

## Scientific Expertise and Environmental Politics: Cross-Border Contrasts

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Scientific knowledge is widely viewed as essential to environmental affairs. As a result, a great deal of funding and effort are devoted to environmental research, and to communicating or applying its results. Scientists study the global climate, identifying signs of a warming world. Forestry agencies use science when deciding how many trees can be cut each year. Environmental organizations gather data to demonstrate that a pollutant is toxic. All parties involved in environmental politics appear to agree, at least, that the environment is a scientific matter.

Yet probably never has the relation of science to politics been viewed as problematic to the degree that it is today. Observers cite countless issues that lack resolution – from global climate change to neighbourhood contaminants – even after decades of research. Scientists provide multiple views of problems, unable to agree on what advice to offer. Science is widely viewed as too closely tied to powerful interests, especially industry and government. According to some critics, the act itself of defining environmental problems as scientific denies their political and economic dimensions, and especially inequalities of power and wealth.

That science, and scientific expertise, are closely implicated in political controversies exemplifies how scientific expertise plays roles at every step of the policy process: not just identifying problems, but contributing to discussions about what to do about these problems, and evaluations of whether progress is being made on solving them (Bocking 2004). Reflecting the importance of science in policy, political scientists, historians, sociologists and others have examined it from various perspectives. In some cases, these studies have adopted a comparative perspective, particularly examining nations on either side of the Atlantic, or within the European Union. This paper extends this research, by comparing environmental science and politics in Canada and the United States.

Environmental politics and policy in these two countries have themselves been the focus of considerable comparative research. These studies have been framed by the presence of both certain similarities, in ecosystems, environmental problems, and economic activity; as well as important differences, particularly in institutions and traditions. Comparative research has demonstrated the relative importance of these factors – of similar ecosystems compared to divergent institutions, for example – in shaping the processes and outcomes of environmental policy. Cross-border comparison of science and politics in Canada and the United States presents similar possibilities. It can draw on insights generated by general comparative studies of environmental science and politics, while at the same time contributing to a broader understanding of environmental policy in North America.

### **Science in context**

It is worth beginning a comparative analysis of science and politics by noting that such an undertaking would once have been considered misguided. Science was viewed as the objective search for truth, with one truth for all nations. Comparative study was therefore considered superfluous (with the exception of comparing levels of national support for the advancement of science). The relations between science and authority were viewed similarly: science described the world; it was the separate province of politics to determine how to respond to this description.

This positivistic view of science and society is now considered antiquated. Yet an underlying proposition, that generalizations about science and politics hold firm even across borders, remains widely held. It is seen, for example, when certain "classic" instances of science and politics are considered to exemplify more general principles. Thus, Brian Wynne's case study of sheep and radioactive contamination in England's Lake District is widely viewed as having more general implications regarding the relations and tensions between local and expert knowledge (Wynne 1996). Similarly, the implications for decision-making in situations of uncertainty and distrust of institutions of the long saga of nuclear waste disposal at Yucca Mountain in Nevada are considered to extend far beyond that particular site (Metlay 2000).

This assumption that ideas about science and politics can be transported across borders can also be found in the widely invoked epistemic communities approach to understanding the roles of scientists in environmental policy. An epistemic community, as presented by Peter Haas and other scholars, is a network of scientists and other experts that can make a collective authoritative claim to policy-relevant knowledge, and that share perspectives on the practice of science, the appropriate relation between knowledge and policy, and the nature and urgency of particular environmental problems (Haas 1992). An important claim inherent in this approach is that the political authority of an epistemic community stems from this cognitive consensus among its members. Through the exercise of this authority, these experts can then play an essential role in encouraging transnational agreement on policy regarding an environmental problem. This approach therefore implies that scientists from different nations can readily come to agreement, with national differences in scientific perspectives at most a minor consideration.

But objections can be raised to such an approach. These objections are rooted in the view of science as an activity embedded within its wider social, political, and economic contexts, both historically and today. One such context is constituted by scientific disciplines themselves. For example, climate science reflects its disciplinary origins in the modeling of atmospheric circulation, which is itself partly a product of Cold War imperatives. As I've argued elsewhere, such an orientation may not be the best suited to persuading governments or citizens to take action on climate change. As another example of the importance of these contexts, forestry and fisheries science in Canada today still exhibit the influence of their historical role in natural resource exploitation. Overall, the assertion of the importance of these links between science and specific contexts is supported by an array of scholarship in the history, sociology and politics of the sciences.

