

**Scale framing of scientific uncertainty in controversy  
over the endangered Steller sea lion**

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## Abstract

Political debate about the endangered Steller sea lion turns on uncertainty about the cause of decline and lack of recovery of this marine mammal of the North Pacific Ocean. To shift the political terrain, different groups tried to shift the scale at which problems are framed. US regulators focused on localized interactions, environmental organizations highlighted the entire fishery management regime, and the fishing industry focused on natural climate change within the North Pacific region. Because debate is about supposedly objective, scientific realities, these practices of scale framing take on particular significance in this case. Scientific understandings of individual problems are not outside the frame of scale practices, but instead there is a politics of scale around science. This case shows that using scale as a framing device is a powerful political strategy for dealing with uncertainty because focusing on a particular scale presupposes certain kinds of solutions while foreclosing others.

## Introduction

Faced with scientific uncertainty as to the cause of its decline, the endangered Steller sea lion (*Eumetopias jubatus*), from the US portion of the North Pacific Ocean, has been the subject of recent litigation and legislation. In a series of court cases stretching back to the early 1990s, the environmental groups Greenpeace, the American Oceans Campaign, and the Sierra Club (“environmental groups”)<sup>1</sup> argued that the US National Marine Fisheries Service (NMFS) has failed to protect the Steller sea lion (Steller) from interactions with industrial fisheries of the Alaska region.<sup>2</sup> On the legislative front, Senator Ted Stevens from Alaska added over \$80 million to the US federal budget, designating this money for scientific research into the cause of

the decline. Whereas the leading scientific hypothesis had been that Alaska fisheries and Stellers compete for the same fish, Stevens earmarked this money to explore other potential causes of Steller decline, including predation by other marine mammals and regional climate change. Throughout these years of litigation and legislation, fishing industry supporters, government regulators, and environmental groups have fought over who and what is responsible for the decline of this marine mammal and what the best strategy is for its recovery.

As with many endangered species, the Steller controversy is an example of an intractable environmental conflict. However, the controversy over the Steller reveals a different aspect of the politics of endangered species from that which is generally highlighted. The major theme in most political debate is conflict between private property rights and endangered species protection (Feldman and Jonas 2000; Shogren 1998). Because the Steller is a marine species, and oceans remain public property, major debate over the Steller is not about private property rights, but rather about scientific uncertainty as to the cause of decline and lack of recovery. In this context, there is a political strategy of “framing,” as different groups try to define not only solutions to the problem, but also the very existence of the problem in such a way as to shape debate and action. In this case, different groups (Senator Stevens and the fishing industry, environmental organizations, and NMFS) shift their focus among different scales of analysis, including the local, national, and supranational. “Scale framing” (Kurtz 2003) is a particularly powerful political strategy that responds to existing scientific uncertainty and creates new uncertainties; focusing on a particular scale presupposes certain kinds of solutions and actions, while foreclosing others.

Information on political strategies in the Steller case comes from written documents, including court decisions, legislation and related congressional reports, scientific and policy

analyses from NMFS, and articles from fishing industry publications. To be clear, none of the groups discussed here states explicitly that they use scale as a political tool, nor do any use the language of scale framing or scale strategies. The idea that scale framing might be important was the result of an iterative coding process of the variety of documents related to the case. First we did coarse coding to identify broad political strategies of different groups; the idea that scale was important emerged from this process. We then did more detailed coding to identify how different groups framed the debate and ways each used scale in their framings. The next section of the article explains our approach to scale, framing, and uncertainty, while the following section examines the Steller case in more detail.

## **Scale framing of uncertainty**

The common idea of geographical scale is as a pre-given set of stages on which social and natural processes play out. Analysis of scale strategies of framing requires an expanded idea of scale in which it is overlapping and produced: individual scales (e.g. local, national, or global) are not just stages but are created through interaction and exist only in relation to each other. That is, scales are not arenas that contain political activity, but rather politics constitutes particular scales and scale relations (see Herod and Wright 2002; Sheppard and McMaster 2004; for applications to environmental issues, see Harris 2002; Mansfield 2001; Sneddon 2002, 2003; Sneddon et al. 2002). In this article we elaborate an approach to scale that focuses on scale narratives as a distinct form of scalar practice (Delaney and Leitner 1997; Swyngedouw 1997; Jonas 1994). These scale narratives tell stories about the world, such that scale “is not simply an external fact awaiting discovery but a way of framing conceptions of reality. The politics of scale may often take the form of contending ‘framings’” (Delaney and Leitner 1997:95). In this

view, it is possible to have complex scale framings without actually shifting activities to different scales.

