An Exchange of Views

When the Natural World Presents Facts to Political Theorists

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The recent article by Marco Verweij in *Law and Society Review*[1] offers a promising approach for studying the effectiveness of rules for achieving environmental goals. He suggests treating levels of toxic substances as the independent variable, and then looking at that variable across a range of legal and regulatory cultures. In the article, he argued that the adversarial culture of the United States compared to the cooperative culture in civil law nations meant that firms in Europe were more proactive in cleaning up their emissions than was the case in the United States. To make this point, he sought to compare chemical pollution in the Rhine to that found in the Great Lakes of North America. He also claimed that the International Joint Commission (IJC), a small-but-respected international organization, had worsened the situation in the Great Lakes. Verweij's approach is so promising, but the execution so flawed, that a comment on his thoughtful effort seemed in order. My comments will address, first, the scientific/technical difficulties in his study and, then, political/social science issues. It concludes with a brief review of other ways we could test his idea. I believe correcting the flaws related to the biophysical science and executing a relevant study along the lines he suggests would advance our understanding of how differences in legal cultures and institutions produce real-world outcomes.

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[1] "Why Is the River Rhine Cleaner than the Great Lakes (Despite Looser Regulation)?" 34 *Law & Society Rev.* (2000), pp. 1007–51.

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Lakes Are Not Rivers and Other Biophysical Issues

Verweij claims he has used a most similar system design. He notes that all the nations in his study are industrial democracies and that the only relevant difference lies in their legal cultures (civil versus common law). In one utterly crucial respect, however, which he acknowledges but dismisses, he has chosen a most different system design: Lakes do not behave like rivers. Because toxics are central to his argument, this error matters. Studies of this nature must make sure that similar cases really are similar—politically and ecologically.

Verweij assumes that chemicals found in a sample of water from the Great Lakes or at the outlet of the river Rhine reflect the success or failure of reduction of toxic substance releases by industry. This is unlikely. Dr. Sarah Green, an environmental chemist, explains the difference like this:

> In simplest terms, the accumulation (or loss) of a chemical in a lake results from differences in the input and removal (by volatilization or degradation) during the residence time of water in the lake (170 years for Lake Superior). The amount actually measured in the water depends on what fraction of the total has sorbed to the sediment. In a river, measurements of water at the mouth indicate (1) the amount put in during the travel of water downstream (a few weeks for the Rhine) and (2) leaching of material that was historically sorbed to the sediments.[2]

Thus, his claim on p. 1016 is in error. "It is unlikely that the Great Lakes firms made greater strides in reducing lake pollution [between 1970 and 1988] than the Rhine companies . . . for if they had diminished their pollution by more than 80% to 90% . . . they would have virtually eliminated the chemical pollution of the lakes by the end of the 1980s." Even if Verweij ignores legacy chemical pollution in or from Lakes Superior, Michigan, and Huron, he would still have to cope with the 2.6 years average retention in Lake Erie and the 6-year retention in Lake Ontario, both of which allow chemicals to concentrate as processes of suspension, settlement, and resuspension take place.

On top of all this, the vast surface area of the Great Lakes means that airborne deposition of chemicals from *outside* the Great Lakes basin also cause pollution; indeed, for some species of chemicals airborne depositions is the *primary* source of inputs. For example, all the compounds he lists in Table 1 come into the Great Lakes primarily from the atmosphere, except for the sedimentary sources of PCBs.[3] Perhaps Verweij would claim that the Toxic Release Inventory, the basis for his estimate of industrial chemical inputs to the Great Lakes, are primarily dumped into the air. That, however, is not necessarily true and could only be

[2] Personal communication, Oct. 24, 2001.

[3] I'm again indebted to Dr. Green.

determined by looking at the permits for different plants in the region—information available in the United States but not in Europe.