Of immediate relevance to this paper, these links are also evident in studies that compare the practice and application of science in different countries. For example, Sheila Jasanoff's recent work, *Designs on Nature*, explores the divergent positions taken by the United States and by European nations regarding research in genetics and biotechnology (Jasanoff 2005). Other researchers have examined distinctive national approaches to the precautionary principle, the Kyoto Accord, and ecological research, identifying how different approaches to these scientific questions relate to broader views of environmental politics and policy. Collectively, these studies illustrate how the recent history of the environmental sciences cannot be separated from the general history of environmental affairs. These studies also demonstrate how the familiar notion that nations have distinctive histories, institutions and values applies as much to science as it does to other areas of national life.

This perspective on the distinctiveness of national approaches to science provides one context for comparative analysis within North America. The other context is that of the differences and similarities between Canada and the United States with respect to environmental policy and politics.

### **Comparative environmental politics**

The Canadian-American comparison defeats easy generalizations. On the one hand, there is ample reason to expect convergence (Howlett 2000). After all, Canada and the United States share a continent, as well as similar ecosystems and environmental problems. Their economies are closely integrated, and have some similar environmental implications, such as intensive use of energy. Shared regulatory instruments such as NAFTA enforce movement towards convergence. Close professional and political ties, both between national governments, and at the regional level, particularly in the Great Lakes and Pacific coast regions, reinforce tendencies towards policy emulation and convergence, as do shared institutions, such as the International Joint Commission. Some scholars have described the emergence of bi-national epistemic communities, replacing distinctive American and Canadian views on joint problems with a common North American perspective (VanNijnatten 2003, 2004).

However, there are also ample grounds for expecting environmental politics in Canada and the United States to take divergent paths. Most important are striking differences in institutions and political traditions. Broadly speaking, American environmental affairs are both more participatory and more adversarial, with a wider range of actors, who make greater use of legal tools to force action. American environmental agencies have fewer opportunities to practice discretion, as their precise tasks and responsibilities are stipulated in legislation. In contrast, Canadian agencies have wider latitude to pursue or defer action. These differences reflect divergent institutional structures, including the relative degree of separation of the executive and legislative branches (Rabe & Lowry 1999).

A further crucial difference is the extent of centralization of authority in the American federal government, contrasted with the considerable amount of jurisdiction exercised by provincial governments. Interestingly, and perhaps unexpectedly, this has apparently created the conditions for American states to be more innovative in the use of environmental policy tools than have Canadian provinces (Rabe 1999). Together, these differences can, for example, make it difficult for environmental organizations to form effective cross-border alliances (Alper 1997).

Adding to this complex picture of both convergence and divergence is the dynamic nature of Canadian and American environmental politics. For example, there is increasing American interest in collaborative partnerships, partly out of frustration with adversarial politics. In Canada, meanwhile, more participatory forms of decision-making have both advanced and lagged in response to changing political priorities and climates, especially cut-backs in environmental commitments during the 1990s (VanNijnatten 1999).

### **Implications for roles of science**

When we turn to the implications of these cross-border patterns for scientific expertise and environmental policy, we can observe several substantial differences between Canada and the United States. Of these, I'll focus today on two.

The first difference relates to the demands imposed on science by adversarial environmental politics. As many scientists called upon to testify have found, they experience much more thorough and critical examination of their work in the court room and in public controversies than they ever do within the scientific community. In adversarial contexts uncertainty is viewed as inadequacy, interpretation as mere opinion, lack of consensus as evidence that science cannot justify any action. Scientific information itself often becomes the focus of controversy, as participants line up with opposing scientific assessments and deconstruct the science of their opponents, critiquing methods, disputing uncertainties, and using those uncertainties to discredit others' results. Those who do not accept a decision can always find experts to back up their objections. Opponents of regulation highlight the absence of definitive proof regarding many hazards, and dispute regulatory decisions through close examination and critique of their scientific basis. In effect, litigation in America has become an alternative channel for debating science, and in courtrooms the ethos of skeptical mistrust toward all testimony has inevitably been directed toward science. The result is often harrowing for scientists subjected to cross-examination, as the assumptions and interpretations underlying their evidence are pulled apart.

