly, tribal stakeholders employed both the scientific and local control frames. This framing strategy is reflected in the Columbia River Inter-Tribal Fish Commission (1996) salmon restoration plan, *Wy-Kan-Ush-Mi Wa-Kish-*

Wit — Spirit of the Salmon. This plan uses the salmon life cycle as an organizing metaphor and endorses the "restored river" paradigm, which "focuses on returning the rivers of the Pacific Northwest through a blend of science and traditional tribal values" (Smith et al. 1998, 673). Like conservation groups, Native Americans have an ambivalent relationship with (traditional) science. Science — archaeology, anthropology, biology — may challenge Native American beliefs about cultural identity and history, as was the case in the so-called "skull wars" controversy surrounding Kennewick Man (Thomas 2000). Furthermore, Native Americans often place themselves outside of science, criticizing science as the root of environmental problems in a way similar to conservationists. Also, Native Americans are often constructed by others as outside of science as the irrational, primitive other. However, developing scientific expertise has provided tribal communities with increased access to decision-making processes and increased access to scientific framing, thus increasing their relevance and influence in the policy debates.

The persuasive capacity of both types of frames relied on a number of rhetorical practices, grammatical constructions, and metaphors. Thus our analysis revealed ways that actors used rhetoric to create credibility and salience. The persuasive impact of their statements was to a large extent shaped by the subtle discursive strategies they used. All used externalizing devices to shift authorship from their claims away from themselves and onto broader constituencies, in ways that make claims seem "true," and not merely a matter of personal opinion (Potter 1996; Skillington 1997).

Implications for Policy

The specific frames adopted, and those that come to dominate public understanding, shape the potential solutions that seem feasible or reasonable (Benford and Snow 2000; Bocking 2005; Fiss and Hirsch 2005). Although the ultimate outcomes of the salmon recovery policy debate are not known, framing in this issue may similarly affect not only the suite of available policy options but also the arena for decision-making. That is, the prominence of scientific and local control framing represents a battle over the decision-making processes and arenas. If scientific framing is adopted, the debate will be located in technical arenas and carried out through Biological Opinions and Environmental Impact Statements. What counts as valid knowledge will be screened through the filters of science. On the other hand, if local control framing prevails, a different set of decision-making criteria and processes might be adopted. If local control framing is adopted the decision-making may be limited to the political arena and especially the local political context.

The framing strategies used depict idealized images of both science and lay stakeholders. Close analysis of the discursive features of text shows how external credibility was bolstered through the choice of specific descriptors and formulations (Koutsantoni 2003; Mercer 2002; Potter 1996). Kubal (1998) notes that, in public forums, discourse tends to become conventionalized into standard forms, and this certainly was apparent in the testimony we reviewed. On the one hand, witnesses overstated both the certainty of scientific knowledge and the ability of science to address policy questions, thereby contributing to the lay/science divide. As in Bocking's case, the specific choices used to describe scientific data were crucial to "selling" the stakeholders' story. On the other hand, locals were portrayed in a universally positive light, with the implication that, if only the locals had control, problems would be solved.

Neither of these images, however, captures reality and both divert attention away from crucial issues that require public debate (Lackey 2007). Science cannot answer the difficult value questions of what to do about salmon (Oreskes 2004). In fact, science itself can be used as an externalizing device for some, because it conceals value preferences behind technical arguments (Sarewitz 2004). In Bocking's case — where environmental interests succeeded in framing land protection as a matter of science — decision-making subsequently bogged down when it became apparent that science could not answer questions such as how much risk and how much uncertainty were acceptable. In the case of salmon, there are many decisions that affect many values, and a simple statement that "we will follow the science" brushes these under the table. Moreover, the testimony makes it clear that local stakeholders do not view scientific procedures as authoritative; instead, programs designed to increase federal accountability (e.g., scientific peer review) are seen as red tape impediments imposed by uncaring bureaucrats.

Adopting the local control frame provides a broad umbrella for a specific interest that is difficult to challenge. Local control discourse often seemed to imply that federal involvement is not needed, that local programs are sufficient, and hence no further science (only funding) is needed. This seems a myopic and misguided view of the situation. Furthermore, by reframing in this specific way, values become broad, vague goals and provide no guidance for concrete solutions. Arguing that "states should have control" implies uniformity and homogeneity among the stakeholders in the state that is simply not present.

The small number of frames identified in this study thus limits the policy discussion and perpetuates stereotypic images, which may diminish the potential for creative decision-making. As the salmon policy community has to this point been unable, or unwilling, to address decline, this study may offer some support for van Eeten's (1999) suggestion that the

key to resolving intractable policy stalemates lies in understanding structural properties of debate (i.e., the configuration of arguments and relationships between arguments and policy positions) and building crosswalk positions that bridge gaps in the arguments. Based on the results of this study, a potential crosswalk position for restructuring policy discourse in the salmon policy arena may be drawn from the notions of "public ecology" (Robertson and Hull 2003) and "citizen science" (Irwin 1995). Such approaches share the ideal that scientific knowledge be consensually produced by a diversity of stakeholders — including local actors — and that such knowledge is directly relevant to policy making. As an example, consider the proliferation of citizen-based "watershed groups" (Woolley et al. 2002) throughout the West that inventory and monitor environmental conditions in riparian areas. Framing the salmon recovery policy debate in terms of "citizen science" draws directly from the two prominent frames in the debate and may provide a discursive scaffold that is flexible enough to engage a diversity of viewpoints but stable enough to organize interactions and move the policy debate forward.

Endnotes

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2. E-mail: dave.white@asu.edu
3. (1) "Decision-making Processes and Interagency Cooperation of NMFS Northwest Region." Hearings before Subcommittee on Fisheries, Wildlife, Conservation and Oceans, Committee on Resources, House of Representatives, One-hundred Fifth Congress, First Session, 24 July and 15 August, 1997, Washington, DC. (2) "NMFS' Implementation of the Endangered Species Act." Field hearings before Committee on Resources, House of Representatives, One-hundred Fifth Congress, Second Session, 2 September, 1998, Pasco, Washington, and 3 September, 1998, Boise, Idaho. (3) "Salmon Recovery on the Columbia and Snake Rivers." Hearing before Subcommittee on Drinking Water, Fisheries and Wildlife, Committee on Environment and Public Works, United States Senate, One-hundred Fifth Congress, Second Session, 8 October, 1999, Washington, DC. (4) "Northwest Salmon Recovery." Joint hearing before Subcommittee on Interior and Related Agencies, Committee on Appropriations, United States Senate, and the Subcommittee on Interior, Committee on Appropriations, House of Representatives, One-hundred Sixth Congress, First Session, 7 April, 1999, Seattle, Washington. (5) "Salmon in the Columbia River Basin: Review of the Proposed Recovery Plan." Hearing before Subcommittee on Fisheries, Wildlife and Drinking Water, Committee on Environment and Public Works, United States Senate, One-hundred Sixth Congress, First Session, 23 June, 1999, Washington, DC. (6) "How to Prevent Salmon Species from Extinction or Disruption." Hearing before Subcommittee on Interior and Related Agencies, Committee on Appropriations, United States Senate, One-hundred Sixth Congress, Second Session, 20 April, 2000, Redmond.

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