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Abstract
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Environmental Protection and the “Precautionary Principle”: A Response to Scientific Uncertainty in Environmental Management

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The principle of precautionary action has been presented by some of its advocates as nothing less than a monumental paradigm shift in environmental management. It is essentially a new legal response to the scientific uncertainties surrounding the capacity of the environment to cope with the increasing demands placed upon it. This article outlines why our knowledge of environmental processes is inadequate and addresses the rationale and content of the “precautionary principle”, tracing its development from an uncontroversial espousal of commonsense to its emergence as a potentially forceful decision-making norm. It will be argued that although the principle has definitional and implementational shortcomings, it has the capacity to inform environmental practices systematically as the basis of a regulatory regime — not merely at the policy level.

The proposition that states are responsible for transboundary environmental harm, now incorporated in numerous United Nations resolutions and regional treaties, was first articulated with some degree of specificity in 1941 in the landmark Trail Smelter Arbitration decision. At issue was whether Canada was liable for the transboundary effects of sulphur dioxide emissions from a copper smelter within its jurisdiction. The emissions had, over a period of 12 years, caused damage to farmlands and crops in the United States. The tribunal awarded the United States compensation and stated:

“[N]o State has the right to use or permit the use of its territory in such a manner as to cause injury by fumes in or to the territory of another or the properties or persons therein, when the case is of serious consequence and the injury is established by clear and convincing evidence” (emphasis added).2

This formulation of state liability — akin to the common law principle of “good neighbourliness” — was extended beyond air pollution to other injurious acts by the decision of the International Court of Justice in the Corfu Channel Case.3 This case is authority for the proposition that every state has an obligation “not to allow knowingly its territory to be used for acts contrary to the rights of other states”.4

Although the Trail Smelter principle became entrenched in international law, the extent to which the rule of liability has improved state environmental practices has been limited for three reasons. First, liability does not arise unless there is a wrongful act. It arises only when harm has occurred and this was reasonably foreseeable. Secondly, the environmental harm must be “serious”. Thirdly, evidentiary problems arise in the establishment of causation. States have often maintained that they are not required to act to prevent harm until “clear and convincing” scientific proof of actual or threatened harm is adduced.5 In one respect, even the Trail Smelter decision is not as significant as it appears because Canada had accepted liability so the issue of causation did not arise.6 Another limitation of the existing legal approach is that the standard of liability for harm caused to the territory of another state is not the onerous one of strict (or no-fault) liability, but a fuzzy question of “due diligence”.7 This term is generally understood as imposing an obligation on states to promote “good governance”, which, in the environmental arena, is
interpreted as requiring action to abate or prevent further transboundary harm. Although states must restrict the use of their territory so as not to harm other states, if harm does occur, a state will only be required to pay compensation where the harm was brought about through a lack of proper care. This standard falls far short of guaranteeing prevention of harm. For example, if diligent control over resources is exercised, but nevertheless harm is caused to another state (such as where it was not reasonably foreseeable), the harm will be regarded as lawful. Further, international law imposes no obligation on states to prevent environmental harm within their borders.

This situation, in which states are able to avoid acting to minimise environmental damage until after it has been caused or is inevitable, has been widely criticised in international environmental discourse. The inadequacies of the existing environmental regulatory regime have been particularly acute in cases where environmental harm resulted from the cumulative effects of a number of activities over a long period (such as acid rain). Compensatory redress in such circumstances is almost impossible considering the hurdles in remoteness and foreseeability of damage which must be overcome. There has been increasing acceptance of the need for a more effective legal framework that would require states to take stringent measures to deal with environmental problems. Corresponding with growing disquiet about the existing reactive approach to environmental damage, support has grown for a proactive approach to ensure action is taken to reduce environmental impacts before they occur. This article will outline the difficulties encountered by decision-makers in the field of environmental regulation and examine the leading policy approach — precaution — which has emerged to guide them.

Scientific uncertainty in environmental management

Policy-makers invariably seek uncontested information as a basis for decision-making, often drawing on “objective” scientific evidence. Environmental management is particularly dependent on scientific evidence and expertise — without it there would be no basis for environmental regulation. Yet environmental regulators routinely are presented with inconclusive or ambiguous evidence and divergent opinions as to the likely environmental impacts of particular activities. The uncertainty which attaches to predictions of environmental outcomes is a combination of the difficulties associated with analysing complex systems and the nature of scientific inquiry itself.

Uncertainty abounds in our understanding of the environment, from the local and discrete level through to processes which are transboundary or global. Although there is a degree of scientific uncertainty regarding the precise nature of every human impact on the environment, uncertainty is more pronounced (and has the potential to be more far-reaching) at the global level where the complexity of environmental relationships severely tests understanding. Science is not equipped to comprehend fully the spatial and temporal intricacies of ecosystems which are characterised by interdependence of countless physical processes and non-linear responses to change. Uncertainty arises where baseline data are unavailable or incomplete due to time or resource constraints or where there are environmental agents which simply are incapable of being monitored or monitored over a sufficiently long period. Not only does uncertainty arise regarding the dynamics of the physical environment, it also arises in relation to the human environment: we cannot be certain about the shape of future societies and we cannot predict the capability and extent of response to environmental exigencies.

When environmental management decisions are made, such as when regulators are introducing new policies or clarifying liability for environmental harm, much demand is placed on scientists to establish “proof” of cause and effects. Yet, in many cases, this is a fruitless search for an infinite series of events. Policy-makers invariably seek uncontested otherwise undermined, information as a basis for decision-making, often drawing on “objective” scientific evidence. Environmental management is particularly dependent on scientific evidence and expertise — without it there would be no basis for environmental regulation. Yet interpretations.

As there are no indisputably “correct” methods for obtaining environmental data, findings will always be open to be refuted, disputed or otherwise undermined.

Despite these limitations, scientists do produce impressive evidence with all the appearance of objectivity. Yet, ambiguity, subjectivity and assumptions are inherent in scientific methods and interpretations. As there are no indisputably “correct” methods for obtaining environmental data, findings will always be open to challenge or differing interpretation. For example, findings invariably are ascribed less weight where the methodology used is
generally accepted as not the best available. Further, in many environmental disputes, both “sides” normally can produce scientific evidence to support their case. Where scientists disagree on the evidence itself, or in respect of the correct interpretation of it, there may be little basis upon which to conclude that either argument is correct. Favouring “majority” evidence (if a clear majority can be found) may be the only permissible approach for decision-makers, but it must be acknowledged that a degree of uncertainty will attach to any approach adopted.