The idea of “framing” has a longer history and wider application. The idea is often attributed to Goffman (1974), who treated frames as a general organizing principle by which people interpret the world and make it meaningful, and the idea has been developed further in a range of fields. Within public policy, commentators note that policies are built from implicit frames that are used to define problems, suggest solutions, and encourage others to act accordingly (Fischer 2003; Schön and Rein 1994). These taken-for-granted frames bring different ideas and perspectives into a more coherent whole, and in doing so influence what people see as the “facts” of the matter. The general idea of framing has been extended to environmental issues in the work of several scholars. Klintman and Bostrom (2004) examine scales of ideology and science in organic food labeling, examining both inter-frame and intra-frame controversies. Developing a general framework, Lewicki et al. have identified eight different types of frames (e.g. identity frames address the question “who am I”) important in intractable environmental conflicts (Lewicki, Gray, and Elliott 2003). None of the eight frames, however, addresses the particularly environmental dimensions of environmental issues, such as human knowledge and perception of socio-natural processes, so their approach is less useful for addressing issues of uncertainty.

A number of scholars have focused on *scale* frames of environmental issues. Slocum (2004) focuses on ways that environmental groups strategically localized global climate change to make climate change seem relevant to people. Examining environmental justice, Kurtz (2003) analyzes how multiple parties framed debate over siting an industrial facility by defining the scale of the problem and its solutions. Developing a more general framework, she argues that

scale framing does the work of “‘naming, blaming, and claiming,’ all with central reference to... particular geographical scales” (2002:254). In developing the idea of scale frames, she identifies three different ways in which scale may work. Scale frames can invoke scales of regulation, referring to different tiers of government; they can construct inclusions and exclusions by shifting the scale at which people conceive of a problem or its solutions; and they can invoke scale as an analytical category for defining and understanding problems and outcomes. Scale frames work holistically to shape how people define the scope of problems and their solutions, which also allows them to interpret what is known and what is important. This wider framework indicates that scale framing is a useful concept for analyzing politics of uncertainty.

Uncertainty is a defining feature of many problems, and especially environmental ones (Wilson and Bryant 1997). In a basic sense, “uncertainty” describes a lack of information and knowledge. However, uncertainty is not simply an objective state or external context for dispute, but is a social relation regarding what is known and important, and hence may be the outcome of dispute (Campbell 1985; Bedsworth, Lowenthal, and Kastenber 2004; Levidow 2001). “Uncertainty expresses rather than explains conflict. Indeed, ‘uncertainty’ may be constituted by a social context, not simply given by a technical context” (Levidow 2001:845-46). People produce uncertainty when they agree on what is not known (agree on the limits of knowledge), but also when they disagree on what is known (dispute each other’s versions of facts), or even when they agree on what is known but interpret that knowledge in different ways (agree on facts but give them different meanings). Accordingly, Wilson and Bryant (1997) argue that uncertainty is the *outcome* of intensification of use of the environment combined with complexity in environmental attitudes and worldviews. This larger emphasis on social relations hints at ways that framing is important not only for responding to but also creating uncertainty.

Frames can reflect uncertainty, in that in situations characterized by uncertainty, people develop different and potentially competing frames that feed into political conflict. But frames can also produce uncertainty, in that frames provide different perspectives from which to assess what is accepted fact and what is important. As an example, Bedsworth et al. (2004) identify three different framings of the low-level radioactive waste problem, and link those frames to different interpretations of uncertainty that were then used strategically to shape policy outcomes.

Our contribution is to bring these perspectives on scale, frames, and uncertainty together as a means for understanding contemporary environmental politics. Scale frames are important when dealing with the politics of scientific uncertainty because of ways that scale is a powerful tool for understanding problems, their causes, and their solutions. Switching scale narratives to frame issues makes some actions seem particularly attractive and forecloses other possibilities. These practices of scale framing take on unique significance in environmental conflict, as often these scale narratives are about supposedly objective, scientific realities. Yet scale framing does not argue from a given terrain of knowledge and uncertainty; instead it sets the terrain within which knowledge and uncertainty are organized and created. Scientific understanding of individual problems is not outside the frame of scale practices—acting as the context for political dispute—but instead there is a politics of scale around science. This is one of the key dimensions of the Steller debate, in which different groups shape political outcomes by framing scientific uncertainty in different scale terms.

