

Ecological Risk Assessment: *Interpreting the Policy Debate*

Robert T. Lackey

Department of Fisheries and Wildlife
Oregon State University
Corvallis, Oregon 97331

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Email: Robert.Lackey@oregonstate.edu

Phone: (541) 737-0569

Web: <http://fw.oregonstate.edu/content/robert-lackey>

Ecological Risk Assessment: Interpreting the Policy Debate

by

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The use of risk assessment to assist decision-making has become commonplace and widely accepted, but its use in ecological policy remains contentious. Opinions on the legitimacy of *ecological* risk assessment are diverse. In the professional literature, they range from encouraging: “scientifically credible evaluation of the ecological effects of human activities” to cautious: “most quantitative ecological risk assessments are generally unvalidated and in many cases highly misleading” to suspicious: “one more hurdle on the road to a permit” to abhorrent: “risk assessment is a sham.” Clearly, there are ardent but disparate attitudes on the proper role of risk assessment in resolving ecological policy issues.

My purpose is not to either champion or vilify risk assessment, but instead to present the essence of the debate about its proper role in ecological policy analysis. The opinions and views described here are my own and do not necessarily represent those of any organization.

The most heated debate over using risk assessment in ecological policy analysis revolves around delineating the initial risk question to be answered. To be technically tractable, rigorous, and credible, the risk question is usually delimited in fairly narrow, technical terms, often diminishing the relevance of the assessment to the fundamental policy issue. Most often the narrowing is done (or is claimed to be) by a policy mandate or management directive. The risk question then becomes relatively modest analytically [*e.g.*, one or a few chemicals are the stressor causing effects on a few biological components; the effects, if present, are adverse by definition]. Still, the risk analysis may be technically complex and require exhaustive scientific information and sophisticated data analyses.

Focusing on relatively simplistic ecological risk questions, of course, evades addressing the more germane policy questions that are probably scientifically intractable. Simplistic views of risk also give the risk assessor a benchmark to determine what society views as ecologically *desired*. It also gives risk assessments an aura of scientific rigor and credibility even if the assumptions upon which the analysis is based limit the applicability of the results. The danger, at least according to some critics, of misusing the results under these circumstances is genuine. One scholar, for example, concluded that ecological risk assessment “acts as a blind, blunt, and unwieldy tool to facilitate and ‘scientifically’ rationalize incremental degradation of the integrity of landscapes and ecosystems.”

RISK QUESTIONS

Technocrats, scientists, and politicians can always define risk questions in ways that can be answered technically, but, unfortunately, few of these easily derived risk questions are relevant to the principal public issues. An anecdote often used to illustrate this quandary is the risk assessor looking for his lost keys under a street lamp. Although the keys were lost far from the street light, the risk assessor laments that he has little chance of finding the keys in the dark so why waste time looking there. Although this anecdote adds levity to an otherwise somber discussion, the message is painfully manifest: ecology is complex and our understanding is limited; policy analysis is multifaceted and rarely centers on narrow technocratic issues; therefore there is a strong, pragmatic tendency to define ecological risk assessment problems in ways that can be evaluated scientifically, even though the risk question may be policy irrelevant.

Perhaps the most commonly alleged misuse by technocrats, scientists, and politicians in formulating the question in ecological risk assessment is reliance on their personal values and priorities rather than on those of the public or elected representatives. In philosophical terms this is illustrated by shifting the scientific “is” to the political “ought.” In science there are no “oughts.” Individual animals or plants may be easily classified as unhealthy (from the individual animal or plant’s perspective), but animal populations, plant communities, and ecosystems are neither good nor bad, better nor worse, healthy nor sick, unless a *value* criterion is applied. *Risk* has no definition in ecology unless someone defines what ecological condition or change is *adverse*. For example, the introduction of wheat, horses, zebra mussels, dogs, or humans to North America is either good or bad, depending entirely on the value criteria applied.

In formulating a question, one runs immediately into the ecological *risk* paradox. By definition, risk is *adverse*, a change or condition that is undesirable. Because ecological systems have no intrinsic good, bad, or adverse, an ecological condition or change can be labeled adverse only by individuals, organizations, or societies making a value judgment. Therefore, the fact that a risk assessment has been executed means that *someone* made a value judgment of which ecological conditions will be defined as *adverse*. Who makes these choices? Most participants in the debate skillfully evade this issue -- or raise it ever so tactfully, but it is an important criticism and it supports apprehensions that risk assessment can be easily manipulated to support any desired policy position. For example, in studying how risk assessment operates in practice, two scholars conclude by decrying the use “of this seemingly benign tool to undermine the development of ‘good’ public policy.”