**Uncertainty in prediction of environmental outcomes**

A corollary of our inability to understand the vast range of environmental interactions is that we will never be able to make accurate long-term predictions about all the consequences of human activities on natural systems. Not all environmental change can be anticipated and any predictions must be provisional. The limitations of science have been illustrated by the history of the ozone debate. On the one hand, we were reliant on science for discovering ozone depletion, yet on the other, the scientific community entirely failed to predict this phenomenon. Other phenomena, including global warming and biodepletion, have been predicted in general terms but remain insufficiently understood.

All predictions of environmental harm are presented in probabilistic terms. Yet, it is necessary to differentiate between risk of environmental harm and true uncertainty regarding environmental outcomes. Cameron explained that it does not necessarily follow that an event with a high risk of occurrence is accompanied by a high level of uncertainty. High risk may be associated with an event either with a high probability of occurrence with consequences which are known to be relatively innocuous, or a low probability of occurrence with consequences which are known to be relatively serious. Conversely, there may be much uncertainty about the full consequences of an event which is assigned a low probative value of occurring (thus considered to be virtually no “risk”). For example, justifications for new nuclear power stations typically include the statement that the risk of explosion is statistically insignificant. Yet the full ramifications of such an event can only be speculated upon. Further, perceptions of risk vary and the spectre of another Chernobyl catastrophe, although often dismissed as statistically unlikely, is possible — and believable — and should not readily be discounted. A limitation of risk analyses is that they assume that we can quantify accurately the statistical likelihood and magnitude of environmental harm. However, the majority of environmental problems suffer from uncertainty and the magnitude of uncertainty can render meaningless any assessment of environmental risks.

**A degree of certainty**

Notwithstanding the inevitability of conflicting interpretations of scientific evidence and gaps in scientific knowledge, there are often areas of general agreement, such as in overall environmental trends. Uncertainty normally is restricted to the extent of threatened environmental damage rather than whether human activities are contributing to such damage. So, we may be able to identify with certainty particular threats to the environment but remain uncertain as to the scale of potential ecological, social or economic disturbance. For example, there is no disagreement among scientists that there has been a global increase in ambient concentrations of atmospheric carbon dioxide, but the full implications of this phenomenon are unknown. Although we have recourse to a considerable body of knowledge on environmental matters to inform environmental practices, there needs to be awareness of the limitations of such knowledge.

**A response to scientific uncertainty: the “precautionary principle”**

To avoid the paralysis of decision-makers when confronted with uncertainty, the “precautionary principle” emerged in environmental discourse as a new approach to environmental protection, providing the “philosophical authority to take decisions in the face of uncertainty”. It is rooted in misgivings about scientific interpretations of environmental tolerance of human activities and accepts uncertainty regarding environmental outcomes as a sufficient reason for action, recognising that we should not wait for conclusive proof of environmental harm before adopting appropriate avoidance measures. The principle moves away from utilitarian approaches to the environment by recognising the intrinsic value of ecosystems and requiring environmental protection as a “moral right”. It is the best legal response to the “tragedy of the commons” dilemma. It seeks collective environmental responsibility and effectively imposes an environmental duty of care to prevent
spatially or temporally distant harm. It is closely associated with the polluter pays principle and intergenerational equity. Gro Harlem Brundtland, former Prime Minister of Norway and chair of the World Commission on Environment and Development, encapsulated the precautionary principle thus: “If we err in our decisions affecting the future of our children and our planet, let us err on the side of caution.”

The premise of the principle is that activities should not be permitted where there is uncertainty regarding their effects and there is reason to believe harm may result. Thus, once an activity is identified as posing a potential threat, decision-makers should be risk-averse and wait to be convinced that the risk is acceptable before allowing it. Also, where there is existing potential for environmental harm, the principle requires anticipatory remedial measures to be undertaken. Perrings termed this “reserved rationality”: we should proceed cautiously to safeguard against the possibility of unexpectedly severe future costs.

Origin and rise of the principle

The origin of the principle lies in the German concept of Vorsorgeprinzip (literally “precautionary principle” or “foresight principle”), espoused in the mid-1960s in response to concerns about pollution levels. In the early 1970s it could be found in domestic West German legislation. It was employed by the West German government to justify vigorous strengthening of environmental protection policies, notably to combat acid rain, global warming and marine pollution.

Since the late 1980s, the principle has become established at the forefront of international environmental discourse. It has appeared frequently in academic literature and is referred to in numerous international policy documents and domestic environmental management strategies. At the international level, precautionary thinking is evident in the 1972 Stockholm Declaration on the Human Environment, which recognised the need to safeguard natural resources, through careful planning and management, for the benefit of future generations, and the 1982 World Charter for Nature, which stated that activities “likely to pose a significant risk to nature” should not proceed where “potential adverse effects are not fully understood”. The first explicit international endorsement of the principle came in November 1987 in the London Declaration of the Second International Conference on the Protection of the North Sea. The participants accepted that

“in order to protect the North Sea from possibly damaging effects of the most dangerous substances, a precautionary approach is necessary which may require action to control inputs of such substances even before a causal link has been established by absolutely clear scientific evidence.”

The parties then put this principle into effect by agreeing to reduce

“polluting emissions of substances that are persistent, toxic and liable to bioaccumulate at source by the use of the best available technology and other appropriate measures. This applies especially when there is reason to assume that certain damage or harmful effects on the living resources of the sea are likely to be caused by such substances, even where there is no scientific evidence to prove a causal link between emissions and effects (‘the principle of precautionary action’).”

The principle has been advanced most successfully in relation to marine pollution but has also been applied to areas including hazardous wastes, climate change, ozone depletion, biodiversity, fisheries management and general environmental management. Arguably the Rio Declaration on Environment and Development (signed by over 170 countries) is the most significant international recognition of the principle and the most accepted formulation. Principle 15 states:

“In order to protect the environment, the precautionary approach shall be widely applied by States according to their capabilities. Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation.”

An appropriate response to scientific uncertainty

There is vigorous debate in the literature regarding whether the principle is a scientifically sound approach which is adequate to deal with uncertainty, or whether it is purely a political concept with little practical application. Gray argued that the principle “has nothing to do with science” because it is a wholesale
rejection of scientific methodology as a basis for decision-making. It is seen as undermining optimism that science can solve environmental problems. Yet, as Cameron argued, the actual limitations of scientific endeavour provide an argument for the application of precaution. The polarisation of views among the commentators centres on the issue of whether precautionary action should be taken in the absence of scientific proof of causal links between activities and environmental harm. Gray is concerned by the rejection of statistical predictions (or “scientific evidence”) of environmental outcomes in favour of acceptance of mere “suspicion of effects” as sufficient for the introduction of precautionary measures. This is perceived as taking objectivity out of the process. He warned against “crying wolf and referred to the North Sea Declaration formulation of the principle (where precautionary measures are to be introduced “even where there is no scientific evidence”) as an example of “unnecessary precaution”. Likewise, Wildavsky, who was a prominent critic of the principle, described it as a “marvellous piece of rhetoric” which supports the elimination of activities which could cause harm, thus reducing decision-making to a “hedging mechanism”. He believed that there is no need to be prepared for all possible eventualities: “why organize our lives around predictions unlikely to come true?” Brunton, another opponent of the principle, argued that the best strategy for dealing with uncertainty would be to develop “resilience” by increasing our understanding by trial and error. In fact, he contended that a conservative “do-nothing” approach, “which would seem to be the one supported by the precautionary principle”, may ultimately prove to be “unacceptably risky”. In a sense, Brunton argued for a reverse precautionary principle — that we should not prevent certain activities because they might reap unknown benefits.

