

## Science's role in natural resource decisions

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Collaborative efforts that rely on local knowledge as well as science are key to resolving difficult land use issues.

The call for land management and regulatory agencies to center their decision processes on "sound science" or "good science" has become a kind of mantra, so that no speech or directive about natural resource decisionmaking is any longer thought to be complete without some recourse to these magic words. At a House Natural Resource Committee hearing on February 5, 2002, for example, the committee's chairman, Rep. James Hansen (R-Utah), urged reform of the Endangered Species Act (ESA) so that it is grounded "in sound science, not political ideology." Such examples could be cited endlessly; the challenge would be to find a policy proclamation that does not contain such a reference. Perhaps the capstone of this phenomenon was provided by the Clinton administration when it decided to appoint a citizens committee to recommend changes in the Forest Service's planning regulations. Rather than entrust the task to planners or public administrators, the secretary of Agriculture appointed a "committee of scientists." If we expect scientists to have some privileged understanding of planning regulations, it is hardly surprising that we consistently invoke good science as the sole reliable path to sound resource decisions.

But this invocation has become as problematic as it is ubiquitous. In fact, almost every time someone calls for centering some policy or decision on sound science, we simply compound the problem. And we will continue to compound it until we begin to recognize that we are still using a century-old and increasingly outdated view of the relationship between science and natural resource management. This nexus was woven into the very fabric of public policy, and especially of resource policy, by the Progressive movement at the turn of the last century.

The Progressives believed that science could and should transform public policy as thoroughly as it had already transformed physical existence. The hard certainties that science produced could now begin to replace the notorious uncertainties so often produced by politics. City government, for example, would be transformed by replacing elected mayors [who made decisions in the old-fashioned, messy (if not actually corrupt) political way] with professional managers who would apply political science to city problems. Replacing traditional decision processes in an embedded context like city hall presented a much greater challenge than the brand new arena of resource management, where the scientific approach had the whole field to itself. Under the aggressive leadership of people like Gifford Pinchot, Progressivism entered that field with a vengeance. The Forest Service, for example, was born under that star; the agency built its identity and based its very substantial institutional pride on its commitment to professional, science-centered resource management.

Now, a century later, politicians and others are repeatedly urging land and resource management agencies to put even more weight on the old Progressive model. That is precisely what Hansen was doing when he criticized the ESA. It was what Undersecretary of Agriculture Mark Rey had done in a milder form when he declared, during a presentation of the Forest Service budget to a Senate committee on February 12, 2002, that, "the budget underscores the Forest Service as a science-based organization." Pinchot could have used language like that a century ago, and the science of the day would have given credibility to his assertion. But science itself has not stood still in the intervening century. As the 20th century progressed, the radical predictability of Newtonian physics (upon which the Progressive faith so largely rested) began to be assaulted by the equally radical unpredictability first identified as a principle of quantum physics. Although there remained, of course, a vast range of highly predictable phenomena, much of the universe now had to be understood as inherently impossible to forecast. Yet, even though science now presents us with a fundamentally different view of the world than that of a century ago, our expectations of the role science should play in land and resource management have not kept pace.

This problem can be illustrated by focusing on the role that science is expected to play in ecosystem management. The ubiquitous invocation of good science as the lodestar for ecosystem management decisions rests on the assumption that we can ever know enough to "manage" ecosystems. In fact, as science itself has taught us, ecosystems are inherently too complex to be known, let alone managed in that way. Because of this complexity, there is always more that could be known about any given species, habitat, or natural system. So why would anyone continue to speak and act as if good science by itself could get to the bottom of these bottomless phenomena and in the process give us "the answer" to difficult natural resource issues? In large part this is simply a holdover of an anachronistic view of how the world works and of what science can tell us about that world. In this sense, the repeated invocation of good science as the key to

resolving complex ecosystem problems has itself become bad science. What is infinitely worse is that this bad science is all too readily made the servant of bad government.

#### Disingenuous appeals

The appeal to good science is often only a way of using the unfathomable complexity of natural systems to forestall or undermine a decision that some group or individual opposes. The basic line of reasoning is that "we don't know enough yet to make this decision." Within limits, such circumspection is a valuable element of any good decision process. But it is easily perverted into saying, in effect: "Because there is more that could be known about this subject, we should not make any decisions until we know everything." But if by good science we mean knowing everything that can be known about a given issue, then this appeal to good science is not only bad science (because there is always more that can be known about any genuinely complex system), but it is also bad governance (because decisions do in fact have to be made in real time, and if science cannot make them for us, we need to stop pretending that it can).

Rey summed up the problem when he testified before a congressional committee on March 6, 2002. He talked about "a myth that has grown up in the midst of natural resources decisionmaking." The myth, he said, is that "good science can, by itself, somehow make difficult natural resource decisions for us and relieve us of the necessity to engage in the hard work of democratic deliberations that must finally shoulder the weight of those decisions." Rey's warning goes to the heart of the matter, but we are still a long way from eradicating the myth. In fact, nearly every new invocation of sound science or good science only compounds the problem. Meanwhile, however, a seemingly unrelated phenomenon in the field of land and resource management provides an opportunity to realign the relationship of science and policy in a way that is more consistent with new scientific understandings. That phenomenon is sometimes referred to as the collaboration movement.