The use of more similar waterways would help to clarify the merits and weaknesses of his larger argument about rules. For example, a comparison of cleanup in the connecting rivers between the Great Lakes versus the Rhine would have come somewhat closer to the biophysical mark. Little water from each of the lakes flows through the connecting channels, about 1% per year. So, Verweij could have assumed that any pollution measured at the downstream end of the St. Mary's or the Detroit River came from whatever was put in the river during the travel time. This could be matched up with plant permits and could even be corrected to some degree for riverine legacy pollution. The small surface area of rivers would serve as well to mute the effects of airborne deposition. Such an approach would thus help accommodate the two features of chemical loadings to the Great Lakes that rivers do not experience so strongly: (1) release of chemicals from sediments, many of which are "legacy" forms of industrial pollution, and (2) airborne deposition of toxics from regions outside the Great Lakes basin, which now accounts for a large and growing portion of the chemical loadings in the water. Alternatively, he could have taken measures from lakes associated with the Rhine, for example Lake Ketelmeer or Lake IJsselmeer,[4] and found similar-sized feeder lakes to the Great Lakes. (Outside my window are Portage and Torch Lakes, both of which connect to Lake Superior, though both are larger than Ketelmeer.)

A second scientific/technical problem comes from the errors that would arise from the differences in sampling design. He says he has "measurements" for toxics, but as my scientific colleagues noted to me, there are almost no measurements presented. He assumes that an ambient water quality sample from near the mouth of the Rhine is equivalent to that of the Great Lakes, which is in error due to the differences between lakes and rivers. Or, failing that, he should have sought the same sort of samples from local water providers along the shores of the Great Lakes,[5] as he did with the Rhine (p. 1013)—although it's unclear whether or how he used those measures at all in his study, given the final water sample at the mouth. Local municipalities in the United States are the ones who monitor water for drinking purposes and might well have similar data to the water supply companies along the Rhine. He also simply assumes that all loadings come from industry, but this is not the case, especially for mer-

[4] See the thesis by H. J. Winkel, "Contaminant Variability in a Sedimentation Area of the River Rhine." http://www.dpw.wageningen-ur.nl/ssg/publ/winkels.htm

[5] http://www.epa.gov/ogwdw/dwinfo.htm This site provides information on many public water works water quality reports. The samples, however, come from the treated water rather than the pretreated water.

cury. In many Great Lakes communities, medical and dental waste are important sources for mercury. One-third of all dioxins (by air deposition) are now thought to come from backyard burn barrels. He employs the toxic release inventory, but does not distinguish between releases sent to water, air, or land. Perhaps he could have gained access to permits for firms on the Rhine versus those in the United States (which are publicly available) to get a better grip on what effluents firms emit now and emitted five years ago.

Explanations for Regulatory Cultures

The discussion of regulatory cultures is informative, but even here a decision the author made may have important ramifications. He left out Canada. Canada has a somewhat stronger affinity to the European model than does the United States. The culture encourages considerable collaboration and consultation among all affected parties before a rule is implemented. Industry has a strong say in what happens through these processes. Indeed, industry has a strong say in the regulatory process in the United States, via comment procedures associated with the Federal Register. Yet, the culture of consensus building in Canada has found its way to the United States—the voluntary Auto P2 program, which has industry, NGO, and government participation, as well as the Great Printer's Project come to mind. Perhaps the seeming absence of cooperative activities is due to the heavy weight he apparently assigned to the views of the Council of Great Lakes Industries (CGLI).[6] If the author were to compare what member firms actually do in terms of environmental corporate responsibility to what adversarial CGLI advances for its members, he might have discovered considerably more willingness on the part of firms to reduce pollution. He might also have noted that the stance taken by the CGLI has prompted a loss of membership, as firms realize the gap between their own environmental policies and the CGLI. Interestingly, when the CGLI was first formed at the end of the 1980s, there was much hope in the government and NGO sectors that, at last, there would be a clearer industry voice to negotiate with.[7] It is a pity this did not work out well—and it does lend support to the author's argument that the organization of industry in peak associations can facilitate improvements in environmental performance.

[6] He said it was one interview of many, but relied heavily on that one in reaching his conclusion.