Gray, Wildavsky and Brunton misdirect their attack on the principle. They view its application as ensuring the loss of profits and opportunities which are traded off for benefits which are unquantifiable, distant and possibly non-existent. In doing so, they place little weight on the higher penalties which may be incurred by society as a whole and by future generations. The principle recognises that inaction in the face of uncertainty may be far worse than corrective action which is taken too late to be effective. It is implicit in the acceptance of precautionary philosophy that some opportunities will be foregone in order to avoid the consequences of unknown, but potential, harm. No apology is offered for such “costs” being incurred. Further, the principle does not abandon scientific evidence. All formulations of the principle require some indication that harm may result before the burden shifts to the proponent of an activity to negate the possibility of unacceptable harm. For example, the formulation in the North Sea Declaration asserts the need to apply the principle “to avoid potentially damaging impacts” of toxic substances. A high level of scientific understanding is required before the principle can be applied in weaker formulations, such as in the Rio Declaration, where the threshold for application is threats of “serious or irreversible damage”. Precaution is not “unscientific” but the principle does recognise that decisions often need to be made in the absence of adequate scientific information.

A new environmental standard: rejection of assimilation theory

There is considerable debate whether the principle is a paradigm shift in environmental management or whether it merely institutionalises commonsense practices. Conventional environmental policies are deeply influenced by assimilation theory, whereby it is assumed that ecosystems can tolerate a certain amount of pollution without detrimental changes to overall quality. The “assimilative capacity” concept is used universally by regulators when calculating permissible waste discharges. By definition, discharges purportedly are made without unacceptable harm. We are compelled to rely on the assimilative capacity of the environment to some degree because human societies will produce wastes and continue to cause environmental impacts. This is implicit in the Trail Smelter decision where liability attached only to “serious” injury.

Although rarely is it disputed that the environment has some capacity to tolerate human activities, the assimilative capacity concept does not provide adequate protection against environmental harm. A major shortcoming is that it assumes critical thresholds of environmental capacity can be determined. However, there are many examples of discharges which were predicted to be safe (including CFCs and DDT) later causing unanticipated long-term damage. The precautionary principle essentially is a new and progressive policy vehicle which represents a philosophical shift from the assimilative capacity
concept towards a more protectionist approach to maintaining environmental quality. It is far more attentive to the possibility of irreversible environmental damage. It cannot, and does not, purport to eliminate unanticipated harm or provide a panacea for our environmental ills. Its use is in facilitating prudent decision-making when confronted with scientific uncertainty.

The principle as a legal principle

Although the principle advances a progressive policy approach to environmental management, as a legal concept it is not as radical as it may appear. International environmental law already addresses some aspects of precaution. In fact, the principle is best understood as a development of existing legal obligations rather than a departure from them. The existing preventive principle in international law obliges states to abstain from conduct which carries “significant risk” of “reasonably foreseeable” harm. Further, international jurisprudential developments of the Trail Smelter doctrine have expanded the requirements of due diligence to include the obligation to investigate the likelihood of environmental harm and to assess whether risk of harm is serious.

The innovative quality of the precautionary principle lies in the requirement of prevention not only where there is “significant risk” of harm, but also where there is uncertainty whether harm will result. The preventive principle requires risk and causation to be scientifically proven; the precautionary principle extends the preventive requirements of due diligence where there is uncertainty as to environmental outcomes. Gündling argued that it is a more stringent form of preventive environmental policy because it requires action “irrespective of the existence of risks”. Although risks are relevant, “the crucial point is that environmental impacts are reduced or prevented even before the threshold of risks is [sic] reached”. Thus, he argued, precautionary action must be taken even where risks are “not excluded”. Yet this interpretation of the application of the principle is too wide. It is inconsistent with most formulations which do not call for action unless there is some indication non-negligible environmental harm may result.

The status of the principle in international law

Although it is common for the principle to be formulated in mandatory terms in non-binding “soft” international law instruments, when it is incorporated in binding conventions, it often is contained in non-operative provisions or is relaxed and expressed in permissive terms. The question is whether, in the absence of a mandatory treaty provision, a state is required to implement the principle under customary international law.

A number of commentators have suggested that, because strong evidence of state practice and opinio juris is absent and because the parameters of the principle remain elusive, it is doubtful whether the principle is part of customary international law, or even whether it can evolve into an international canon of environmental practice. Others have argued that, because the principle has been invoked so frequently in international environmental resolutions, it has crystallised into a basic normative principle of international law. As the principle has been expressly adopted in a plethora of international instruments (as well as being endorsed implicitly in many more), it seems any doubt as to its legal validity goes to determining its specific requirements rather than to its existence as a principle of law. Freestone argued that the “bottom line” is that a state which has endorsed the principle would be liable if it caused harm in the future through activities which today are strongly suspected (but not proven) to cause substantial harm. This opinion is relevant for Australia, which has adopted the principle by signing a number of international documents which contain it, including the Rio Declaration. For those states which have not assumed the responsibility to implement the principle, their environmental conduct should nonetheless be influenced by it because its entrenched status as “soft” international law means that increasingly it will shape future determinations of international legal liability.

Interpreting the principle

Notwithstanding the almost universal acceptance of the principle in recent international documents concerned with environmental management, there is considerable confusion as to what is meant by the concept. No commonly agreed definition exists, nor criteria to guide its implementation. This prompted one commentator to describe it as the “fuzziest” of environmental principles. Bodansky argued that the principle is too vague to serve as a regulatory standard because it does not define the vital concept of precaution or specify how much precaution should be taken. The uncertainties surrounding its content
and implications stem from its numerous formulations and the ambiguous wording typically used in statements of policy. The generality of the principle has led to criticism that it is devoid of practical meaning. However, others have pointed to an undisputed conceptual basis to which effect can be given. O’Riordan and Jordan, for example, identified the core of the principle as:

"[The intuitively simple idea that decision makers should act in advance of scientific certainty to protect the environment (and with it the well-being of future generations) from incurring harm. ... In essence, it requires that risk avoidance becomes an established decision norm where there is reasonable uncertainty regarding possible environmental damage or social deprivation arising out of a proposed course of action."