## **Shifting scales in the Steller sea lion debate**

The range of the Steller extends from California around the North Pacific to Japan, yet seventy percent live within the Alaska region. Following a rapid decline in this population since

the 1960s, in 1990 NMFS listed the Steller within the US as threatened under the Endangered Species Act (ESA) (16 USC §§ 1531-1544 (2005)). Once NMFS listed the Steller as threatened, it was then legally required to prepare a variety of analyses and management measures. In 1992 NMFS released a “recovery plan” that highlighted the lack of knowledge about the Steller in general and specifically about the cause of decline (Steller Sea Lion Recovery Team 1992). Plan authors listed an array of possible causes, but instead of choosing any specific management measures they opted to propose a research program to fill gaps in knowledge. In 1993, as required by the ESA, NMFS designated critical habitat of the Steller. The ESA defines critical habitat generally as a subset of all habitat that is determined to be essential to the conservation of the endangered species and that may require special management considerations. Official critical habitat of the Steller includes all marine areas within 20 nautical miles of haulouts (resting places) and rookeries (where females give birth and raise their young), plus three larger foraging (food source) areas that extend beyond the 20 nautical miles (NMFS 1993). This critical habitat is the relatively limited area from which juveniles and pregnant and lactating females cannot stray far when they feed; it was not defined in terms of the larger area in which a broader segment of the population might be found. In 1997, NMFS then re-classified the Steller into two distinct populations divided by 144° W longitude and listed the western population as endangered.

The political struggle over Steller protection and recovery has been conducted on legal terrain set out by the ESA and the National Environmental Policy Act (NEPA) (42 USC §§ 4321-4370e (2005)), both of which provide particular mechanisms for analyzing and mitigating the impacts of public action on endangered species. The ESA requires all federal agencies to carry out conservation programs for listed species, and, more specifically, requires that federal

agencies ensure that their actions neither cause “jeopardy” to a listed species, nor adversely modify critical habitat. Agencies must complete formal consultations that produce Biological Opinions (BiOps) on potential effects of their actions,<sup>3</sup> and if BiOps find that actions are likely to have adverse effects, the agency must develop mitigation plans. NEPA, which applies not just to endangered species, requires federal agencies to prepare Environmental Impact Statements (EISs) for all proposed actions, and if EISs find significant impacts to be likely, to develop alternatives to the proposed action. In practice, implementing both laws has been quite contentious, as groups argue over when analysis is actually required, the process of analysis, results of analysis, resulting regulations or changes in proposed actions, and implementation of regulations. Analyses and resulting action plans thus provide thorny grounds for political debate, even after a species is listed as threatened or endangered.

In the Steller case, conflict swirled around the issue of what, if any, agency actions might actually affect Stellers, with central focus on the possibility that fishing might cause adverse effects either directly (e.g. injuring animals) or indirectly (e.g. taking too much fish or harming habitat).<sup>4</sup> Of major concern is that the area in which Stellers live is also the site of the largest fisheries in the US, which are for groundfish (bottom and near-bottom dwellers) such as Alaska pollock. Not only are groundfish eaten by Stellers, but Steller decline coincides in time with development of these industrial fisheries. A central hypothesis is that these fisheries create either general or localized depletions of food for the Steller, to the point that there is not enough food to support large populations of these animals. The environmental groups have embraced this fishing explanation of the problem, the fishing industry (“industry”)<sup>5</sup> has rejected it, and NMFS at different times has argued both ways. Thus, both science and politics complicate the problem of designing an effective conservation plan.

***NMFS: focusing on the local***

In its approach to Steller management, NMFS has largely resisted any kind of broad analysis of all regional fisheries in ecosystem context, focusing instead on local interactions between individual fisheries and the Steller. In their insistence on narrowing their approach, their strategy has been to limit the types of actions they might have to analyze, implement, and enforce. NMFS has done this by focusing mainly on critical habitat and the possibility that fishing might cause localized depletions of prey around Steller haulouts and rookeries. The agency frames the issue as one of local interactions and the overlap of Stellers, fishing vessels, and fish in both time and space. As further discussion of NMFS' approach shows, this scale strategy focuses the debate around what happens within the relatively limited area NMFS designated as critical habitat. This scale strategy allowed them to remove some of the larger uncertainty regarding correct action. This, then, shows that the designation of critical habitat itself took place within the scale politics of Steller protection, and is not a neutral ground on which debate is carried out.

