Understanding and Applying the Precautionary Principle to Deep Sea Minerals Mining in the Pacific Islands Region: A Socio-cultural and Legal Approach

Summary

What is the Precautionary Principle?

- The principle provides guidance on a process for avoiding serious or irreversible harm under conditions of uncertainty.
- Precautionary measures are triggered when, for a given action,
  A: there is potential for unacceptable harm *and*
  B: there is uncertainty about causality and magnitude of impacts.
- Precautionary measures can range from a moratorium on the proposed development, when potential for harm and uncertainty are deemed unacceptable, to careful monitoring of the development project at the other extreme.
- The principle requires a participatory decision-making process that gains definition and meaning as it is applied in specific situations.

Why is a participatory decision-making process important for applying the principle to specific situations?

- The principle depends on value-laden language that can only be given meaning by reference to specific socio-cultural communities. For example, the *unacceptability* of harm is a cultural and social value that can be variable. A participatory process ensures that decision makers are aware of the values of various stakeholders implicated in a potential mining project.
- Scientific uncertainty means that decision makers cannot appeal to adequate technical information when assessing an activity. Under these conditions especially, decision makers should consult those who may be affected since appeals cannot be made to adequate knowledge.
- Determining the social values given to terms such as unacceptable harm, serious harm, and uncertainty helps determine how severe or lenient precautionary measures should be.

Is the Precautionary Principle relevant to Deep Sea Mineral Mining?

- Yes, for both socio-political and scientific reasons specific to DSM mining.
- The Precautionary Principle has 'wide recognition in international Law'.
- The United Nations Convention on the Law of the Sea (UNCLOS) obligates countries to protect the marine environment, the International Tribunal for the Law of the Sea (ITLOS) has consistently promoted a precautionary approach in the utilization of marine resources, and the International Seabed Authority (ISA) suggests a precautionary approach to ensure effective protection for the marine environment from harmful activities (in 'the Area'). The ISA provides, however, the most thorough guidance available on DSM related matters in all waters.
- At the great depths at which DSM is proposed, there is a great paucity of scientific knowledge, thus great scientific uncertainty.

What is the history of the Precautionary Principle and how has it changed over time?

- 1970's: The notion of 'first, do no harm' was initially applied to the environment for air pollution legislation in Germany, to provide balance in short-term decision-making, based on limited information.
- 1980-90's: The principle proliferated as a component of several key international conventions, including the Rio Declaration, Principle 15 (1992).
- 2000's: Important synthesis statements emerged, including a UNESCO paper that expresses the principle as: 'When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, action shall be taken to avoid or diminish that harm.' (2005).
- Historical development of the principle shows that it is intended to counter the presumption in favor of development (Cooney, 2004), thus shifting the burden of proof away from those advocating environmental protection and public health.

The Precautionary Principle is referred to as 'weak' or 'strong' in some cases, what does this mean?

- Strong versions of the Precautionary Principle obligate decision makers to take precautionary action, and therefore perhaps offers the greatest protection, however cannot differentiate between several risks or assess the equity of applying precautionary actions. This limited focus makes strong versions 'narrow' from a decision-making point of view.
  An example is the Wingspread Statement, 1998.
- Weak versions of the Precautionary Principle obligate decision makers only to consider precautionary measures and do not prescribe responses. However weak versions provide a mechanism for discourse and inclusion of multiple options and the equity of multiple parties in response actions. This expanded capacity makes weak versions more 'inclusive' from a decision-making perspective.
  An example is the Rio Declaration, 1992.
- Both strong (narrow) and weak (inclusive) definitions of the Precautionary Principle have valid application in some cases, depending on the scale and type of action, number of involved parties and the level of available knowledge.
- The UNESCO version of the principle (and the DSM version given at the end of this summary) attempts to build strong *and* inclusive expressions of the principle that capitalize on the strengths of both strong and weak versions.

Figure 1 illustrates when strong (narrow) and weak (inclusive) definitions are most appropriate. Strong (inclusive) versions are more broadly applicable.

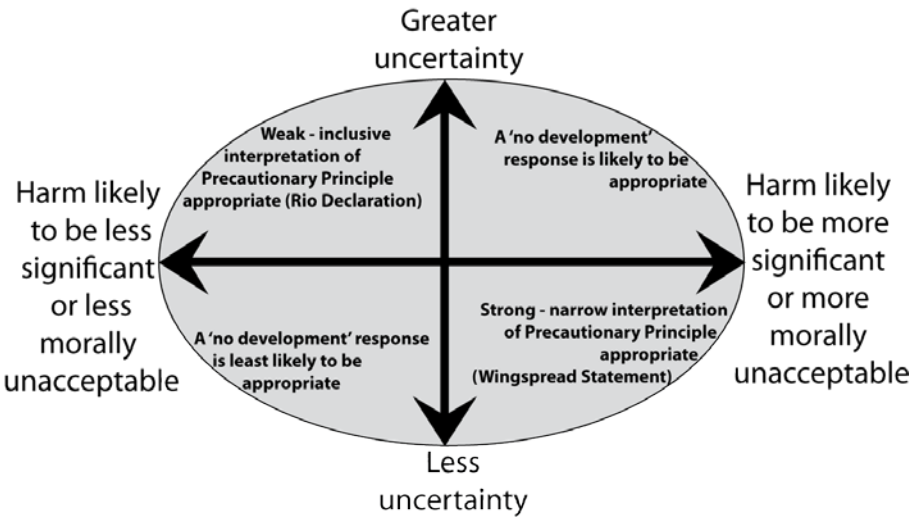


Figure 1: *Figure to guide the most useful formulation of the Precautionary Principle in a specific instance*

I have heard people suggest the Precautionary Principle states that:

"In any development where there are threats of serious harm to the marine environment, the lack of full scientific data shall not be used as a reason for postponing ***that development****. However, that particular development shall use cost-effective measures to prevent environmental degradation."*

Is this interpretation of the Principle correct?