Content of the principle

Formulations of the precautionary principle tend to be hortatory in character, but, for it to be implemented, a specific and operable content must be determined. This task is made difficult by the wide range of obligations which the principle has the potential to impose. Consensus needs to be arrived at as to the type of regulatory approaches which are appropriate for its implementation in particular circumstances. At minimum, the principle is understood as requiring the adoption of sound environmental practices and the reduction of emissions of pollutants at source — although other methods for directly and indirectly implementing precaution have been advanced. These include stringent environmental quality objectives, the principle of non-degradation, strict prohibition or cradle to grave care with regard to hazardous substances, strict liability, insurance mechanisms, environmental impact assessments and the integration of environmental policy into wider decision-making.

Some formulations of the principle require precaution to be implemented by the adoption of “clean production” methods. This requires the use of “best available technology” (BAT) or the more discretionary “best available technology not entailing excessive cost” (BATNEEC). Yet these approaches are not without difficulties. As Bodansky argued, it would be unworkable if BAT was taken to mean “available at any price” because that would result in environmental hazards always being prioritised ahead of economic costs. There also are difficulties in determining what is the “best available” technology because of continuous advances in technology and because the concept only permits precautionary action where it is technologically and economically feasible. Further, use of BAT may not give proper effect to the principle. Outright prohibition of activities may be preferable. However, applying strict precaution and insisting on zero discharge of pollutants does not eliminate risk and can be counter-productive. For example, the banning of hazardous waste disposal at sea results in increased disposal on land, simply transferring risk. As an illustration, in Norway there has been considerable debate over the discharge of ilmenite (a black mineral composed of iron titanium oxide), which is insoluble and accumulates in water, but is non-toxic. Environmental groups insisted that it is a pollutant because not all its effects on marine biota are known. They argued that it should be stored in a specially constructed dam on land. On the other hand, local residents and a number of marine biologists have been opposed to the construction of a dam, arguing that it would be too costly and would have its own environmental impacts and further, that the dumping of ilmenite at sea is not risky. Application of the principle is controversial and debate tends to devolve to the acceptability of different levels of uncertainty. Bodansky argued that the principle is normally misconceived as a choice between risk and caution, when often it is a choice between one risk and another. It is perhaps more accurate to state that application of the principle normally involves accepting an known risk of environmental harm to guard against an uncertain environmental outcome (possibly involving no harm).

Economic considerations

The application of the principle cannot be divorced from economic considerations which dominate decision-making at many levels. The principle requires that economic costs be incurred to avert environmental damage. But how much precaution is economically acceptable? Some governments have decided to reduce their reliance on the principle on economic grounds. For example, the British government stated that it is 

"prepared to take precautionary action to limit the use of potentially dangerous materials or the spread of potentially dangerous pollutants, even where scientific knowledge is not conclusive, if the balance of likely costs and benefits justifies it. This
precautionary principle applies particularly where there are good grounds for judging ... that action taken promptly at comparatively low cost may avoid more costly damage later" (emphasis added).76

Cameron argued that, to some extent, this is necessary because there are dangers in applying precaution at any cost. For example, if high cost regulatory action is imposed and it is subsequently shown to be unnecessary, arguments will surface about economic inefficiency, “thus reducing the force of subsequent precautionary arguments”. Thus, the possible costs of over-responding to uncertainty should be taken into account when applying precaution.77 Further, precautionary measures which have been imposed should be attenuated if they are subsequently found to be unnecessary.

However, decision-makers need to guard against economic considerations attaining paramountcy when considering precautionary measures. Otherwise the principle will be weakened substantially because the most appropriate precautionary measures may not be taken. The principle would become little more than a cost-benefit analysis. The essence of precautionary philosophy entails that some “unnecessary” caution (with its associated costs) must be accepted.

Threshold for application

While there is widespread acceptance of the need for precautionary measures in environmental management, a controversial aspect surrounding the principle is the determination of the appropriate point at which precautionary action should be taken for a given activity. It is not in dispute that the principle is only applicable where there is a lack of knowledge about or disagreement concerning possible, non-negligible environmental harm. The crucial question is, how much evidence of “unacceptable” harm is necessary to warrant precautionary action? In 1986 the West German government explained that the Vorsorgeprinzip concept requires the taking of

“[a]ctive measures ... if general experience or scientific findings indicate with sufficient probability that damage will be caused; any remote possibility that damage will be caused is not sufficient” (emphasis added).79

Some formulations fall only just short of calling for proof of significant harm. Various (often overlapping), thresholds have been adopted, including where:

- there are threats of “serious or irreversible” damage80
- there are “significant” risks of damage81
- there is “reason to assume” damage is “likely”82
- there are “reasonable grounds for concern that pollution may be caused”83
- harm “may” be caused84
- there is “potential” for damaging impacts85
- there is no proof of harmlessness86

It is not appropriate to select one evidentiary standard for all situations. As the risk of harm increases, a greater level of scientific uncertainty (entailing a lower evidentiary burden) can be accommodated when engaging the principle. Further, the greater the level of anticipated harm, the more rigorous precautionary measures should be. The task now is to formulate appropriate thresholds for different areas of environmental management.

Shifting the burden of proof

A unifying feature of most formulations of the principle is a shifting of the burden of proof. Traditionally, an activity will be permitted unless there is proof of likely and unacceptable harm. The burden of proof necessarily falls on opponents of the activity. In many cases sufficient “proof” is only available after harm has been caused. This occurred in relation to drift-net fishing where tens of thousands of seabirds and porpoises died before regulators were satisfied that drift nets damage marine life.87 It is the inability of the conventional burden of proof to provide an effective legal response for environmental damage which cannot conclusively be traced to the activities of one legal identity which gave rise to the principle of precautionary action. The principle reverses the situation by mandating that a party cannot be permitted to act unless it is shown that the proposed activity will not adversely affect the environment. The impact of the principle on the burden of proof can be understood in two ways.88 First, there is a lesser standard of proof: it is no longer necessary to have conclusive proof of harmful effects to justify the imposition of a particular regulatory regime — environmental harm need only be plausible. But more importantly, the evidentiary burden shifts as a result of changing the party required to discharge the burden, usually that of showing that an emission or development will not cause serious environmental degradation. When legal regimes are adopted to implement the principle, different evidentiary burdens
may be advanced. For example, it may be that a prospective developer would be required to present a persuasive case of the unlikelihood of harm occurring, but then opponents may be given the opportunity to respond to the evidence.