[7] Interview with Durfee, 1990, at the Center for the Study of the Great Lakes, Chicago. At a 1995 meeting of the Lake Superior Binational Forum, the CGLI representative said that zero discharge was not, even in principle, acceptable to its members. When asked what its members were doing in pollution prevention, the representative could not answer. He was instructed to find out and report back. Three hours later he produced a long list of success stories.

Verweij also discusses the underlying political institutions of the United States and continental Europe. He notes that the United States has a presidential system—American political scientists emphasize the weakness of the president and prefer "separated powers" as the descriptive term—and the Europeans a parliamentary one. He does not make enough of the fact that continental parliamentary systems are based primarily on proportional representation. This may be the cause of the single most important political reason why cooperation (not to be confused with regulatory effectiveness) might be better in Europe than in the United States: Green parties win seats in European parliaments.

Last, he blames the International Joint Commission (IJC) for fanning the flames of the U.S. adversarial culture by including citizen-based NGOs. He happened to hear about the 1993 Biennial Meeting, which was indeed very imbalanced toward the NGOs. The IJC's U.S. section budget was slashed by Congress exactly the amount it contributed to the 1993 meeting, and the organization was duly chastized. Had the author seen the radically different Biennial Meeting in Duluth in 1995, he would not have been as ready to assume the IJC was at fault; or, had he gone to earlier meetings where neither NGOs nor industry came, he might have seen this as a new feature of the IJC–governments' relationships. The author cannot be faulted for not having gone to another meeting, of course, but care should always be taken about extrapolating a trend from one data point.

Rather than assuming the IJC made things worse, perhaps the first step should have been to take his independent variable, toxic loadings, more seriously. If one looks at polycyclic aromatic hydrocarbons in the Great Lakes, Rhine, and at New Orleans (with Rhine and New Orleans being two riverine systems), one will find recent loadings are the same for the Great Lakes and the Rhine, and ten times higher for New Orleans. Or, consider that concentrations of PCBs in fish tissues at the Yazoo River, a river tributary to the Mississippi River, were the highest found in the United States.[8] In sum, it is more likely the presence of the IJC has helped, not hurt, the cleanup of the Great Lakes by interjecting Canadian views, by providing a means to resolve conflicts, and by providing a focus for different stakeholders to share and compete over information.

[8] http://ms.water.usgs.gov/nawqa/pubs/posters/organochlorine/organochlorine_compounds_in_fish.htm

Research Opportunities

Verweij's article offers an excellent insight into how one might get at the effectiveness of legal and regulatory systems: Treat toxics, or some other measureable, as the independent variable. How could this be done more effectively? First, use concentrations in fish tissues. There is a reason why the Great Lakes scientific, medical, and regulatory communities emphasize the loadings of chemicals and their effects in tissue: This is a major pathway of chemicals into animals and humans and thus is a sound gauge, especially in light of the complex ways chemicals behave in lakes. It is what matters. This measure will not get at sudden changes in water quality, but can more readily be compared across different water systems and across time. The downside, of course, is that different fish bioaccumulate toxic substances at different rates, given, for example, their place on the food chain and their body fat. Thus, it may prove difficult to compare fish in two different places. Still, some fish are fattier than others, and these are the ones that bioaccumulate the most of some classes of chemicals.

Verweij could compare nations along the Rhine or in the Rhine drainage basin; others could compare Great Lakes states and the provinces of Ontario, or even Quebec. Or, one could look at states along a major internal U.S. river to see what differences might appear there relative to the Rhine. Last, one might also assess what difference the IJC makes by comparing other *rivers* under its jurisdiction elsewhere along the US–Canada border to check for the difference it makes relative to the Rhine. More generally, comparison of the Great Lakes, which are largely under IJC jurisdiction, to the Mississippi, which is not, might offer more insight into what difference an international organization makes to pollution inside the United States.

Verweij's interest in the effectiveness of regulatory cultures is on target. It could lead to better understanding of regulatory cultures and improved management of a range of issues. The use of toxic chemical substances as an independent variable looks like a very strong idea, but incoherent biophysical science will not and did not contribute the link he seeks. The hard challenge, to match social and biophysical processes correctly and usefully, must be met. When it is, the promise of Verweij's central insight will, I believe, become apparent.