

Risk and the Human Environment

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ABSTRACT: This article is concerned with the nature of what federal legislation calls "the human environment" as a preliminary to understanding impacts upon it and risks to it. After discussing the features that distinguish human systems from others, emphasizing nonmetrical aspects of their sociocultural characteristics, eighteen points concerning risks and impacts are made. The article concludes with a discussion of the possible place in the human environment of what Stephen Toulmin calls "post-modern science and risk analysis."

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STUDIES of risk, under the guise of environmental impact studies, have, by legislative mandate, been part of environmental and resource planning for several decades now, and the complex nature of that which is at risk—the environment—has increasingly been recognized. Thus, for instance, the Outer Continental Shelf Lands Act as Amended,¹ in accordance with which the Department of the Interior leases rights to extract hydrocarbons from the Outer Continental Shelf (OSC), requires studies of risks to what it calls “the human environment.” This term subsumes not only features of ecosystems related to human populations but those populations themselves and their social, cultural, and economic systems as well. Because this simple characterization masks enormous complexity, it is necessary to enlarge on the distinctive nature of human environments before considering possible risks to them.

Human systems are complex not only because they include innumerable elements in continuous interaction but also because some of their components are qualitatively different from others. Some, including humans themselves, are natural products of genetic, geological, and ecological processes. Others—the sociocultural elements of such systems—are symbolically conceived and socially constructed. The latter include their more or less distinctive political, legal, economic, social, religious, recreational, and aesthetic conventions: rules, practices, ways of doing

things standardized by law, custom, or habitual usage as well as the conceptions, perceptions, and understandings on which these rules and practices are founded. Several points follow.

First, all human systems can, of course, be characterized in terms of a range of fundamental demographic, economic, physical, and social properties and activities. Such obvious and quantifiable variables are those most often considered in assessments of the impacts of resource extraction or other forms of economic development on human systems.

But, second, any adequate description of such systems must also consider their social, symbolic, and conceptual elements. Indeed, economic systems are subsets of social systems, and inasmuch as they are conventionally established and not “naturally” constituted, they are themselves social and symbolic in nature, and the value of money is purely conventional.

The understandings on which conventional rules and practices are founded are not all narrowly focused on specific instrumental aspects of human affairs. They also include more general and, from the point of view of the actors, more fundamental conceptions of morality, equity, justice, and honor; religious doctrine; ideas concerning sovereignty, property, and rights and duties; and aesthetic values and what constitutes quality of life. There are also distinctive understandings concerning the nature of nature, of the place of humans in it, of proper behavior with respect to it, and of equitable distribution of its fruits, its costs, and its

1. Outer Continental Shelf Lands Act Amendments, Pub. L. 95-372, 43 U.S.C. §§ 1801-66 (1978).

dangers. At levels yet deeper lie assumptions about the nature of reality: what is given, what requires demonstration, what constitutes evidence, how knowledge is gained. Such loosely structured bodies of understandings and the conventions and practices they inform are what anthropologists call "cultures" and what laypeople probably mean by such phrases as "way of life" or "tradition."

Demographic and economic aspects of human systems are relatively amenable to numerical representation, but other aspects of society and culture, including most of those just listed, are not. They are no less real for that, however, nor are they less compelling as factors in human affairs for, as vaguely articulated as they often are, they command great loyalty. It is through such conceptions that risks are not only perceived but defined as such: such conceptions specify what those who are at risk understand to be at risk. Risk analysis risks resistance or rejection if it ignores such conceptions.

Third, although it is proper to speak of a generalized American society and culture, regional, ethnic, class, and other differences play variations on that common theme. In some instances—for example, Native American groups—the local version diverges widely from the generalized. In all instances, the divergence is significant. It follows that the features of local sociocultural systems cannot be taken for granted but must be explored.

Fourth, it follows that impacts are always in part relative to the particulars of the affected sociocultural sys-

tem. It would be one thing for an oil spill to decimate marine life in an area exploited only by white commercial fishermen and quite another to decimate an equivalent fauna in Bristol Bay, Alaska, which is fished and hunted by Yupik-speaking Native Americans. For white fishermen the loss of their fishery is economic. For Yupik it is not simply economic. Because subsistence activities are central to their cultural reproduction, Yupik maintain that the destruction of their fishery would constitute genocide. It would be more accurate to call it ethnicide.