**Applying the principle**

A major criticism of the principle concerns the difficulty in determining which precautionary measures are appropriate to take. There are divergent views on the level of precautionary action required and when and how it should be applied. Often, a range of precautionary measures will be available and the difficulty lies in choosing precautionary options when action is being taken because of uncertainty. Where a proposed activity is identified as requiring application of the principle, there is essentially a choice of four operational approaches to implement precaution:

- completely reverse the burden of proof to require the proponent to meet a high evidentiary standard pointing to harmlessness before the activity — or modified activity — may be permitted;
- approve the activity, contingent on a low “acceptability” level of uncertainty, (determined in a manner similar to cost-benefit analyses or risk assessments);
- approve the activity but require the proponent to use BAT or BATNEEC and conduct stringent post-decision monitoring;
- apply precautionary measures pursuant to the doctrine of “no regrets”.

Formulations of the principle vary greatly as to their substantive requirements. In the particularly bland National Pollutant Inventory (NPI), established in May 1996, is an example. The Commonwealth Environment Protection Agency employed assimilative capacity language when it stated that “for a chemical to be included on the NPI, it must be known to, or reasonably expected to, cause serious health problems or severe damage to the environment”.

The burden of proof is thus reversed and it becomes necessary for the applicant to demonstrate that the activity will cause “no harm” before it can be sanctioned. Such strong formulations of the principle have provoked criticism because of the almost impossible task of proving a negative proposition — that no harm will be caused. As Stebbing pointed out, “only disproof is logically conclusive” because repudiating what is false is the only act scientists can perform with complete certainty. Insisting upon application of such formulations of the principle is quixotic because, taken to its logical conclusion, the principle entails the prohibition of all activities about which there exists uncertainty as to environmental effects — virtually every human activity.

Selecting appropriate thresholds for precautionary action will be challenging. As Cameron pointed out, the use of precautionary language is often accompanied by the setting merely of preventive standards rather than precautionary standards. This occurs where parties act to reduce a risk because they are acting in the knowledge that a dangerous outcome is possible (or probable) rather than because they are uncertain as to any environmental effects. The more that is known about a possible outcome, the less precautionary any measure will be to prevent it. The National Pollutant Inventory (NPI), established in May 1996, is an example. The Commonwealth Environment Protection Agency employed assimilative capacity language when it stated that “for a chemical to be included on the NPI, it must be known to, or reasonably expected to, cause serious health problems or severe damage to the environment”. Thus, only those substances with clearly identified hazard potential are listed. A substance about which there is much uncertainty as to its environmental...
effects will not be included on the list because its risk has not been identified. Conceptually, this is a preventive approach. A truly precautionary approach would involve applying regulatory standards to all substances about which there exists uncertainty as to their environmental effects. This can be achieved by "reverse listing". The conventional regulatory approach, as illustrated by the NPI, involves listing substances which cannot be discharged. Reverse listing entails a blanket prohibition except for listed substances which have been demonstrated to be safe (or within acceptability criteria). Further, over time, precautionary standards can turn into preventive standards. For example, the Vienna Convention for the Protection of the Ozone Layer, signed in 1985, is itself precautionary because it was established before there was conclusive evidence of ozone depletion. However, with the increase in scientific knowledge, much more is known about the environmentally damaging effects of CFCs so the standards set prescribing controls for their production and consumption are now better described as preventive rather than precautionary.

The most effective operational approach would be to modify the burden of proof to require a potential polluter to present evidence of a high standard pointing to harmlessness or negligible harm. Precautionary measures would be introduced where the magnitude of uncertainty (influenced by indications of potential harm) outweighs indications of benefit from a proposed activity. This would enable precaution to be implemented quickly and activities would be permitted only where there is confidence that they would not result in unacceptable harm.

The status of the principle in Australia

Policy documents

The precautionary principle was firmly established domestically with the signing, in May 1992, of the Intergovernmental Agreement on the Environment (IGAE) by the Commonwealth, States and Territories and the Local Government Association. The principle is one of four intended to inform environmental policy and programmes at all levels of government. Under cl 3.5.1 the parties agreed that:

"Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."

In the application of the precautionary principle, public and private decisions should be guided by:

(i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
(ii) an assessment of the risk-weighted consequences of various options."

Specific areas of environmental policy and management where the principle "should" be applied are identified in Schedules to the Agreement. These are:

- Data collection and handling
- Resource assessment, land use and approval processes
- Environmental impact assessment
- National environment protection measures
- Climate change
- Biological diversity
- National estate
- World Heritage
- Nature conservation

A basic problem of the IGAE is that it is a political accord and is not binding on parties. The National Strategy for Ecologically Sustainable Development, although not employing the term "precautionary principle", also adopted the principle, mirroring the IGAE definition. The principle is also included in a number of specific environmental policy documents. The Guiding Principles for the Sustainable Management of Coastal Resources and the Draft National Strategy for Rangeland Management are just two examples.

Legislation

Specific references to the precautionary principle, separate from its inclusion as a major component of Ecologically Sustainable Development (ESD), are so far rare in Australian legislation. The most significant reference to the principle in Commonwealth legislation is in the Environment, Sports and Territories Legislation Amendment Act 1995 which by s 31 amended s 39z of the Great Barrier Reef Marine Park Act 1975 to require the Great Barrier Reef Marine Park Authority to be informed by the principle in preparing management plans and protecting World Heritage values. The Act adopts the IGAE definition of the principle.

There has been greater explicit endorsement of precaution in State legislation. The first Australian
legislative inclusion of the principle is contained in the *Protection of the Environment Administration Act 1991 (NSW)*. Section 6(2) outlines the principles of ESD and specifies that it can be achieved (in part) by implementing:

"[T]he precautionary principle — namely, that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation."

The principle is also in the *Fisheries Management Act 1994 (NSW)* and is contained in some pieces of legislation as a specifically mentioned component of ESD. For example, the objectives of the *Environment Protection Act 1993 (SA)* include ensuring that "all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment having regard to the principles of ESD and "to apply a precautionary approach to the assessment of risk of environmental harm". However, legislative intent that decision-makers should consider the principle can be found further afield. As precaution is accepted as a guiding principle of ESD, it must be recognised as implicit in any statement of ESD. Thus, references to ESD in legislation would entail a consideration of the principle. Unfortunately, existing legislative incorporations of the principle and the ESD concept are worded generally and reflect an intent to advance precautionary decision-making but not to mandate particular environmental outcomes based on precautionary criteria.

