
Some cautionary remarks about the Precautionary Principle

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Questions

The task before us is to consider what level of potential environmental danger justifies policy changes in the face of scientific uncertainty. What strategy should governments invoke, to make socially responsible decisions?

To many in the international community, this question has already been answered, at least in part. The challenges presented by environmental threats, they aver, are so new, they require rethinking how nations make choices. And the potential damage these dangers pose is so great, that they demand quick responses unimpeded by prolonged scientific debate or nitpicking cost/benefit analysis.

So they subscribe to a prudential axiom called the Precautionary Principle. This precept has proved wildly popular, being embraced by governments around the globe. It is incorporated into many treaties and resolutions, including the Rio Declaration, the Montreal Protocol, the Convention on Biological Diversity, the 1992 Climate Change Convention, the Treaty on European Union, the Convention for the Protection of the Marine Environment of the North-East Atlantic, and the Helsinki Convention on Marine Protection in the Baltic. And it is fast becoming, say some jurists, a ‘fundamental principle of international environmental law.’¹

So what, precisely, is this postulate? While appearing in slightly different forms in each political and legal context, most iterations resemble the 1990 Bergen Declaration on Climate Change, which states in part that ‘where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.’²

And no wonder this precept is popular. It conveys a sense of caution. It is intuitively plausible — being, say its advocates, nothing more than a legal application of the old adage, ‘an ounce of prevention is worth a pound of cure.’ It suggests that public policy decisions based on it are made objectively. And it has been effective in stopping or slowing some activities that might be harmful to natural systems or public health, such as harvesting whales or ocean dumping.³

It might appear that such applications of the Precautionary Principle benefitted societies and the environment. But we cannot always be certain this is so. They could — and indeed as I shall argue, often do — produce more ecologic and social harm than good, and often

1 Canadian Environmental Protection Act, Issue Elaboration Paper #18, CEPA and the Precautionary Principle/Approach, 1997.

2 Bergen Conference on Sustainable Development, May 1990.

3 CEPA Paper #18.

we don't know what the consequences are until it's too late. Therefore, the principle is not innocuous. It must be handled with care.

Take the issue of minke whaling: Norway and Japan insist that harvesting this species benefits the environment, since minkes have become so abundant they are severely limiting the food base of blue whales and other, truly endangered marine mammals. But the International Whaling Commission, employing the Precautionary Principle, bans the harvest of minkes.⁴

Thus, the ban might be helping the environment or hurting it, depending on whether the IWC or Norway and Japan are correct. And at this time, there is no way of judging these competing claims, as our knowledge of the numbers and prey base of minkes remains scanty. But we do know that the ban has proved an economic hardship to whaling nations.

And, indeed, on closer scrutiny, the Precautionary Principle provokes a host of queries: What, exactly, qualifies as 'environmental damage?' When is such harm deemed to be 'serious' or 'irreversible'? And how imminent must these dangers be? For example, there is an infinitesimal but measurable probability that life on Earth could be destroyed by a collision with an asteroid within the next century. Does the Precautionary Principle entail that nations should devote billions to avert this small but potentially disastrous calamity?

And since science is always uncertain, does the Precautionary Principle require that we should always take steps to avert every conceivable threat, no matter how unlikely it is to occur? If not, then what is the threshold of probability at which a danger is deemed to justify action? How far into the future must we assign probabilities to possible calamities? If we must assign probabilities to distant events, then perhaps the evidentiary requirements can never be met. If so, then the rule should never be applied at all, ever.

And why must we suppose that the maxim is an *environmental principle*? Its logic could equally justify anti-environmental decisions. For example: The Biological Diversity Convention states that 'Where there is a threat of significant reduction in loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimise such a threat.'⁵

But what's to prevent us from saying, 'Where there is a threat of significant economic decline or loss of liberty, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimise such a threat'? That the principle is never used

⁴ Institute of Cetacean Research, *Findings*, 1997; Stoichi Tanaka, 'Whaling and conservation of nature', *Journal of Japanese Scientists*, vol. 19, no. 6, 1984; Heidi Sorensen, 'The environmental movement and minke whaling,' *Eleven Essays on Whales and Man*, High North Alliance, 1994; Government of Norway, 'Norwegian Minke Whaling', May 1995; International Whaling Commission, 'Management Policy', 1982, and 'Revised Management Procedure', 1996.

⁵ Convention on Biological Diversity, *Preamble*, 1992.

this way suggests that it is not considered by its handlers to be a mere neutral, logical schema, which accepts any value we plug into its variables. Rather, ‘green’ preferences have been hard-wired into it. The Precautionary Principle stacks the policy-making deck against those who place a higher priority on other values.