Given this complexity, the conception of the human environment on which many impact studies have been based seems impoverished. To the extent that the concept has been formulated at all, it seems to have been operationalized only in terms of economics, demographics, and government services. But adequate consideration of ultracomplex human systems, conventionally constituted as they are, must also rely on social, cultural (anthropological), and even psychological analyses. An integrated approach is required if information is to be adequate to the gravity of such actions as OCS development. This framework needs to be sufficiently comprehensive to allow the full range of phenomena constituting human systems to enter into analyses, and it must be inclusive enough to take into consideration the concerns of all interested parties—especially those who are likely to experience impacts directly. It should, furthermore, be sufficiently consistent to make for reasonably commensurate studies, thus

facilitating extrapolation, comparison, and generalization—in short, to encourage learning from experience.

EIGHTEEN THESES ON THE HUMAN ENVIRONMENT

More specific observations concerning both the nature of what the Outer Continental Shelf Lands Act as Amended awkwardly terms “human environments” and how they are to be characterized are now possible.

1. Because human systems are ultracomplex and always unique in some particulars, the range of possible social, cultural, and economic effects of human activities on them cannot be specified, even in principle, in advance of studies based upon empirical research. It is not legitimate to stipulate a priori what qualifies as a social, cultural, or economic impact. The establishment of such specifications constitutes an attempt to legislate reality, but the degree to which reality is amenable to such legislation is slight. Any limitation on the nature of what counts as a real impact—for example, that it is physical or quantifiable or translated into monetary terms—can only misrepresent actual conditions. Given the responsiveness of human systems, such misrepresentations are likely to have political, legal, and social repercussions, themselves properly regarded as impacts.

2. Humans respond not only to events but also to information concerning events. Indeed, in this age of rapid communication, the preponderance of response is not to direct observation of events but to news of them.

When news of events, rather than events, provides stimuli, the events need not have yet occurred for them to have significant effects. Thus apprehensions about undesirable developments, and not simply developments themselves, are real and immediate effects of announcements of possible developments. For example, uncertainty concerning the future of a coastal region ineluctably increases from the moment a tract appears on a Department of Interior five-year hydrocarbon leasing plan until a lease sale fails or until exploration ends in either abandonment or drilling. Uncertainty itself constitutes a real impact. Both apprehension and uncertainty about future activities and their consequences are properly construed as impacts in the present because they may alter the current psychic, social, and perhaps economic well-being of a community and because they influence subsequent attitudes and behavior.

3. It follows that in ultracomplex human systems, some effects are not simply linear outcomes of earlier actions. Between causes and effects—that is, between perturbing factors and responses to them—lie conceptions and evaluations of not only how the world is constructed and how it works but also how it should be constructed and how it should work. It is in terms of the latter (values) that the former (perceptions of actual conditions) are understood. Such values are, of course, culturally or even subculturally variant.

4. The relationship between the news of an event and the physical characteristics of the event is not

simple. News is not simply radiated from an event, as light from a bulb, but is subject to amplification, dampening, editing, and distortion in transmission, and it requires interpretation by receivers.

Interpretation takes into account the reliability and credibility of transmitters and channels. Credibility can be a serious problem for both transmitters and channels, and its loss can be a consequence of their responses to events. For instance, OCS environmental impact statements that an affected public takes to be inadequate or misleading can discredit their sources. There are, moreover, grounds for believing that risks are perceived to be higher when information sources are distrusted. Such perceptions can lead people to oppose even projects that could benefit them.

5. If impacts include responses of systems to perturbations, then the legal, political, and organizational responses of states, municipalities, tribes, and interest groups to announcements of development plans are themselves impacts, as are their opportunity costs. Antagonisms developing between affected groups as conflicts between their interests become apparent, and conflicts between such parties and the federal government are also impacts.