**Judicial application**

Not surprisingly, there is very little Australian jurisprudence on the principle. The first and most significant judicial consideration of it was given in 1993 by Stein J of the New South Wales Land and Environment Court in *Leatch v National Parks and Wildlife Service*. The Shoalhaven City Council proposed to construct a road in an area known to be a habitat of the Giant Burrowing Frog, listed as an endangered species. The council applied to the Director-General of the National Parks and Wildlife Service for a licence to "take or kill" endangered fauna, as was required by the *National Parks and Wildlife Act 1974 (NSW)*. The definition of "take" in s 5 (since repealed) included the disturbance, injury or "significant modification of the habitat of the fauna which is likely to adversely affect its essential behavioural patterns". The licence was granted and an appeal on the merits of the decision was instituted. Stein J noted the inclusion of the precautionary principle in Commonwealth strategies respecting endangered species and biodiversity, the IGAE and the *Protection of the Environment Administration Act 1991 (NSW)*, and concluded, in relation to the *National Parks and Wildlife Act 1975*, that:

"While there is no express provision requiring consideration of the 'precautionary principle', consideration of the state of knowledge or uncertainty regarding a species, the potential for serious or irreversible harm to an endangered fauna-and the adoption of a cautious approach in protection of endangered fauna is clearly consistent with the subject matter, scope and purpose of the Act."

His Honour held that the Director-General must have regard to the distribution, habitat depletion and ultimate security of the species and to this end the "commonsense" principle is not an "extraneous consideration". He continued: "Application of the precautionary principle appears to me to be most apt in a situation of a scarcity of scientific knowledge of species population, habitat and impacts." He noted the "dearth of knowledge" about the population, habitat and behavioural patterns of the frog and refused the licence because of inadequate scientific understanding of the possible impacts of road building on the species. *Leatch* provides a clear example of how the precautionary principle can operate as a determining factor in environmental decisions.

Optimism that the New South Wales Land and Environment Court was going to establish a firm basis for the application of the principle was shaken somewhat by obiter dicta of Talbot J in *Nicholls v Director-General of National Parks and Wildlife Service*. His Honour noted that the State department was not bound to take into account standards formulated at the international level and indicated that the implementation of the principle as a legal standard "could have the potential to create interminable forensic argument. Taken literally in practice it might prove to be unworkable".

Just two months later, in *Greenpeace Australia Ltd v Redbank Power Co Pty Ltd*, in dismissing an appeal against the grant of a development application for the establishment and operation of a coal-fired power station, Pearlman J stated:
“The application of the precautionary principle dictates that a cautious approach should be adopted in evaluating the various relevant factors in determining whether or not to grant consent; it does not require that the greenhouse issue should outweigh all other issues.”

The principle was discussed by Gallen J of the High Court of New Zealand in Greenpeace New Zealand Inc v Minister of Fisheries. The case concerned an application for review of a decision by the Minister of Fisheries determining the total allowable commercial catch (TACC) for the orange roughy fish species for the 1993-1994 fishing year. The applicant contended that where there was significant scientific uncertainty regarding fish stock levels, “the Minister should take a precautionary approach so as to set a TACC which will best manage and conserve the fishery”. Gallen J referred to the decision in Leatch and stated that there could be little doubt that the approach adopted in that case would apply also in New Zealand. However, he commented that:

“[T]o state that something must be approached with caution means just that. The fact that a dispute exists as to the basic material upon which the decision must rest, does not mean that necessarily the most conservative approach must be adopted. The obligation is to consider the material and decide upon the weight which can be given it with such care as the situation requires.”

His Honour noted that there was no statutory obligation on the Minister to apply the precautionary principle but accepted that there was “a movement towards a view that in questions of such moment, a degree of caution is appropriate”. To this end, a precautionary approach “is a weighting and not a decisive factor”. He concluded:

“In assessing the information upon which a decision must be based, the precautionary principle ought to be applied so that where uncertainty or ignorance exists, decision-makers should be cautious” (emphasis added).

On the evidence before him, Gallen J considered that the TACC set by the Minister could not be criticised for “want of caution” because it was a decision “arrived at consistently with expert evidence” placed before the Minister. In accepting that the Minister was cautious merely by his acting consistently with available scientific evidence, Gallen J failed to give consideration to the limitations of scientific evidence which is implicit in the precautionary principle. The decision indicates that the courts will not be rigorous when considering whether decision-makers have acted with requisite caution. The evidence relied upon by the Minister was a fresh — although equivocal — scientific opinion on the restorative capacity of orange roughy stock which indicated that the TACC could be set at a higher level than had previously been thought appropriate. Although Gallen J noted that “scientists with the highest qualifications” were “unable to agree on a number of issues relating to the orange roughy fishery”, he held that the Minister’s decision could not be seen as unreasonable because there was material which justified the Minister coming to the conclusion which he did.

Nonetheless, these decisions demonstrate that the principle has been afforded a degree of legal recognition. It is now unlikely that, in the environmental arena, it could be held to be an irrelevant consideration. Indeed, Leatch established that, although there is no legal duty to apply the principle, it should now be considered a factor to be taken into account in appropriate circumstances. The High Court recently held that there is a “legitimate expectation” that Commonwealth discretion will be exercised in conformity with the terms of international conventions to which Australia is a party, thus reinforcing this view. Yet there is no clear guidance as to the circumstances in which the principle is a relevant consideration. It is easier for courts to apply the principle if they are empowered to conduct merits review of decisions (such as in Leatch) rather than judicial review (such as in Greenpeace New Zealand). However, given the vague language used in legislation enshrining the principle, the courts have been given an insubstantial mandate to enforce it. The formulation of the principle in the few pieces of legislation which adopt it indicates that it is most likely to be applied as a general principle of statutory interpretation and not as a legally enforceable rule.

The principle needs to be adopted in a manner which would establish it as a mandatory consideration in environmental matters in all Australian jurisdictions due to the reasons stated above. That this is not yet the case is unsatisfactory because decision-makers can ignore the principle in circumstances in which its consideration or application is appropriate. A recent example of this shortcoming is the decision of Martin
CJ of the Supreme Court of the Northern Territory in *Northern Land Council v Energy Resources of Australia Ltd.* The case concerned an application by the Northern Land Council and six Aboriginal residents for an interim injunction restraining the defendant from releasing water into the Magela Creek or its environs from Ranger Uranium Mine Retention Pond No 2. The second plaintiff, Mr Big Bill Neidjie, deposed that he was “frightened by the proposed release of water” in that he feared it would “kill the trees, waterlillies and other water plants”. Concerns were also expressed that people who drink the water or eat produce from the area after the discharge may be affected. In dismissing the application, Martin CJ stated that the

"fear arises from a belief that the water is contaminated — ‘poisoned’ — by uranium and other toxic substances. There is no evidence to show that the proposed discharge would have any such effect [sic]. On the other hand, the evidence on behalf of the first defendant is that the contaminants in the water to be released … will cause no harm to people or the wider environment. … Although this is the first time it is proposed that water be released from Retention Pond No 2, water from Retention Pond No 1 is allowed to be released fully every year, and since the mid 1980’s [sic], water from Retention Pond No 4 has been released in most years. The dilution requirements in respect of the release of water from Retention Pond No 2 means that the impact on the environment of the water released from it will be identical to that released from the other two ponds in respect of which there has been no noticeable affect [sic]. … Though the individual plaintiffs may genuinely have been frightened as to the possible consequences to arise from a release of the water, there is no foundation for that belief. The evidence is all the other way” (emphasis added).