Between 1991 and 1996, NMFS completed a series of BiOps (NMFS 1991a, b, c, 1992, 1996a, b), the stated goal of which was to analyze the effect on the Steller of both broad fishery management plans and related total allowable catch levels, without limiting their focus to individual fish species and years. However, in their analyses (and especially the earliest ones) NMFS provided very little information about the fishery itself or the fishery management process, and made no connections between these and the Steller. Instead, they examined existing scientific data that both did and did not link fishing to the decline of the Steller, focusing on possible declines in food availability and interactions such as entanglement of Stellers in fishing gear, intentional harassment, and disturbance by vessels. They also mentioned, but did not address, the potential for indirect or cumulative effects. The main focus was on localized

depletions of food for the Steller within critical habitat, and NMFS compiled evidence for increasing overlap between the fisheries and Steller foraging: fishing increasingly was happening at the same times and in the same places as Steller foraging, and both fishers and Stellers were targeting the same species. While acknowledging that localized depletion was a concern, NMFS concluded that these fisheries were not causing jeopardy to the Steller. They justified this conclusion by emphasizing that “a definitive causal link between the [Alaska] fishery and the Steller sea lion decline has not been established” (NMFS 1996a:6). Thus, in these early BiOps, NMFS acknowledged and relied on scientific uncertainty but chose to focus almost exclusively on localized interactions within the areas around haulouts and rookeries; the agency then used scientific uncertainty about whether localized depletions were happening to justify their decisions not to change their management actions and require changes to the fishery. In this way, NMFS mainly focused on the general issue of scientific uncertainty and used this to frame the issue in terms of localized interactions between fishers, fish, and Stellers.

It was after these BiOps that NMFS declared the western population of Stellers to be endangered (and still declining), and subsequent to this, in 1998, that the environmental groups filed suit against NMFS in federal court. Although the general position of the environmental groups was that NMFS had not done enough to ensure the Steller has access to sufficient food, particularly within critical habitat, in their case they mainly argued that NMFS was acting without an adequate BiOp or EIS, especially in light of the switch in status from threatened to endangered (Greenpeace also filed, and lost, a similar case in the early 1990s; see below). The court initially issued a stay in this suit, as NMFS indicated that it was preparing new and comprehensive analyses, including ones that would focus on the entire groundfish fishery management plan. Late in 1998, NMFS released two biological opinions: “BiOp1” analyzed

specific fisheries and regions (i.e. atka mackerel and pollock in the Bering Sea, and pollock in the Gulf of Alaska) (NMFS 1998b), and “BiOp 2” analyzed the entire groundfish fishery (which includes mackerel and pollock as well as a suite of other species) but addressed only levels of total allowable catch and only for 1999 (NMFS 1998a). They also released a new, “supplemental” EIS (SEIS) to extend the one from twenty years earlier, when conditions in the fishery and for the Steller were quite different (NMFS 1998c). In all these documents, the main question NMFS asked was framed in local terms: would fishing activity within critical habitat be likely to cause localized depletions that would negatively influence the Steller? This question then delimited the evidence they examined, which limited the level of uncertainty they incorporated. They found that fisheries for mackerel and groundfish in general would not cause localized depletions, but that fisheries for pollock would. NMFS ruled, therefore, that pollock fisheries were likely to cause jeopardy to the Steller. This ruling then required the agency to develop “reasonable and prudent alternatives,” which, based on the idea that localized depletions were the problem, focused on spatial and temporal dispersion of fishing effort.

NMFS’ general approach to these BiOps and the SEIS, since the early 1990s, reveals a strategy of scale framing in which they focused on local scale interactions. They used scientific uncertainty to justify their local focus, while also trying to constitute social agreement on local interactions as the problem. By framing the problem in this way, they also make some solutions seem reasonable—curb fishing within critical habitat—while eliminating solutions with broader impact (although the fishing industry contested NMFS’ rulings, narrow as they were; see below). This scale framing also limits the type of analysis that NMFS saw itself as required to do, for if the problem was a fairly local one, then broader, more comprehensive analyses of the entire fishing regime, introducing more types of uncertainty, were not necessary. It is on this ground

that the environmental groups continued to challenge NMFS, in the process developing their own scale strategy and making NMFS' strategy more visible. As the next section will show, NMFS continued to take a localized stance to BiOps and the SEIS, but lost more of their case in the courts.