For a more than a decade now, the American West has been the scene for a steadily growing number of local agreements among western environmentalists, ranchers, loggers, miners, and recreationists about how the public land and natural resources should be managed in their river drainage or ecosystem. The list of such local collaborative efforts is now growing too fast to be catalogued, but the work of groups such as the Henry's Fork Watershed Council, the Quincy Library Group, the Willapa Alliance, the Malpai Borderlands Group, and the Applegate Partnership are beginning to add up to something with genuinely historic proportions. A steadily expanding number of westerners on both sides of the political fence now believe that they can produce better results for their communities and their ecosystems by working together to solve resource problems than by continuing to rely on the adversarial and increasingly dysfunctional mechanisms of the existing decision structure.

There are two ways in which collaboration creates a radical change in the way science is brought to bear on natural resource decisions. First is the crucial role of local knowledge in every collaborative effort. Effective collaborators are, nearly without exception, longtime inhabitants of the ecosystems in which they are collaborating. They know those ecosystems in a variety of ways, all arising from their years or even generations of having lived with their complexities. This ingrained knowledge is not incidental to the process of collaboration; it is essential to it. It provides a way of knowing the ecosystem that an appeal to objective, external, expert science simply cannot supply.

One example from the dozens that could be chosen will illustrate the crucial role of local knowledge in collaborative work. In 1992, while developing a basin-wide water management plan for the Clark Fork River in Montana, the Clark Fork Basin Committee went on a series of field trips to become familiar with the range of water uses in the basin. As one observer, Donald Snow, put it, "Biologists, irrigators, mineral processors, and others were able to inform steering committee members of the organizations' interests in the river. A lot of native wisdom came forth the kind of knowledge gathered up by people on the land, people whose livelihoods depend directly on the river." In one crucial conversation, the observations of local rancher and water guru Eugene Manley brought into play specific and highly reliable information, garnered during more than 70 years of living in the valley, that helped the group understand the timing required to maximize both instream flows and the needs of irrigation. It would be difficult to exaggerate the central role that such ingrained knowledge plays, time and again, in enabling longtime adversaries to discover a common base of factual understanding on which they can then develop innovative and sustainable management decisions.

#### Rejecting conflict

The role of local knowledge in making collaboration work leads to the second way in which collaboration contributes to a new positioning of science within natural resource decisionmaking. Collaboration has arisen and spread because it offers an alternative to

the highly adversarial form of public involvement that now dominates almost all public decision processes. An integral part of that approach has been adversarial science. Each side in any contentious resource issue hires as many scientists as it needs or can afford and puts their conclusions in the record. The resulting image of science for sale creates deep public cynicism about scientists, of course, but it also corrodes confidence in the decisionmaking process itself. How can lay people, either citizens or officials, possibly hope to know what is right for their ecosystems when scientists cannot even agree about it? This leads either to alienation from public life altogether or to one more spurious invocation of good science to save democracy from this quandary.

Collaboration slices through this Gordian knot in a totally unexpected way. Rejecting the adversarial approach to decisionmaking, it necessarily rejects the use of adversarial science as well. Collaborators begin by determining what they already know about their ecosystem on the basis of their local knowledge. They then agree on what they don't know but need to know in order to make wise and sustainable decisions about their ecosystem. The need to know is the crucial element here. What they don't know about their ecosystem is infinite, and therefore in a sense irrelevant. Collaboration works when diverse interests can agree on what portion of that infinity they need to explore. Even more important, collaboration works when opposing interests can agree on the specific scientists or scientific procedures that can give them reliable information to fill in the relevant gaps in local knowledge. This move rescues science from its adversarial perversion while enabling it to play a role that is actually within its grasp: providing reasonably reliable information about a reasonably determined set of ecosystem parameters. Without that consensual determination of the questions science is expected to answer, we continually set science up by expecting it to give us the answers without having done the civic work of first deciding what the questions are.

There are some glimmers of hope (Rey's testimony to the Senate committee is one example) that this more mature understanding of the role of science in resource decisions is spreading from local collaborative settings to higher policy circles. A constructive next step would be for agency leaders and elected officials to begin conscientiously resisting the temptation to appeal to good science as a shortcut to decisions that can only be made by democratic deliberation.

The problem, of course, is deeper than rhetoric, but a heightened awareness of the language used to describe the role of science within a democratic decisionmaking system would go a long way toward dissolving the myth. Beyond that, a whole new training framework needs to be thought through and implemented to help public officials and agency personnel at all levels understand more clearly the emerging role of local knowledge in collaborative decisionmaking. By implication, that training should also emphasize the still often crucial but far more realistically modest role of hard science in collaborative settings.

One of the greatest challenges is to rethink and reposition the role of science in the National Environmental Policy Act and other decision processes in such a way that the adversarial use of science is minimized, the recourse to local knowledge is emphasized, and science and scientists are routinely called on to fill consensually identified information gaps.

Finally, schools of natural resources and public administration should be encouraged to incorporate into their curricula a rigorous exploration of the changing role of science in natural resource decisionmaking and management. There is clearly much to be learned about that changing relationship, and it should be a refreshing change for both theorists and practitioners to move beyond the myth of scientific omnipotence that has so clearly outlived its usefulness.

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