The case demonstrates the inappropriateness of the existing burden of proof by which plaintiffs (often concerned residents) must adduce evidence to “show” that activities “would” result in environmental harm. Further, the scientific evidence led by the defendant was unchallenged by the plaintiffs or Martin CJ. Considering the preceding discussion, it is untenable to argue that there is irrefutable evidence that the release "will cause no harm". Likewise, the complexity of environmental interactions means that the argument that environmental impacts will be "identical" to that of similar releases elsewhere cannot be sustained. The claim that there has been "no noticeable effect" concerning released waters needed to be analysed in terms of the effectiveness of existing monitoring programmes. The decision also glossed-over the potential for future environmental effects which may only manifest themselves after a long period. Although consideration of the precautionary principle in this case may have resulted in the same decision, at least the proceedings would have commenced from the position that the release of water would not be permitted unless the weight of adequate scientific evidence dispelled any reasonable concerns about possible environmental harm.

**Conclusion**

The precautionary principle emerged in environmental discourse in recognition of the need for a framework for decision-making which would be adequate to deal with the increasingly complicated nature of environmental problems. It is the foremost example of legal recognition of the aggregate nature of environmental harm and the potential for harm to be irreparable. It is not a lofty ideal, but an approach which is necessary. It has achieved a degree of conceptual clarity and its continued acceptance in international and domestic environmental fora indicates that its future as a leading environmental principle is secure. Some foresee it as developing into "the fundamental principle of environmental protection policy at the international, regional, and local levels".

However, to date, in Australia, the principle’s most important test — implementation — has been bedevilled by problems. Existing legislative and policy formulations are too vague or ambiguous to enable it to be implemented systematically. Its practical use is currently limited because decision-makers are not bound to apply it and are in doubt as to how to apply it. Although the federal government has embraced the principle internationally and domestically, the current practice of repeatedly espousing the principle as a guide to environmental decision-making is not sufficient to discharge the Commonwealth's obligation to ensure the principle is "widely applied". It must be given effect.

The principle is in a crucial transitional phase. While its merits as an environmental philosophy are virtually unquestioned, the debate has shifted to the more difficult aspect of its potential to amount to more
than a nebulous "guiding principle" for environmental protection. The argument that the principle is incapable of being given clear definition is waning. Thresholds for its application can be determined and appropriate precautionary responses can be adopted. Although the principle’s success at the international level has led to the perception that it is relevant only to “macro” level policy as a response to transboundary harm and threats to the global commons, it is apposite for the entire spectrum of environmental decision-making, including individual development decisions. For the federal government to give effect to its international obligations to implement the principle and to be seen as taking the ESD concept seriously, it must apply the principle so that it influences decisions and environmental management practices. Operative Rather than continuing merely to repeat the principle and to be seen as taking the ESD concept seriously, it approach to environmental decision-making and to for the federal government to give effect to its international obligations to implement the principle and to be seen as taking the ESD concept seriously, it must apply the principle so that it influences decisions and environmental management practices. Operative standards need to be adopted which, at minimum, would be in conformity with Australia’s international obligations and, ideally, would position Australia at the forefront of nations implementing the principle. This would require greater legislative commitment and the creation of enforcement mechanisms. In the absence of clearly defined regulations, courts are likely to be deferential to departmental interpretations of the principle and not go beyond determining it to be a non-binding “relevant consideration”. For the principle to be implemented effectively, it must be integrated into the most sophisticated environmental protection framework that we have — environmental impact assessment. The Environment Protection (Impact of Proposals) Act 1974 (Cth) is the “main plank”132 of the Commonwealth’s environmental powers and is the logical starting point for reform options.

The principle’s progressive quality lies in the opportunity it creates to mandate a commonsense approach to environmental decision-making and to form the basis for an effective regulatory regime. Rather than continuing merely to repeat the principle in hortatory terms, the federal government must shift attention to developing specific operating criteria or “rules” which must ensure the application of some minimum content and not allow precaution to be diminished. Otherwise the principle faces the prospect of being reduced merely to an unachievable aspiration for environmental management.

References

1 Trail Smelter Arbitral Tribunal Decision (United States v Canada) (1941) 35 AJIL 684.
2 Ibid at 716.
3 Corfu Channel Case (United Kingdom v Albania) [1949] ICJ Reports 4. D R Rothwell and B Boer, “From the Franklin to Berlin: The Internationalisation of Australian Environmental Law and Policy” (1995) 17 Syd LR 242 at 248. Since the early 1970s, international environmental law has also dispensed with the need to establish direct and tangible injury to the territory of another state. Conventions and international resolutions now recognise the obligation to prevent harm to the global commons (areas beyond the limits of national jurisdiction). See, eg, Stockholm Declaration on the Human Environment, Principle 21 — UN Doc A/Conf 48/14 Rev 1, 16 June 1972, reproduced in (1972) 11 International Legal Materials (ILM) 1416.
4 Ibid at 22.
5 P W Birnie and A E Boyle, International Law and the Environment (Clarendon Press, Oxford, 1992), p 97. For example, the United States invoked “scientific uncertainty” regarding the causation of acid rain by specific pollutant emissions as a reason for non-compliance with remedial measures. Likewise, in the United Kingdom, authorities used the lack of “certain knowledge” that acid rain is responsible for tree deaths and lake acidification to justify continuing power station emissions — G Hand, “Environmental Security and Global Change: The Challenge to International Law” (1990) Ybk Int’l Environmental L 3 at 22; S Yearly, “Green Ambivalence About Science: Legal-Rational Authority and the Scientific Legitimation of a Social Movement” (1992) 43 British Journal of Sociology 511 at 524.
7 However, some treaties do provide for strict liability, such as the 1972 Convention on International Liability for Damage Caused by Space Objects. See also Principle 11 of the proposed legal principles for environmental protection and sustainable development adopted by the World Commission on Environment and Development (WCED) report. It purports to impose strict liability on states by requiring that they provide compensation “should substantial transboundary harm occur even when the activities were not known to be harmful at the time they were undertaken” — WCED, Our Common Future (Oxford University Press, Oxford, 1987) (Brandtland Report).
8 J McLoughlin and E G Bellinger, Environmental Pollution Control: An Introduction to Principles and Practice of Administration (Graham & Trotman, London, 1993), p 165.
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12 Yearly, op cit n 5, at 516-529.