### ***Environmental Organizations: achieving success by expanding the scale frame***

The environmental organizations share with NMFS a general focus on localized interactions, and have long argued that the main problem is that the fishing industry causes localized depletions of fish around Steller haulouts and rookeries. This was the basis of the 1991 lawsuit brought against NMFS by Greenpeace (without the other environmental groups as co-plaintiffs). In this suit, which they lost, Greenpeace challenged the “no jeopardy” findings of the 1991 BiOps, arguing that NMFS had not properly taken into account all the scientific evidence for localized depletions (Greenpeace also challenged the adequacy of the 1978 EIS under which NMFS was operating) (Greenpeace Action v. Franklin 1992). As Greenpeace explained the issue, “between 1977 and 1992, as Steller populations crashed, commercial catches of one of the primary food sources—pollock—remained at historically high levels, and...increasingly, commercial harvests shifted to areas which have subsequently been designated as critical habitat” (Greenpeace 1996:38).

Having lost this early case, the environmental groups changed their strategy. While focusing on localized depletions, they also started to frame the problem more broadly by insisting that local interactions are situated within a bigger picture of fishing and fishery management within this entire region. This strategic broadening of scale allows greater questioning of science, which introduces new types of uncertainty. The environmental groups have consistently argued that federal law requires comprehensive analyses that are to encompass the cumulative impacts

of the entire fishery management regime. Thus, when these groups brought their 1998 case against NMFS, they specifically argued that NMFS was acting without a “programmatic” SEIS and without BiOps taking into account the overall, cumulative impact of fisheries on the Steller. They argued that it was not enough for NMFS to analyze individual fisheries and individual years without addressing the overall fishing regime. While this regime includes non-spatial dimensions, such as how total catch levels are determined, it is also spatial, in that it is coextensive with the entire Exclusive Economic Zone of the North Pacific. In this sense, the strategy of the environmental groups has been to focus on the national scale of fishery management and jurisdiction over the oceans.

This scale strategy became especially clear as the 1998 lawsuit continued. The original basis for the case was that NMFS was acting with analyses that were outdated, particularly given that the legal status of the western population of Stellers had been changed from threatened to endangered. As noted above, this case originally was stayed by the courts because NMFS indicated that it was indeed carrying out these analyses, which it released late in the year (in the form of the SEIS, BiOp1 (on the pollock and mackerel fisheries), and BiOp2 (on the entire groundfish fishery but only for 1999)). Once NMFS released these new analyses, however, the environmental groups remained unsatisfied and continued their suit. Their case against BiOp1 was actually less about scope, in that they argued that NMFS had failed to provide a scientific rationale for their decisions (*Greenpeace v. NMFS* 1999). In making this objection they were partly successful, as the court required NMFS to rewrite their “reasonable and prudent alternatives” for avoiding jeopardy and adverse modification of critical habitat arising from the pollock fishery, but upheld NMFS’ determination of no-jeopardy for the mackerel fishery.

The environmental groups were more clearly successful in their challenges to BiOp2 and the SEIS, in which the crux of their argument was that, under the requirements of the ESA and NEPA, NMFS needed to analyze not individual species or years, but the entire fishery management system of the North Pacific. In doing so, environmental groups tried to make NMFS' job more difficult by introducing greater potential for uncertainty. They challenged BiOp2 by noting that, whereas NMFS had earlier indicated this would be comprehensive, it actually only covered the 1999 fishery and only addressed the issue of total allowable catch, rather than analyzing the cumulative effect of the entire groundfish fishery as carried out under the fishery management plan (*Greenpeace v. NMFS 2000a*). Similarly, in their case against the SEIS, the environmental groups noted that, whereas NMFS provided a range of information regarding the fishery in a broad context, when it came to analyzing actual alternative actions NMFS focused only on total allowable catch levels. This ignored a range of other management issues, such as time and area closures, gear types and restrictions, or allocation of the fish among different sectors of the fishery (*Greenpeace v. NMFS 1999*). In essence, the environmental groups argued that NMFS had tried to evade legal requirements by asking the wrong question. NMFS asked about individual fisheries and their localized impacts, rather than addressing the cumulative effect of the entire fishery. In this view, NMFS incorrectly defined "agency actions" as authorization of individual fisheries, rather than as the entire fishery management regime.