The limitations of decision-making

We live in an age in which not merely political leaders but many scholars act as though, philosophically speaking, they were born yesterday. So it is that the Precautionary Principle has been thrust on an unsuspecting world as a new idea. It owes its origin, says this conventional wisdom, to the ‘Vorsorgeprinzip’ of German law, promulgated in 1976 and appearing internationally in 1987, in the North Sea convention.⁶

Actually, it is merely old wine in a new green bottle. Kings, generals and other gamblers have been minting strategies to minimise risk and maximise benefits since long before the first walled city was built. In 1789, Jeremy Bentham conceived the Utility Principle, a decision-making rule calling those actions best that produce the greatest happiness for the greatest number of people. Bentham’s Utilitarianism, in turn, ultimately inspired the 20th century fields of game theory and welfare economics.⁷

Unlike the fuzzy Precautionary Principle, these latter disciplines constituted rigorous, analytic attempts to understand how to make decisions under conditions of risk and uncertainty. And being precise, they expose the limitations of any decision theory, in a way that the Precautionary Principle does not.

From game theory, we learn that there is no such thing as a ‘correct’ decision under conditions of uncertainty, and that all choices are subjective, reflecting the values of the decision-maker. And from welfare economics, we learn that individual values are incommensurable — one cannot be said to be qualitatively or quantitatively ‘better’ than another. And thus, there is no rational way of knowing what options are best for society as a whole.

Consider, for example, two alternative game theory strategies — the Maximin Rule, which directs us to choose that course of action most likely to cause the least harm, and the Maximax Rule, which directs us to choose that action most likely to produce the most

⁶ CEPA, Paper #18.

⁷ Jeremy Bentham, *The Principles of Morals and Legislation*, London, 1789; Kenneth J. Arrow, *Social Choice and Individual Values*, John Wiley and Sons, New York, 1951; I. M. D. Little, *A Critique of Welfare Economics*, Oxford University Press, London, 1957; R. Duncan Luce and Howard Raiffa, *Games and Decisions*, John Wiley and Sons, New York, 1958; John von Neuman, ‘Zur Theorie der Gesellschaftsspiele’, *Mathematische Annalen*, 100, 295–320, 1928; John von Neuman and Oskar Morgenstern, *Theory of Games and Economic Behavior*, Princeton University Press 1953, and Carl Hempel, *Aspects of Scientific Explanation*, Free Press, New York, 1965.

beneficial results. The first would be preferred by pessimists, the latter by optimists. But neither is more ‘correct’ than another.

As R. Duncan Luce and Howard Raiffa put it in their classic work on game theory, *Games and Decisions*, what strategy is chosen merely reflects ‘how the subject feels about the alternatives.’⁸

Similarly, welfare economics failed to achieve Bentham’s goal of constructing a ‘hedonistic calculus,’ because it found it couldn’t make interpersonal comparisons of utility. If one action favours those most concerned about the environment and another favours those most interested in economic growth, we cannot say which is preferable. Consequently, as philosopher of science, Carl Hempel has observed, ‘the mathematical models (of game theory) ... do not offer us much help for a rational solution of the grave and complex decision problems that confront us...’⁹

A closer look at the Precautionary Principle

So the Precautionary Principle does not offer a means of making quantitative assessments of alternative courses of action. It does not provide us with a calculus by which to weigh and compare economic costs against ecologic benefits, or *vice versa*. It cannot be a value-neutral schema for reaching objective decisions. To be functional at all, it must incorporate some subjective values. And clearly, these values are green ones. But what are they, exactly?

Are they humanistic or biocentric? Are they intended to benefit humankind, or to protect some supposed more important entity, such as the ecosystem or biosphere?

Some expressions of the principle apparently embrace both ideas, without giving us guidance over which to choose when they conflict. Several versions seek to avert threats ‘to the environment or human health.’ But most are blatantly or subtly biocentric, as, for example, the Rio Declaration, which would protect the ‘health and integrity of the Earth’s ecosystem.’¹⁰

Indeed, biocentrism — the belief that the ‘health’ of Gaia, the Biosphere or ecosystem takes precedence over the well being of humanity — is the fundamental value embedded in most versions of the Precautionary Principle. But it is utter nonsense.

8 Luce and Raiffa, p. 21.

9 Hempel, p. 467.

10 CEPA, Paper #18; Rio Declaration on Environment and Development, *Preamble*, 1992; Tim O’Riordan and James Cameron, editors, *Interpreting the Precautionary Principle*.

