FOREWORD

Thoughts on the Role of Science in Making Public Policy

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The Greater Sage-Grouse (*Centrocercus urophasianus*) has become a species whose listing status under the Endangered Species Act (ESA) is fraught with controversy. The recent past has seen court cases, high-level political intervention, and disputes over what constitutes the best available scientific information. Yet the conflict over the warranted listing of the sage-grouse presents an opportunity to engage the public about what is known about the science of the sage-grouse and its sagebrush habitat, and to promote public deliberation about possible solutions. That opportunity can perhaps raise public confidence in science and make the blatant politicizing of science more difficult.

SETTING THE STAGE

The role of science and expertise in making public policy may strike many readers as a relatively modern concern. Certainly, recent events surrounding the listing decisions for the sage-grouse have brought that role to the foreground and jump-started a new and intense discussion. But we have talked about that role for a long time. Woodrow Wilson, the only president to hold a Ph.D., noted in 1912,

What I fear, therefore, is a government of experts. God forbid that in a democratic country we should resign the task and give the government over to experts. What are we for if we are to be scientifically taken care of by a small group

of gentlemen who are the only men who understand the job? Because if we don't understand the job, then we are not a free people. We ought to resign our free institutions and go to school to somebody and find out what it is we are about. (Davidson 1956:83, as quoted in Smith 1991:2)

Wilson was not bashing experts but asking us to think about their appropriate role in a democracy. Today, the role of science in public land management is the question before us. It remains part of the context of decisions over whether to list the sage-grouse as an endangered species. I argue that that role can help us learn what we are about regarding our federal lands, while continuing to make decisions grounded in democratic practice.

I had the privilege of serving on, then chairing, the Science Advisory Board of the Bureau of Land Management (BLM) during the late 1990s. The board's purpose was to work with the BLM and its director on improving the communication of the bureau's science and research needs to other agencies, scientists, the U.S. Congress, and the public; helping get scientific findings to BLM field office staff; and coping with resource management issues. The board lasted until the early years of the Bush administration when its Federal Advisory Committee Act charter was not extended.

One of the most interesting and important projects of the board and BLM was writing the bureau's science strategy. That strategy was to

delineate the role of science in BLM decision making and public land management. The strategy noted:

Science is useful for evaluating alternatives and estimating outcomes. However, it is not the sole factor in making decisions because the state of natural resource science is often insufficient to give definitive cause-effect predictions. Unknowns and uncertainties will always be associated with predictions of decision outcomes. Science may reduce but can never completely eliminate the uncertainty regarding future events. However, the use of the best-available science—along with a consideration of political, social, and economic information—will result in the best-informed decisions. (United States Bureau of Land Management 2000:3–5)

In this document, science was considered a necessary but insufficient condition for making BLM management decisions. It was also my experience, both on the board and as someone who pays attention to the academic and actual worlds of federal land policy, that science can occupy other places in discussions over its role in public-land policy decisions. Indeed, it was likely that most of those involved with the writing of the statement above, as well as many other observers, were aware that there was quite a bit of debate and confusion over the role of science in natural resource and public lands decision making.

TWO ISSUES IN THE SCIENCE-POLICY RELATIONSHIP

Two regularly occurring issues influence any attempt to untangle the science-policy relationship. The first issue concerns viewing science as a process versus science as truth. Science as process refers to the use of the scientific method to produce knowledge, which is then subjected to peer review and published in professional journals. All chapters of this volume of *Studies in Avian Biology* were subjected to peer review, revised, and, in some cases, reviewed again, certainly meeting the process test.

The science-as-truth claim refers to the use of science as the proper way to solve policy conflicts over other ways of deciding. To use the BLM quote above as an example, the science-as-truth claim would thus disallow political, social, and economic concerns. Authors of this document

did not make any such claim about science, nor were they even given the task of considering such concerns, but it nonetheless remains an important issue in the science-policy dialogue.

Science as Process

An extension of the process discussion is a question of particular concern to those who work on public-land management conflicts such as that of the sage-grouse. Is the knowledge produced helpful to land managers and other decision makers? This is a difference between applied and basic science. During my tenure with the BLM board, agency scientists often discussed being evaluated and rewarded for publication in journals, even though the information needed by land managers was of a different sort—more immediate and thus less able to go through long peer-review processes—but it had to be credible or it simply would not stand up in court or anywhere else. This volume is a good example. It has gone through a long and exhaustive review process both to ensure science credibility and to stand up in court. Beyond the immediate purpose of providing information for determining the listing status of Greater Sage-Grouse, how will it get used by managers and other decision makers to influence public-land policy?