6. The previous points suggest an order in which impacts of different natures become dominant. Earliest effects—for example, those following soon after the listing of a region on a five-year OCS oil leasing plan—are likely to include increased apprehension and uncertainty about the effects of future OCS development. Ap-

prehension is always unevenly distributed in populations, and immediate subsequent effects are likely to include attempts by their more interested elements to raise concern among the less sensitive. Activity of state and local agencies and already existing environmental groups and trade associations soon increases, and special state and local bureaucracies and special-purpose grassroots organizations often spring into being. Conflict between those taking various positions comes next. All of this happens before any lease sale takes place. Subsequent exploration and production have their own effects, including disaster and its possibility, and so, finally, does termination, subsequent to which there may be as yet unexplored residual effects.²

7. That certain important consequences of development in general and of gas- and oil-related OCS activity in particular can be strongly felt well in advance of any actual physical activity on the part of oil companies may contradict some recent court decisions. The general failure to recognize prelease sale effects of OCS activities may be related to their typical resistance to plausible quantitative representation. More easily quantifiable impacts generally come later in

2. See W. R. Freudenburg and R. Gramling, "Community Impacts of Technological Change: Toward a Longitudinal Perspective," *Social Forces*, 70:937-57 (1992); R. A. Rappaport, "The Human Environment: Appendix B," in *Assessment of the U.S. Outer Continental Shelf Environmental Studies Program*, vol. 3, *Social and Economic Studies*, by Committee to Review the Outer Continental Shelf Environmental Studies Program, Socioeconomics Panel (Washington, DC: National Academy Press, 1992).

the sequence. It may be because early effects resist representation in terms—such as monetary—familiar to many or most administrators that public awareness of them has been slight.

8. Although some aspects of events and their consequences are metrical in nature, or easily represented in numerical terms, other aspects of the same or other events cannot be so represented. It should be clear that a good many significant effects of OCS and other developments—the psychic and social tensions that attend uncertainty, or anger at and alienation from the government—cannot be represented adequately, or even at all, in quantitative terms of any sort, let alone monetary terms.

The prevalence of opinions should, of course, be sampled. It is one thing, however, to quantify the prevalence of particular opinions on particular issues as they may be indicated by responses to the limited range of choices offered by particular questions asked at particular moments in an ever changing history, and it is another to grasp the underlying cognitive structures out of which these relatively evanescent opinions emerge in response to unfolding events. Attempts to force the representation of such structures into inappropriately quantitative terms or, alternatively, to dismiss them because they cannot be quantified is to misrepresent reality. The aesthetic considerations of affected populations, for instance, or violations of their religious beliefs or of their conceptions of equity or even of their vague conceptions of the good life cannot be ruled inadmissible be-

cause they resist quantitative representation, for they are likely to be those aspects of their lives that these populations take to be most seriously at risk. Such considerations cannot be disqualified as mere preferences or prejudices of uninformed laypeople. They are embedded in views of the world no more and no less arbitrary than other views of the world, and as such have valid claims on reality. More decisively, they are social facts and as such serve as grounds for action.

In sum, metrical representation—including the results of opinion surveys—should be pushed to the limits of plausibility but no further, and it is necessary to recognize that some considerations, often decisive ones, lie beyond the reach of plausible numerical representation. Attempts to reduce radically unmeasurable components of the world to common metrics preliminary to bottom-line calculations are not to be justified as aids to clear thinking—the clarity and certainty so claimed are false.

9. The term “significant” in point 8 is meant in both its major senses: both “consequential” and “meaningful.” To say that a phenomenon is meaningful is to say that it enters into the motivational processes of actors. This implies that values are of crucial importance in risk analysis and that their consideration cannot be avoided. Risk assessment cannot be value free because values define what is at risk, and what is at risk may be values themselves.

In some contexts, the conception of value, particularly when accompanied by a modifier—for example, “food value”—seems intrinsically metrical.

But the term also refers to such conceptions as truth, honor, honesty, integrity, life, liberty, and happiness. Two subsidiary points follow.

First, there is a radical incompatibility between most such values and metrics of any sort, and an absolute contradiction between some of them and monetary valorization, a contradiction indicated by such questions as "How much money is your integrity (or honesty or vote) worth?" Any assignment of monetary metrics to such values renders them false. It follows that attempts to mitigate the violation of strongly held values through cash awards may be taken by those to whom they are offered as insults heaped on previous injuries. The Shoshone, for instance, have refused to accept a cash award of tens of millions of dollars as compensation for what they construe to be seizure of their lands by the federal government in violation of the Ruby Valley Treaty of 1863. Similarly, many people in Nevada characterized as attempted bribery the suggestion that they receive large cash payments in return for accepting a national nuclear waste repository.