14 Normally understood to be the amalgam of the known probability or chance of an event occurring and the seriousness of its consequences.

15 An event with an unknown probability.


18 For example, fears concerning Indonesia's plans to construct 12 nuclear power plants in areas prone to earthquakes and volcanic activity are dismissed as baseless by Indonesian authorities. The event of an accident occurring is described as "unlikely". See L Murdoch, "Study Finds Java N-Plant a Threat" (The Age, Melbourne, 22 May 1996), p 6; and C Hamilton and L Williams, "Asia's Worst Nightmare: Nuclear Cataclysm" (The Age, Melbourne, 14 June 1996), p 15.


22 Cameron, op cit n 17, p 17.

23 Note, however, Handl's observation that the "dominant facet" of the principle may be "economic utilitarianism", being the idea that restraint is warranted simply to facilitate long-term exploitability of natural resources — Handl, op cit n 5, at 23.

24 This phrase was coined by Hardin in his seminal 1968 paper. He used a now famous parable of herdsmen knowingly overstocking the commons because, for individual herdsmen, this was economically "rational" — G J Hardin, "The Tragedy of the Commons" (1968) 162 Science 1243.


42 UN Doc A/Conf 151/SR 1, reproduced in (1992) 31 ILM 874.

43 The principle is also listed as one of nine fundamental principles for guiding state conduct in the Draft International Covenant on Environment and Development (1995). This covenant is likely to become the leading international environmental policy document.


45 Cameron, op cit n 17, p 29.


48 Ibid, (1990b), at 600. Brunton, in his attack on the principle, argued along similar lines: "The principle ... provides a justification for taking seriously all kinds of spurious or non-existent — but supposedly deleterious — links between human actions and environmental effects and so offers the basis for potentially massive, and frequently counterproductive, regulatory intervention" — R Brunton, "We must adopt a risk-averse approach and always err on the side of caution when dealing with environmental issues" in J Bennett, Tall Green Tales (Institute of Public Affairs, Perth, 1995), p 32.

49 Wildavsky, op cit n 9, pp 428, 445.

50 Brunton, op cit n 48, p 32.

51 Cameron and Aboucher, op cit n 20, at 2.

of proof is the balance of probabilities. It may well be that, in a particular case, on the balance of probabilities, the scientific evidence that is presented suggests that there will be "no harm".

Cameron, op cit n 17, p 24.

Environment Protection Agency, National Pollutant Inventory — What it means for you (Canberra, 1996).


Cameron and Aboucher, op cit n 20, at 17.

The IGAE set up a framework for improved environmental management throughout Australia. It purports to provide a mechanism to facilitate a co-operative national approach to the environment, better definition of the roles of the respective governments, greater certainty in decision-making and better environmental protection. However, support for the Agreement has appeared to wane in recent years.

Clause 3.1.


The principle is also contained in the Ozone Protection Act 1989 (Cth) by way of the inclusion in Sched 3 of the Montreal Protocol on Substances that Deplete the Ozone Layer.

Section 30(2)(c).

Section 10(1)(b)(iv).


The State Owned Corporations Act 1989 (NSW), s 8(1)(c); Fisheries Management Act 1991 (Cth), s 3(1)(b); Endangered Species Protection Act 1992 (Cth), ss 32(3)(c), 34(3)(c), 60, 70, 81; Natural Resources Management (Financial Assistance) Act 1992 (Cth), s 3(2)(b); Land Use Planning and Approvals Act 1993 (Tas), Sched 1; WaterHoard (Corporatisation) Act 1994 (NSW), ss 21(1)(b), 22(3)(a), Sustainable Energy Development Act 1995 (NSW), s 4(c); Threatened Species Conservation Act 1995 (NSW), ss 4(1), 97(1)(e), 140(2)(b), and Waste Minimisation and Management Act 1995 (NSW), ss 3(2), 8(5), 17(c), among others, fall into this category.

(1993) 81 LGERA 270. The principle has been considered, but not commented upon, by the Federal Administrative Appeals Tribunal in Queensland Nickel Management Pty Ltd v Great Barrier Marine Park Authority (1992) 16 AAR 319, and the Queensland Planning and Environment Court in GFW Gelatine International Ltd v Beaudesert Shire Council [1993] QPLR 342. Also, in Simpson v Ballina Shire Council Peiraman J of the New South Wales Land and Environment Court took the principle and the IGAE into account in dismissing the applicant's appeal against the refusal by the council of their development application. His Honour held on the balance of probabilities that the "proposed subdivision would cause a significant adverse impact on the local environment" (unreported, NSW Land and Environment Court, 31 March 1994).


Ibid at 284.

Ibid at 283.

Leach was considered by the High Court in R v Secretary of State for Trade and Industry: Ex parte Duddridge (decision delivered 4 October 1994), although held to be of no relevance.
to English law. *Duddridge* is English authority for the proposition that where a government has adopted the precautionary principle there is nothing to prevent it applying a threshold it chooses. The government could not be held to the threshold it chose in *This Common Inheritance* (HM Govt., op cit n 76). Smith J held further that the government was not required to rely on the principle. See Hughes, op cit n 66.

Minister for immigration and Ethnic Affairs *v* Teoh (1995) 183 CLR 273 at 287-288 per Mason CJ and Deane J; at 298-303 per Toohey J; at 303-305 per Gaudron J. It has been argued that the need to release water owed much to the inadequacies of the Environmental Impact Statement and environmental management plan prepared prior to construction of the mine. See C Christophersen and M Langton, “Allardā!“ (1995) 17 *Arena Magazine* 28.

Although the precautionary principle was not mentioned specifically in the decision, the tribunal upheld a decision by the Northland Land Council allocating to the applicants less water from the Mangakahia River than they had requested, and for a shorter duration. The tribunal considered that the taking of a cautious approach was justified (in part) by the uncertainties surrounding the health and wellbeing of the river (unreported, Bollard J (presiding), Dr A H Hackett and Mr J R Fitzmaurice, 14 November 1995).


It has been argued that the need to release water owed much to the inadequacies of the Environmental Impact Statement and environmental management plan prepared prior to construction of the mine. See C Christophersen and M Langton, “Allardā!“ (1995) 17 *Arena Magazine* 28.

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