It was also not clear whether land managers did a very good job at explaining to scientists both within and outside an agency (like BLM) how they made decisions. To put it differently, how did they use science to make a decision while still considering political, social, and economic information, especially under conflicting multiple-use laws? Having this kind of discussion would go far in allowing people to see the alternate perspectives in the science–public policy arena. Indeed, agency-based meetings or conferences should be designed to do exactly that.

Many suspect that more may be going on with the process question than how managers use science. Scientists always need to be transparent about how their own values did or did not inform their research choices. In 1994, a fascinating debate appeared in the journal *Conservation Biology* over whether conservation biologists should link arms with activists in efforts to reform grazing practices (Brussard et al. 1994). Other noted conservation biologists were concerned that conservation biologists might damage their credibility

by openly advocating and supporting political positions. They suggested asking instead how livestock grazing can be managed to have the fewest impacts on biodiversity and ecosystem integrity (Brussard et al. 1994). They worried about the flaw of deductive reasoning which leads to a research question that states:

“range management must be dramatically reformed.” . . . Our work as scientists involves recognizing patterns based on data and only then formulating a general rule. More importantly, how can we hope to advance society’s mission to preserve biological diversity if our audience of policymakers assumes that we intend to prove a presumed conclusion instead of attempting to falsify well-framed null hypotheses? (Brussard et al. 1994:920)

In this example, we see well-respected scientists having a polite discussion about the use of scientific information and how it informs policy. What the authors caution against is an approach that confuses scientific assertions with value judgments (grazing reduces biodiversity) and assumptions (grazing has a negative influence on ecosystem integrity). One begins with a supposedly neutral hypothesis arising from a presumed conclusion that grazing is bad or grazing must be reformed. It might then be a relatively easy to find the science in support of the hypothesis.

The more appropriate hypothesis in this argument ought to be along the lines that grazing has no effect on biological diversity. If it is falsified, then people can begin to speak of reform. Of course, as Brussard et al. (1994) also note, sometimes the effects of grazing could be positive. We also know that all of these hypotheses are very specific to place and perhaps not as useful in such a complex issue as the sage-grouse status. The authors remind us that good science starts with data, looks for patterns, then forms general rules that are subject to further testing through hypothesis development.

A second process-related issue concerns the influence of political appointees on the production and dissemination of science to be used in decision making. If science is indeed necessary (and the requirements and legal interpretations of many laws seem to make that a noncontroversial statement), then it can become strategic to influence what that science might be asserting. In May 2008, the United States Government Accountability

Office issued a report on United States Fish and Wildlife Service reviews of ESA decisions (including Greater Sage-Grouse and Gunnison Sage-Grouse [*Centrocercus minimus*]) during the George W. Bush administration’s tenure and concluded that political appointees indeed had intervened. Not surprisingly, there was debate over that role and whether or not there was undue pressure on scientists to alter documents and conclusions. As one former official, Craig Manson, put it, “the fact was the assistant secretary’s office took a very active role in the ESA program, and that’s perfectly proper for the assistant secretary’s office to do so” (Manson 2008:A-7).

Manson is correct. Political appointees do take an active role in these sorts of decisions, and they should. They represent the president and the president’s views. They are accountable to the president, and they are accountable to Congress and to all Americans. In the best of circumstances, they have to navigate a labyrinth of laws, values, and conflicting expectations. They are not given the task of simply following best science, because best science is not a trump. However, how they take an active role is important. As one reviewer of this introduction noted, changing data, altering reports, and attempting to intimidate scientists is unacceptable and destroys the integrity of the process.

We could decide as a society that best science ought to be the trump. We would have to do that through legislation, and in doing that, we open up a number of other issues regarding science and democracy. Such a solution might be thought extreme by many, though perhaps not by many of my friends working on the science needed for federal land-management decisions. More realistically, what is needed for this particular problem, based on the actions of political appointees in this case, is an administrative framework, a series of guidelines that make it difficult for the excesses reported by the Government Accountability Office to occur. Such a framework ought to provide an open and defensible accounting of why certain scientific information was edited, replaced, not allowed, and so on. After all, this *Studies in Avian Biology* volume, used by the United States Fish and Wildlife Service in its listing decision, must by law be made easily accessible to the public. There should not be a mysterious administrative process that only partially reveals and certainly does not explain why a decision was made. This is

similar to the earlier call for scientists to be clear about their values and to disentangle those values from their science. Decision makers ought to be clear, too.