Second, fundamental or basic values tend to be low in specificity. What, after all, constitutes liberty or happiness or, for that matter, life? To say, however, that values are not specific or even vague does not say that they are not cogent, or even decisive, in the formation of positions on which social actors stand and from which they understand the world and act in it. Furthermore, it may even be that the vagueness of a value and the strength of the motivations it engenders are

directly correlated. People will sacrifice themselves to protect whatever they mean by "liberty" or "democracy" but not to balance the budget of the federal government.

10. A general value of sufficient significance to warrant special mention is fairness. Americans are likely to take such actions as OCS oil and gas development leasing to be in their nature unfair. First, affected populations are quick to perceive that the most substantial benefits of development are likely to flow to parties other than those most directly exposed to attendant risks. Second, and even deeper, it seems that the attitude of local publics to local land is that it is in some sense theirs. That a private or alien interest can curtail or endanger their use of what they see as their own—whether private property or public amenity—violates not only a deep sense of right but possibly also a deep sense of connection to place: "Who are *they* to endanger *our* wetlands (or fish or beach)?" Such sense of violation and its attendant feelings of outrage and alienation are properly regarded as possible impacts of such development, as are any political reactions that ensue.

11. The next point is related. Communities may take projected developments to endanger something that may seem even vaguer and more general than fundamental values. They may refer to whatever it is as their "way of life," or they might use the slightly more esoteric term, "culture." At the heart of a culture or way of life are symbolically mediated and socially constructed conceptions that are realized, maintained, and restruc-

tured through customary action. We have already noted that among certain Native Americans, such customary actions involve subsistence activities. Hunting and fishing are, thus, among the main means by which Intuit, Aleut, and other indigenous cultures are kept alive, and perceived threats to them will therefore be bitterly resented and resisted. It need hardly be said that there is no valid way to assign a monetary value to a culture. Its destruction, Yupik insist, would be unmitigable.

Violations of a community's values, or threats to its way of life, must be understood to constitute, in and of themselves, serious impacts on that community. To elaborate an earlier suggestion, the less amenable to metrical representation and the vaguer the threatened value, the stronger the response to its violation, for in such instances the defenders understand themselves to be acting on general principle rather than out of personal interest.

12. It follows that threats to a community's conceptions of its rights, to its conceptions of justice and equity, to its general way of life, or to its basic canons of reality often take precedence over material considerations in the formulation of action. Furthermore, actions so undertaken are likely to be more highly charged emotionally, more physical, and more aggressive than those undertaken in the service of economic or material advantage. The higher principles invoked in response to perceived threats to a way of life or its highly valued constituents seem to license, or even to sanctify, forms of action

that the actors themselves would in other circumstances condemn. We may recall here civil disobedience campaigns in the American south, and otherwise law-abiding citizens breaking laws in pro-choice versus pro-life confrontations. Even when, or especially when, such actions are by law criminal, they may be viewed by their partisans as legitimate or even heroic.

13. This account proposes that when a community's concerns are ignored by analysts and decision makers, the matters at issue change. The dominant issues become matters of high principle. When conflicts are escalated to the level of high principle, they are no longer objective disagreements resolvable by fact, logic, or even self-interest. Rather, in the principled mode an economic form of rationality is replaced by claims to virtue vouchsafed by self-sacrifice. Escalation into the principled mode is a risk of development activity.

14. An implication of the discussion so far is that whether a community's understanding of the world's nature, or whether its values concerning it, is "realistic" in terms of "objective" criteria established by putatively disinterested analysts, or whether the community's fears are, in the view of analysts or officials, fanciful is, in some degree, beside the point. Impacts and risks are, in considerable degree, to be understood relative to the affected community's definitions of reality. The concerns of local people must therefore be given full and respectful treatment because it is the environment as these people conceive it that, as far as they are

concerned, will be affected, and it is in terms of these understandings that the community responds to intrusions. Failure to treat local understandings seriously risks widespread citizen alienation and anger, political and legal action, and even threats of violence.

15. Note, however, the qualifications "in some degree" and "in considerable degree." It would be a serious error to suppose that risks and impacts are to be defined only in relation to the community's understandings, for many serious consequences may be unforeseen by those who will be exposed to them. It is the responsibility of those who prepare environmental impact statements not only to grant reality to the concerns of affected communities but also to bring to those communities' attention risks that they might not perceive.