These characteristics of adversarial processes generate a demand for scientific information that can be expressed with minimal uncertainty. This is illustrated by the American Clean Air and Clean Water acts. Both acts specify not standards based on the quality of the receiving environment, but rather, technological standards. In other words, to give an example, an industrial facility located on a river is required to show it has installed the best available technology, rather than, as was the case in the early years of the Acts in the 1970s, avoid degrading the river environment below a certain standard. These ambient standards had relied on the inherently more uncertain evidence provided by ecological science, and hence were less defensible in a legal context. In contrast, more use is made of these ambient standards in Canadian environmental regulation.

A second significant difference between Canada and the United States illustrates the consequences of a reaction against adversarial styles of environmental affairs that has been taking place in America over the last decade. One manifestation of this reaction has been the adoption of ecosystem management by American resource management agencies. Ecosystem management signifies a broader range of considerations in resource management, encompassing both scientific understanding of entire ecosystems, and the full range of human values and interests at stake in resource issues. In addition, the concept usually incorporates broader participation in decisions, through participatory and collaborative approaches.

In 1992 the U.S. Forest Service adopted ecosystem management as policy for its national forests. Other agencies have since followed, including the Fish and Wildlife Service, the National Marine Fisheries Service, and the Bureau of Land Management. By one estimate, ecosystem management has been applied in more than 600 instances in the United States. This reflects, especially, greater interest in building a basis for collaboration among diverse agencies and parties in natural resources management.

But while ecosystem management has been adopted widely in the United States, it has yet to penetrate effectively into Canadian resource management, apart from certain special cases, such as the Clayoquot Sound region in British Columbia. This difference likely reflects, among other factors, the greater opportunities for participation, and the wider array of interests involved in resource management, in the United States relative to Canada. And this difference also has consequences for the relation between science and environmental politics, particularly with, in Canada, a narrower range of scientific knowledge being considered relevant to resource management than is the case in the United States.

I've noted two specific ways in which the relation between science and environmental politics diverge between Canada and the United States, that are evident in adversarial regulatory processes and in ecosystem management. More general conclusions can also be generated through a comparative perspective. One relates to the need for a more nuanced approach to cross-border comparisons. Clearly, a diversity of approaches to doing and using science are evident in environmental politics within each nation. Thus, general comparisons of Canadian versus American environmental policy approaches should be approached with caution. Comparison at other scales, such as the sub-national or the international, or within certain specific realms of environmental affairs, may be more appropriate.

It is also evident that the roles of science in each country reflect aspects of their previous history, including previous policy priorities and experiences. This underlines the significance of the history of science and of public policy in shaping the pathways followed by the evolving relations between science and environmental politics, and thus the value of understanding this history in order to understand contemporary environmental politics and policy.

Another set of general conclusions relates to the kinds of scientific knowledge that are required by particular approaches to environmental policy. These conclusions extend beyond the Canadian-American comparison. For example, approaches to environmental policy that emphasize the clash of interest groups, or conversely, that emphasize the seeking of consensus, each have distinctive knowledge requirements.

These conclusions also have practical implications. I'll mention two. One is that it is possible to identify how a particular approach to environmental policy can, through its knowledge requirements, constrain scientific research so that it provides only a misleading or incomplete understanding of the natural world, and hence, an inadequate basis for making policy. For example, a political system that demands only that information that can be defended against challenge in an adversarial context will fail to elicit knowledge of more subtle and long-term, but nevertheless significant phenomena (Wynne & Mayer 1993).

A second implication is a more positive one. By understanding the knowledge demands of particular policy approaches, it should be possible to identify what forms of scientific activity would be most effective in those contexts. This could then be useful in ensuring that that scientific research is done that can most effectively overcome barriers to constructive environmental initiatives. To cite a topical example, this could provide the basis for a critical examination of Canadian climate science, that could determine whether there are alternative

scientific approaches that could help generate the necessary impetus for Canada to respond effectively to the climate change challenge.

More generally, it seems that, given the substantial expectations imposed on science in the environmental policy process, that it's appropriate to apply analytical tools, such as a comparative approach, to evaluating whether science is indeed able to fulfill these expectations, and can play an effective, credible, and politically legitimate role in environmental politics.

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