As biological systems are constantly assaulted by disturbances and as evolutionary change produces an incessant stream of unique conditions, no single state can be either ‘healthy’ or ‘unhealthy.’ A place may be ‘healthy’ for humans or ‘healthy’ for malarial mosquitoes, but never just plain healthy.¹¹

Likewise, just as environmental ‘health’ is meaningless, so are its cognates and converse locutions, such as ‘destroying the environment’ or causing ‘irreversible damage’ to it. The environment cannot be ‘destroyed,’ only changed. All change is ‘irreversible.’ And ‘damage’ lies in the eyes of the beholder.

This illusory belief in the health of nature is derived from another erroneous idea that has become the linchpin of the green agenda: the so-called ‘Gaia concept, or the self-regulating ecosystem.

Combining two simple notions — the unity and balance of nature — the self-regulating ecosystem concept is based upon the supposition that nature is composed of networks of interconnected parts which interact to keep everything in equilibrium. So long as these systems retain all their members (i.e. sustain their biological diversity), they remain healthy. But if they lose enough parts (i.e. species), their capacity for self-regulation fails and they become unstable.

This hypothesis is popular because it seems to explain what has gone wrong with the environment and how to fix it: environmental health requires ecosystems to remain in balance, which in turn demands that they retain their biodiversity. And the best way to ensure these conditions is to leave ecosystems alone. Ecosystems management means keeping humans away from nature.

Hence, the ecosystem idea equates the stability or unchangingness of nature with its health. Yet today, most ecologists recognise the self-regulating ecosystem to be myth. Random disturbance, not permanence or order, governs nature. Left alone, biological communities do not tend toward equilibrium, but lurch wildly, propelled by rapid shifts in species composition, climate and other conditions.¹²

The Precautionary Principle, in sum, presupposes the nonsensical notion of the health of nature, which in turn is derived from the mistaken concept of the self-regulating ecosystem. Thus, this decision-making rule seeks to bring about conditions that never existed, never will exist and never could exist. And while in some cases it demands action

11 Alston Chase, *In a Dark Wood: The Fight over Forests and the Rising Tyranny of Ecology*, Houghton Mifflin, Boston, 1995.

12 Alston Chase, In a Dark Wood; P. S. White and S. T. A. Pickett, eds., *The Ecology of Natural Disturbance and Patch Dynamics*, Academic Press, Orlando Florida, 1995; Donald Worster, *The Wealth of Nature*, Oxford University Press, 1993; Daniel B. Botkin, *Discordant Harmonies*, Oxford University Press, 1990.

(such as restrictions on carbon emissions to ‘avert’ global warming) and sometime inaction (as, for example, banning whaling) in all cases, the common characteristic of its applications is an injunction not to intervene in nature. Gaia, the ecosystem, must be allowed to operate without human interference. Yet this ‘hands-off’ alternative is often the worst possible one we could choose.

Some perils of precaution

Consider the following applications of the Precautionary Principle, to range management in Yellowstone National Park and to forest preservation in America’s Pacific Northwest:

(1) **Yellowstone.** In 1967, National Park Service authorities introduced a management scheme called ‘Natural Regulation.’ The intention, based on a version of the Precautionary Principle, was not to ‘Play God’ but to practice ‘benign neglect.’ Nature, it was assumed, ‘knows best.’ We don’t know enough to justify intervention in biotic processes. And if we let nature take its course, the ecosystem will take care of itself.¹³

This decision ignored the fact that aboriginal Americans had been evicted from the park in 1876, and that these peoples had played a critical role in keeping ungulate populations in check and in modifying the landscape, through burning. So natural regulation was historically unprecedented.

And by erring on the side of caution, the service invited calamity. Protected from predation, elk and bison multiplied ten-fold in twenty years. Bison overgrazing destroyed natural grasses. Browsing elk virtually eliminated aspen, willow and alder — plant species critical to the survival of mammals that use riparian areas, such as beaver, otter, white-tail and mule deer and grizzly bear. As streams became denuded of the cottonwood trees whose roots had provided structural strength to banks, these shores collapsed, and soil erosion became pandemic.

Thanks to the absence of aboriginal burning, the build-up of combustibles in the forests continued, until, in 1988, a giant conflagration erupted. A million acres burned. Crown fires, burning too hot, sterilised soils and further accelerated soil erosion.

(2) **Old-growth forests in the Pacific Northwest.** For decades, the US Forest Service, following various so-called ‘sustained yield’ policies, practiced forest conversion in this region, clear-cutting old-growth to stimulate regeneration of shade intolerant Douglas fir. Its goal was sustainable development — to increase growth rates in order to ensure a steady supply of timber in the future.

¹³ Alston Chase, *Playing God in Yellowstone*, Atlantic Monthly Press, Boston, 1986.