16. It follows that impact studies themselves are not free of possible impacts. For an impact statement to ignore, dismiss, disqualify, underestimate, or, in the view of affected parties, misrepresent or represent inadequately their concerns is for the statement itself to provide evidence to those affected parties that they are being unjustly treated. It is both plausible and prudent to assume that the community will respond to perceptions of injustice in whatever ways are available and that they deem appropriate. Active responses can include emigrating (likely when strong opposition combines with the sense of powerlessness and failure of trust in the institutions responsible); voting those viewed as responsible out of office; or, even more aggressive, form-

ing ad hoc organizations, demonstrating, or even committing sabotage.

That such overt actions fail to materialize should not be taken to indicate unambiguously that projected developments or environmental impact statements have elicited no responses, for responses can include cognitive and attitudinal effects expressing themselves in such stress-related phenomena as substance abuse, domestic violence, racial antagonism, and other forms of social pathology.

17. Among the most significant components of environmental impact statements, as far as affected communities are concerned, may well be estimates concerning the probability and magnitude of disasters. If, for example, the probability of oil spills is represented—rightly or wrongly—to be much lower than the common sense of a coastal community projects, or if their effects are, in the community's view, significantly underestimated, and if these projections cannot be plausibly justified, the trustworthiness of the institutions preparing the impact statement may be at risk. Distrust may be contagious, spreading from the specific agency preparing the statement—for example, the Minerals Management Service—to the department of which it is a part—in this case, Interior—or even to the federal government generally. Impact statements that do not win the credence of affected communities may thus put trust in government as a whole at risk. Undermining confidence in government and even questioning the legitimacy of government itself are thus possible risks of impact studies themselves.

18. The last point alluded to "affected communities," but full analytical isolation of "affected communities" is impossible if the term is understood to include all of those that take themselves to be in some way threatened and all who respond in some way. Communities in Alaska were most affected by the *Exxon Valdez* oil spill, but there were, and will continue to be, responses to the Alaskan events in communities distant from Alaska. Such nonlocal responses must be included in any serious and comprehensive account of impacts.

The responses of those distant from Prince William Sound have varied in ways that can be fully grasped only through empirical research, but it can be suggested that they have combined to produce a cognitive, social, political, cultural, and perhaps even economic environment increasingly hostile to OCS activity. To use a medical metaphor, the *Exxon Valdez* may have inoculated the society against OCS development, stimulating organizational, cultural, cognitive, and political antibodies against it. Subsequent spills could be regarded as booster shots. The antibody effect must be included among the possible impacts of OCS activity.

CONCLUSION

If modern science is based upon the objectivity of disinterested observers radically detached from the systems concerning which they seek to develop dispassionate theoretical understanding through replicable empirical procedures, then risk and impact analysis cannot qualify as

modern science. Analysts are never radically separated from the systems they observe and, furthermore, those systems are composed of human subjects with cognitive capacities equal to, and local knowledge usually greater than, those of the analysts. As such, they are likely to respond to analyses in highly engaged ways. In sum, risk and impact analyses are themselves interventions in the systems they seek to understand. This does not necessarily impeach their validity, unless it impeaches the validity of virtually all sciences this side of extragalactic astronomy. (Particle physics, after all, has its Heisenberg principle.) Nor does it destroy the usefulness of such analyses, although their nature counsels humility and caution and requires openness to local understandings.

If risk and impact analysis does not qualify as a modern science, it does qualify for inclusion in what Stephen Toulmin has called "post-modern science,"³ which, he argues, differs from modern science in returning observers to the systems from which modern science exiled them, and which is as concerned with praxis as theory. As such, it is legitimately interventionist, but as such it also eschews claims of value neutrality, for intervention, unless it is mere clumsy intrusion, is directed toward the achievement of some sort of state, condition, or goal. All of this further entails openness to the inside knowledge and understandings of subjects

3. Stephen Toulmin, *The Return to Cosmology: Post-Modern Science and Natural Theology* (Berkeley: University of California Press, 1982).

as well as to the objective outside knowledge of analysts.

The practice of postmodern science will not be easy, but it may be liberating. It may also be that the

very characteristics of risk and impact analysis that make it dubious as modern science suit it admirably for leadership among postmodern sciences.