Science as Truth

The second issue, science as truth, involves the value one places on science and the knowledge it produces. A recent article by Lockwood (2008) on the mythic cowboy sets the stage for this perspective:

From the first-hand perspective of a scientist—an insect ecologist, in particular—I can assure you that science cannot provide the answers to the deep questions concerning what we ought to do with western people and lands. Science is necessary, but it is not sufficient. And here's why.

In the Myth of Scientism, the hero is an absolutely objective, rational discoverer of unchanging physical truths (like Isaac Newton and the apple incident, which of course never happened—but we know that myths don't collapse under the weight of facts). The scientist reveals how the world really is, not some fanciful tale replete with human desires. The problem, of course, is that according to this myth, science is value-free. So the hero can offer no moral lessons regarding our treatment of one another or the land.

If it claims to answer value questions, science, from this second perspective, moves from a way of knowing grounded in a process to a purveyor of truths. It has become a form of higher law. As Gregg Cawley and I have pointed out (Cawley and Freemuth 2007), one of the leading writers in public administration suggests that “the imperative of higher law is always conceived as derived from what is most valid, most powerful, most highly honored. Historically this has most frequently been God. But in the late nineteenth and early twentieth century America it has often been SCIENCE” (original emphasis; Waldo 1984:157). The science-as-truth claim suggests that it can answer questions not simply about what might or could be done but about what should be done.

Is there a path that leads away from the problems associated with these two issues? Perhaps, but it requires patience and dialogue. As Albert Teich, director of science and policy programs for the American Association for the Advancement of Science, recently wrote:

The dominant mode of scientists engaging with the lay public in the past has been “public understanding of science”—an approach based on the belief that if people only knew more about science, they would see the world the way scientists do. This is a paternalistic posture, one that is based on a failure to recognize the legitimacy of people's values when they conflict with those of the scientist. The constituencies whose values are reflected in some of the political positions of the administration with which many scientists disagree are not necessarily uneducated or irrational. Rather, they have a different perspective on these issues, one that places a different value on the costs and risks versus the benefits of stem cell research, reductions in carbon dioxide emissions, or the preservation of an obscure species of aquatic plant that may block construction of a dam. They need to be engaged in genuine two-way conversation—a dialogue—rather than dismissed out of hand, or “educated.” (Teich 2008:22)

Before scientists get upset at Teich's remarks, they might consider that some of the scientists who capture the public imagination are those who effectively communicate the excitement and challenges of modern science, such as the late Carl Sagan.

A POSSIBLE PATH

We should experiment with new forms of decision making and public discourse. Let us create a sage-grouse science and public policy deliberative forum, where scientists, the public, and interested decision makers might assemble to talk through the issues surrounding a possible listing of the sage-grouse. Scientists known for their skills in communication could present their best science in an accessible and understandable way, while letting us know how their values and assumptions guided and informed their work. This would mean distilling the diverse offerings that make up this volume, but that can be done, and scientists should be rewarded for doing it. Scientists could also debate and question each other so the public could see science at work. The public could ask questions and talk about the scientific information they think would be useful, but they should be prepared to put their own assumptions and values on the table as well, such as whether they have already decided that they are for or against

listing. Conserving sage-grouse and sagebrush are very good goals, but some of the measures required to do that may not be accepted by an expanding human population in the western United States that has other priorities. We need to know if that is true.

We should hear as well the perspective of various sage-grouse working groups throughout the West who provide a useful way to link questions of science to questions of public and agency concerns and values. Managers and decision makers ought to come—indeed, ought to be compelled to come—and talk about the factors that govern their listing decisions and the role that science plays or

does not play in those decisions. Together, perhaps all parties could develop the sort of guidelines that should be used by managers and decision makers in reviewing the scientific information needed for an effective listing decision. This process would take much work, but it might be more sustainable, and certainly would be more democratic, than our current one.

This volume is a hugely important part of this process. The work that has gone into it is extraordinary. But we all need to participate in developing a better way to link it to the other processes that will lead to a decision about the future of the sage-grouse and its habitats.

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