In ruling on these challenges, Judge Thomas Zilly agreed that the proper agency action was the entire fishery management plan. Ruling that the BiOp needed to be comprehensive in scope, he said "an agency may not unilaterally relieve itself of its full legal obligations under the ESA by narrowly describing the agency action at issue in a biological opinion" (*Greenpeace v. NMFS 2000a:1146*). He further chided NMFS for producing these limited analyses when they had

earlier promised to conduct a comprehensive analysis. “The overall, cumulative effects of the groundfish fisheries on the sea lion has been a primary issue throughout this litigation. The ESA specifically requires a cumulative effects analysis. Although BiOp2 states that its conclusions are based on a ‘cumulative effects analysis,’ and even contains a section titled ‘Cumulative Effects,’ in fact this section contains no analysis whatsoever...The section contains no explanation of how the various groundfish fisheries and fishery management measures interrelate and how the overall management regime may or may not affect Steller sea lions” (Greenpeace v. NMFS 2000a:1149). Regarding the SEIS, Judge Zilly similarly ruled that NEPA “requires NMFS to analyze the ways in which the groundfisheries effect [sic] the North Pacific ecosystem, and to provide decisionmakers and the public with a document that will help further informed decision-making as to the consequences of these plans. The present SEIS, by focusing its analysis only on [total allowable catch] levels, does not fulfill this mandate” (Greenpeace v. NMFS 1999:1276). NMFS could not limit their analysis to incremental changes and individual management decisions but must evaluate the entire fishery management regime in a “programmatic” SEIS.

Subsequent to Judge Zilly’s favourable rulings on BiOp2 and the SEIS, the environmental groups continued to turn to the courts to ensure that NMFS followed through on their court-ordered tasks. In 2000, the environmental groups successfully sued for an injunction on all fishing until NMFS completed its comprehensive BiOp, which it did late in that year (Greenpeace v. NMFS 2000b). After NMFS released a 2001 supplement to this BiOp, these groups tried to challenge NMFS’ conclusions on reasonable and prudent alternatives for avoiding jeopardy and adverse modification of Steller critical habitat (Greenpeace v. NMFS 2002). Their strategy here focused less on scope and more on the science used in NMFS’ decisions, and hence

revolves around uncertainty. While in the end the judge ruled in their favour on two of three claims, the environmental groups were not as successful as in the past, in that the judge dismissed many of their arguments about the inadequacy of scientific claims made by NMFS, arguing that in the case of scientific uncertainty NMFS was free to make its own scientific judgments. Since this time, the case has been resolved, as the environmental groups agreed to drop their case once NMFS agreed to complete the required analyses on a given timeline.<sup>6</sup>

The environmental groups were most successful when they used scale to frame the debate—to frame what is uncertain and how that matters—and less successful when they argued directly about scientific uncertainty. When environmental groups tried to address uncertainty directly—arguing that NMFS needed to take certain interpretations into account—the courts rejected their arguments, ruling that uncertainty gave NMFS the right to its own interpretations. Yet uncertainty in a broad sense was still central to the environmental groups' successes, as claims about uncertainty allowed them to argue that NMFS analyses were inadequate. NMFS could not claim that scientific evidence showed that limited analyses were all that was required; uncertainty instead meant that they should analyze everything. Even as the environmental groups agreed with NMFS that the problem was mainly one of localized depletion of prey for Stellers, they argued that the issue was really of greater scope in that it included the entire fishery management regime. They framed the issue as one that required comprehensive analysis of relationships between fishing and the Steller within the space defined by national jurisdiction over the oceans.

### ***The fishing industry: finding macro-regional drivers of environmental change***

Industry members were largely dissatisfied with all the above approaches, especially because they would bear the resulting economic burden. Not only did the new management strategy

based on spatial and temporal dispersion of fishing away from critical habitat (i.e. closed areas and seasons) create new economic and safety challenges, but industry members also estimated that the 2000 injunction on the fishery, which lasted only a few months, cost \$100 million to the industry (e.g. Wyman and Warren 2000a). After the rulings in favour of the environmental groups, industry supporters expressed contempt for NMFS, arguing that fishers and processors were paying for the mistakes of the agency. For example, the editor of *Pacific Fishing* said that, “In the end, Zilly had little choice...The government had fumbled the defense. But beyond lawyering, the defeat came from a core problem at NMFS: a chronic habit of ducking hatchets” (Warren 1999:5). In an attempt to shape the outcomes of this legal battle, industry groups joined the court case a number of times. They challenged the findings for jeopardy, argued that NMFS should have taken economic concerns into consideration when designing management alternatives to mitigate the jeopardy finding, and supported the limited scope of the supposedly comprehensive BiOp2—but they lost on all these grounds.