INHERENT ASSUMPTIONS

Identifying which questions are appropriate for ecological risk assessment is predicated on accepting a fundamental assumption about the characteristics of ecological policy: *anthropocentrism* -- the benefits from decisions affecting ecological systems are accruable to humans. Indeed, society

may preserve wilderness that few humans actually visit, shield from extinction unsung species that have no economic or tangible value, and allocate scarce tax dollars to sustain habitats for species without market or aesthetic appeal, but all such efforts provide benefits to people. The benefits may be nonmarket, nonmonetary, or merely a way to purchase some indeterminate future insurance, but the decisions benefit man. Brusquely stated, ecosystems, species, or individual organisms may survive (benefit) or not based on man's decisions, but policy benefits are accruable only to man. Society protects biodiversity because a sufficient number of people believe deleterious things may happen to current or future generations if we do not. We preserve wilderness areas because merely knowing that unaltered ecosystems exist has value (benefit) to some people.

From an anthropocentric perspective, risk assessments provides information to decision-makers in their attempt to weigh ecological alternatives on the basis of their relative value to man: protecting owls vs. providing timber jobs; building highways to facilitate mobility vs. protecting watersheds to maintain salmon populations. Contrary to the common supposition, the assumption of anthropocentrism does not necessarily lead to risk questions that are skewed toward commodity or other tangible benefits.

Another world view is *ecocentrism*. The basic tenet is that all species are equal; humans are only one species and are no more important than others. We protect ecosystems because all animals and plants have a right to exist. Further, this perspective holds that protecting indigenous biological diversity is important because it is morally right, not because biological diversity is or might be important to man.

Risk assessment can be abhorrent to those holding an ecocentric view. For them, the mere discussion of ranking risks to ecosystems would be similar to Sophie's choice, deciding who should live and who should not. The debate is often based on values or morals; thus rational (in a philosophic sense) argument can play little or no role. For those individuals who hold an ecocentric world view, or those who lean in that direction, risk assessment has not been well received. From an ecocentric perspective, risk assessment is at best a form of ecological triage.

Perhaps there is another path around the polarized debate over the use of ecological risk assessment. One possible approach is to use the human health metaphor.

ECOLOGICAL HEALTH

Imbedded in the debate over ecological risk assessment is the concept of ecological health, patterned after human health. Unfortunately, there is little consensus among scientists and policy analysts on the connotation of ecological health, nor are the limitations and implicit assumptions understood by most politicians and the public. The fundamental complication is not lack of technical information, but lack of agreement on what constitutes the *desired* or *preferred* ecological condition. For example, is a pristine condition defined as the benchmark, or preferred condition, of ecological

health? If such an assumption is honored, then does human alteration make an ecosystem less healthy? Does it follow that the degree of perturbation is inversely related to ecological health? Whereas humans are conceived, follow a predictable gestation period, live through well-defined life stages, always followed by death, ecosystems follow no such path.

Selecting the desired or preferred ecological (healthy) state is, or at least ought to be, driven by societal values and priorities; this is difficult, if not impossible, to do in a pluralistic society. Better ways to evaluate and measure public preferences and priorities in framing ecological issues need to be developed. Public opinion polls always show that the public is very supportive of the "environment," as it is of "peace," "freedom," and "economic opportunity." The public similarly is supportive of preserving biological diversity, ecosystem management, and sustainable natural resource management. Unfortunately *preference* information usually is of limited use in helping make difficult environmental decisions.

CONCLUSIONS

Debate aside, there does not appear to be any decrease in the use of risk assessment for ecological policy problems; in fact, its use probably is increasing. But neither does there appear to be any lessening of the dissension over its use; rather, the number of critics appear to be increasing. Where does that leave us? Let me conclude with three predictions:

First, I don't see any near-term developments that will make the application of risk assessment to ecological policy problems dramatically less controversial. Opinions will continue to range from highly supportive to highly negative, complicated to a large degree by serious differences over multiple definitions for the same words.

Second, debates over formulating the questions in ecological risk assessment will continue because they raise important, policy-relevant conflicts. How the risk question is formulated in ecological risk assessment substantially circumscribes the analytical result and more and more people recognize this. Focusing the important policy debate around the first step in risk assessment, defining the question to be asked, is appropriate.

And finally, to the extent that ecological risk assessment forces debate toward fundamental policy differences rather than superficial technical ones, it will be most useful to society. Otherwise, it is merely the latest in a procession of analytical tools, each of which has a role, albeit limited, in ecological policy analysis.

About the Author:

Dr. Bob Lackey is professor of fisheries science at Oregon State University. In 2008 he retired from 27 years with the Environmental Protection Agency's national research laboratory in Corvallis where he served as Deputy Director among other senior science and management jobs. Since his very first fisheries job mucking out raceways in a California trout hatchery, he has worked on an assortment of natural resource issues from various positions in government and academia. His professional assignments involved diverse aspects of natural resource management, but mostly he has operated at the interface between science and policy. He has published over 100 articles in scientific journals. Dr. Lackey has long been an educator, having taught at five North American universities and continues to teach a graduate course in ecological policy. Canadian by birth, he is now a U.S.-Canadian dual-citizen living in Corvallis, Oregon