And by the late 1970s, this strategy was succeeding. But then the goal posts were suddenly moved. What under an earlier set of values (maximising timber production and upland game species) had been considered ‘sustainable’ was then judged by a new value, namely the desire to preserve old-growth. And by this yardstick, service policies were not ‘sustainable’ at all.¹⁴

The change occurred when a graduate student at Oregon State University, Eric Forsman, began studying a little bird known as the Northern Spotted Owl, which, he concluded was an ‘old growth’ species. And therefore, Forest Service harvests jeopardised its survival. On the basis of Forsman’s study, environmentalists went to court, demanding the bird be listed as threatened under the Endangered Species Act and that logging be halted to save the creature.

Eventually, environmentalists won. Timber harvests on federal lands dropped from 5.4 billion board feet in 1989 to less than 800 million in 1994, and continued to drop. Nearly 200 mills went out of business. Schools closed. Crime rose. Communities died. As public harvests declined, timber prices rose, encouraging private landowners to log their own stands without attention to ecological consequences. As forests were left unthinned, wildfires spread. Thousands of acres of supposed spotted owl habitat went up in smoke.

The people and biota of the northwest had become victims of premature judgements inspired by the Precautionary Principle. The decision was made to ban logging to save the owl long before anything approaching ‘scientific certainty’ existed. At that time there was only one empirical study — Forsman’s. And it had tracked a mere six pair of owls. No one knew how many such birds there were, nor whether old-growth was a source or sink for these creatures.

Later studies would find over 12 000 owls. And evidence would mount that the preferred habitat of these birds were cut-over lands, not virgin forest. But unfortunately, Endangered Species Act provisions against disturbing the owl’s officially designated ‘critical habitat’ will not permit the kinds of research needed to confirm or disconfirm this possibility. By preempting the issue, the precautionary approach had made the search for scientific truth moot.

The Precautionary Principle and global warming

In sum, the Precautionary Principle is not prudential at all. Rather, it is a rhetorical device for promoting a biocentric agenda. By encouraging us to leap before we look, its application often proves disastrous for both nature and society. Again and again, it has

¹⁴ Alston Chase, *In a Dark Wood*.

encouraged us to jump to conclusions, concerning scares over radiation, pesticides, fungicides, herbicides, asbestos and ozone depletion and many other things. Each of these hasty responses has inspired prohibitions that limited the options available to us for coping with more genuine dangers, and some might have done more harm to public health than good.

Similar consequences could result if this maxim is used to guide policy decisions on global warming. For it enjoins us to ignore all the scientific questions, all the uncertainty, all the failed, global circulation model predictions of calamity, all the evidence that waiting poses little risk, all the possible beneficial effects, on plant life and growing seasons, of increased atmospheric carbon dioxide, all the economic dislocations, all the social injustices of carbon rationing, all the losses of liberty, all the bloating of bureaucracies, all the increased poverty and all the diversions of funds from other environmental-protection efforts — to ignore all this, just to ensure that we don't continue to interfere with nature.

Given the potential dangers of using the Precautionary Principle in this instance, therefore, I suggest we apply this precept to itself. Such a meta-rule would be: 'If there is a probability, however small, that invoking the Precautionary Principle to combat global warming might produce more ecologic or social harm than good, then lack of scientific certainty should not be used as a reason for postponing the decision not to use it.'

Rather than invoking the Precautionary Principle, I suggest we slog along as we have, continuing research and debate, weighing carefully what we know and what we don't know, keeping in mind that living systems are far more robust than civilisations, and that societies are more likely to collapse as a consequence of unwise social policies than as a result of ecological mismanagement.

Just as the theorems of game theory imply, this is a debate between optimists and pessimists, in which no one holds the logical, moral or epistemic high ground. The values of biocentrism are no more sacrosanct than those of liberty or economic prosperity. And it is the people and their elected representatives, not scientists or NGO careerists who must decide.

The linguistic traps in environmental debate

In George Orwell's novel, *1984*, a totalitarian government imposed on its citizenry an artificial language called Newspeak, designed 'to make all other modes of thought impossible.'¹⁵

Yet now, we are doing the same to ourselves. We have embraced a language that makes it almost impossible to consider alternatives to the environmentalist agenda. Even skeptics

¹⁵ George Orwell, *1984*, Harcourt Brace Jovanovich, New York, 1949.

perform use the words that greens conceived, such as 'ecosystem,' 'biodiversity,' 'ancient forest,' 'sustainable development' and 'The Precautionary Principle.'

These locutions sound scientific, rational and precise, but aren't. Whatever explicit meanings they once had, have long since disappeared. Rather, these terms are employed not to inform, but to persuade. And so long as we use them, we will be unable to perceive these issues clearly.