Where industry supporters have been successful is in using scientific uncertainty to shift the scale at which they frame the problem. They reject the idea that fishing in general or localized depletions in particular affect the Steller. To justify this position, they have highlighted a series of other scientific hypotheses about the cause of Steller decline and lack of recovery. Other hypotheses, which each have different amounts of evidence to support them, include poaching, chemical pollutants, and predation by killer whales. The hypothesis that has been of most interest to the fishing industry has been that naturally occurring regional climate change across the North Pacific has caused the decline in Stellers. Just as the Steller decline coincides with development of regional industrial fisheries, it also coincides with a well-documented shift in regional climate from a cool period to a warmer one. This climate change is thought to have

ecosystem effects, including shifts in dominant species: whereas pollock is currently abundant, in the cooler regime fattier fish such as herring were much more plentiful. Thus, there is a “junk food” hypothesis: even with industrial fishing, there are more than enough pollock for Stellers, but Stellers cannot survive on pollock alone. They need the fattier fish that are no longer available under the current climate regime.

Fishers have made this case among themselves, particularly in industry publications such as *Pacific Fishing*. For example, an article specifically on the science of the Steller case stated that “in fact, the environmentalists’ case is weakest at its heart. It depends on the theory of ‘localized depletion,’” which the magazine describes as “conjectures, not facts” (Wyman and Warren 2000b:34, 37). “In contrast,” the article goes on to say, “the scientific literature teems with papers describing the profound climatic regime shifts of the North Pacific” (39). Fishers were able to expand their influence by taking this case to Congress. Senator Stevens, in particular, was a strong advocate of fishing industry views, arguing against NMFS’ scientific findings on localized depletions and against subsequent management measures that caused economic hardship for the industry. His comment on the jeopardy finding of the 1998 BiOp was that it was just one person wielding bad science who was wreaking havoc on the industry. This person “came up with the concept of, what is it, on-site depletion, local depletion... That was the opinion of this one person who reversed five previous opinions of [NMFS]. And we believe it’s entirely wrong...If Congress doesn’t do something, this moratorium of the taking of pollack [sic] is going to continue on into this pollack season. That affects about 25 percent of the people who have employment in my state” (Stevens 2000).

Subsequently, Stevens passed a rider to the 2001 Appropriations bill that delayed implementation of this BiOp, so that it was phased in over the course of a year. In 2001 and

2002, he also garnered a total of over \$80 million for Steller research (see Ferrero and Fritz 2002 for more on federal appropriations). The goal of this research was to find ways to keep the fishery operating. A report from the Senate Appropriations Committee, chaired by Stevens, made the case for such money by stating that “more resources are needed to enable the agency to produce the science and data to keep these fisheries open” (US Senate 2001).

In other words, industry supporters needed science, and in particular a scientific consensus that uncertainty exists, to produce a particular outcome. Thus, the legislation designated money specifically to challenge the localized depletion hypothesis, with much of it set aside for specific research efforts. Of the 2001 money, \$20 million was set aside to “develop and implement a coordinated, comprehensive research and recovery program” that would investigate a range of hypotheses for Steller decline. Of an additional \$10 million designated for NMFS, two million was for studying predator-prey relationships (including the killer whale predation hypothesis), and another two million was for the North Pacific Fishery Management Council to commission an independent review of the 1998 comprehensive BiOp, including its underlying hypotheses and management recommendations. The rest of the money for NMFS—six million dollars—was specifically for studying the impact of ocean climate shifts on the North Pacific, including shifts in fish and mammal populations. Thus, the goal in general was to keep the pollock fishery open and operating with as few restrictions as possible, but the means to do this was to fund scientific research that would challenge the evidence on which NMFS based restrictions. That Stevens’ efforts to procure this money for research was part of a political strategy is supported by the fact that these efforts came over a decade after the Steller was declared threatened, rather than at the time that regulators first noted lack of knowledge about Steller decline. Stevens appropriated

this research money not just to find the cause of decline, but also to introduce uncertainty to shift attention away from fishing as the primary suspect.

The focus on science involved a scale strategy of shifting attention particularly to ecosystem changes, including new predator-prey relationships, that result from regional climate change. In this sense, scale framing produces uncertainty as part of a political strategy. While there were a range of scientific hypotheses to explore, in this scale framing they are related to natural processes occurring at scales that are not only much larger than local scale interactions within Steller critical habitat, but are also larger than the scale of national jurisdiction and the area covered by the fishery management regime. The scale strategy here has been to use scientific uncertainty to shift attention away from local or national scales (and therefore away from fishing), to natural regional processes that are outside national jurisdiction and human control.

## **Conclusion**

The federally funded research effort seems to have been successful in diverting attention away from fishing as the primary cause of Steller decline, though this effort is not necessarily working in the way intended. While research efforts are ongoing, and there is still uncertainty as to why the Steller has declined and is not yet recovering, new research efforts are focusing attention in different directions. In particular, a National Research Council committee, funded through Stevens' appropriations, synthesized current knowledge on the Steller in ecosystem context to claim that neither climate change (the junk food hypothesis) nor fishing activities (localized depletions) are likely the culprits (National Research Council 2003). The committee did not dismiss these factors completely, and it also emphasized that it is likely that multiple factors have combined to create current conditions. Yet the committee's major finding was that

it is more probable that processes such as predation by killer whales or direct killings by humans are the main causes of the ongoing decline. Thus, while policy makers will probably not continue to give primary attention to climate change, as the fishing industry may have hoped, scale framing drew their attention away from fishing as the primary culprit.

This article has shown that different groups involved in the Steller debate, regardless of perspective or resources, have devised scale strategies for negotiating uncertainty and the politics of endangered species protection. NMFS tried to limit the scope of their analyses by focusing primarily on critical habitat and local interactions. The environmental groups tried to expand the scale of analysis to include national jurisdiction more generally, but did so to further their goal of limiting action within critical habitat. By taking this argument to the courts, they were successful in forcing NMFS to complete new, more comprehensive analyses. Yet the environmental groups were not successful at shaping scientific debate in the way industry supporters have been. By shifting the scale from localized depletions and national fishery management to ecosystem-wide processes, Senator Stevens and other industry supporters were able to procure funds for research that is finding that fishing itself is not the problem. Their use of scale as a political strategy to highlight uncertainty and thereby effect change was successful, and in the process they are shaping what is known about Stellers.

The Steller case, then, highlights that the politics of scale does not necessarily involve shifting scales of interaction to achieve particular outcomes, but can instead involve developing narratives about scale that work to define and understand problems. Thus in this case, political strategies involve scale framings about the causes of and solutions to problems, and how those problems should be analyzed and mitigated, all within a national legal framework. Groups use scale framing to delimit debate and subsequent actions: as a political strategy, groups use scale to

make particular actions seem either prudent or reckless. These insights draw on Kurtz's (2003) notion that scale frames shape political struggle, but this article further develops this general insight by showing that scale framing involves not just dispute over existing knowledge and uncertainty (in that they invoke different scientific understandings of problems), but that scale framing also produces uncertainty and therefore shapes the scientific process. Scale framing affects research agendas, research funding, and opportunities for coordinating different kinds of research approaches and findings. This, then, affects what is known, which then further influences future debate and action. Given the level of uncertainty as to the causes of the problem, in this case groups called on science to resolve questions not only about the ecology of Steller sea lions, but also political questions of the relevant scale of analysis and action to protect (or do nothing to protect) this endangered species. This case shows, then, that while uncertainty seems to be the external terrain of the debate, different groups create scale frames that strategically interpret and use uncertainty to advance their views and interests. In the face of this uncertainty, science is called on to adjudicate political dispute, yet the scientific process is shaped within this politics of scale.

## Notes

<sup>1</sup> We refer to Greenpeace, the American Oceans Campaign, and the Sierra Club together as “environmental groups” because as co-plaintiffs in the court cases, they are represented together.

<sup>2</sup> “Fisheries” is a flexible term used to denote fishing activity at multiple scales, with different methods, and of different species. For example, the North Pacific pollock fishery is a subset of North Pacific fisheries, and itself can be decomposed into more specific fisheries based on geographical region or fishing method.

<sup>3</sup> There are exceptions to this process. Agencies can start by conducting informal consultations. If these find no impacts, then a full, formal analysis is not needed.

<sup>4</sup> Fishing is carried out by private interests, but is regulated and managed by NMFS and so becomes a federal action subject to ESA and NEPA requirements.

<sup>5</sup> We treat the fishing industry as a single group because an array of people and organizations came together around the Steller issue. Groups that intervened in the court cases include the At-Sea Processors Association (representing factory trawlers), a coalition of shore-based processors, and the United Catcher Boats (representing independent fishers).

<sup>6</sup> NMFS completed a final BiOp in 2003 and a Programmatic SEIS in 2004

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