- No, this is not included in statements of the Precautionary Principle, either in word or intent.
- *Principle 15 of the Rio declaration states* '…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*** ' which, in intent, is the opposite point of view.
- The incorrectly stated version given in the question above replaces 'cost-effective measures…" from the Rio Declaration, with the term 'that development.'
- The history of the Precautionary Principle has been a mechanism to counter a presumption in favor of development, specifically placing the burden of proof of 'no irreversible harm' upon the proponent of an activity (rather than those advocating for public health or environmental protection, which was historically the case), which, again, is the opposite point of view.

When is it not appropriate to apply the different versions of the Precautionary Principle?

- The Precautionary Principle is not always necessary or desirable, specifically in cases where:
  1. Scientific data or experience clearly demonstrates that there is no threat or the threat is reversible or morally acceptable,
  2. When the threat is causative and well understood, in which case risk management is more appropriate.
- Since the current status of DSM mining entails both the possibility of irreversibly harm and scientific uncertainty, the precautionary principle is necessary.

Given these considerations, can a version of the precautionary principle be suggested that is specific to DSM mining?

- Yes, the following version of the principle for DSM mining is suggested as being a relatively specific yet flexible version of the principle for the purposes of assessing deep seabed mining projects:

"Because DSM mining poses the possibility of irreversible harm and entails scientific uncertainty, measures must be taken to protect the marine environment and the people who value it. These measures should reflect the levels of uncertainty and possibility for harm, as determined by a participatory process, and can range from a moratorium on mining, in one extreme case, to only monitoring of mining projects, in another, but may involve more moderate measures such as the creation of MPAs, an incremental test bed approach, and measures to ensure improved social welfare."

Understanding and Applying the Precautionary Principle to Deep Sea Minerals Mining in the Pacific Islands Region: A Socio-cultural and Legal Approach

Introduction and Background

A great deal has already been written about the Precautionary Principle (PP), which as a first approximation can be expressed as a process for avoiding serious or irreversible harm under the conditions of uncertainty, such as lack of full scientific knowledge desired for decision-making. However, despite extensive effort, this body of literature still seems to give inadequate guidance for those thinking about the possibilities of Deep Sea Minerals (DSM) mining. The following discussion paper gives insights into why this is the case and suggests an answer: the PP depends upon value-laden concepts that become meaningful as the context in which the principle is applied becomes more specific. This context is at the same time geophysical, biological, socio-cultural, legal and economic. It is also uncertain. Together, these contextual factors, uncertainty, and the need to establish the meaning of social values inherent in the PP require a participatory decision-making process. The principle, as such, is primarily concerned with initiating and guiding this process.

This discussion paper is a small but hopefully significant contribution to a much larger program of support for Pacific Island Countries[1] as they consider the relative merits and challenges of possible DSM mining both within EEZs and the International Seabed Area (the Area). In 2011 SPC, with funding provided by the EU, began implementation of a four year project: 'Deep Sea Minerals (DSM) in the Pacific Islands Region: A Legal and Fiscal Framework for Sustainable Resource Management.' The key objectives of the project are:

(1) Development of a Regional Legislative and Regulatory Framework (RLRF) for offshore minerals exploration and mining;
(2) Formulation of policy, legislation and regulations, at a national level;
(3) Building national capacities; and
(4) Effective management and monitoring of offshore exploration and mining operations.

A regional workshop was held in Nadi, Fiji in June 2011 to consider the terms of mutual agreement that would guide the drafting of the RLRF. In December 2011 another workshop was co-sponsored by SPC (SOPAC division), the Government of Fiji, and the International Seabed Authority (ISA) to address environmental management needs for exploration and exploitation of DSM, including issues relevant to the RLRF.

At both of these workshops the importance of the Precautionary Principle was emphasized. However, it soon became apparent that the meaning of the PP was somewhat open to interpretation, leading to

[1] These consist of 15 P-ACP countries: the Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Tonga, Samoa, Solomon Islands, Tuvalu, Vanuatu, and Timor Leste, which has been included at the request of the EU.

confusion and, at times, disagreement about what the PP was and how the principle should be operationalized. Because the PP is widely applied within environmental governance and management, SPREP offered to sponsor the drafting of a discussion paper on the meaning of the PP and its application to potential DSM mining projects in the Pacific region. The resulting document was written with the understanding that it would provide guidance for completing the RLRF and aid individual countries as they attempt to apply the principle to real situations.

The dual structure of the document is the result of these considerations. The first major section of the paper outlines a general framework for understanding the PP in context. It argues that the ambiguity of the PP can be an advantage if understood correctly and gives suggestions realizing these advantages when applying the PP. The second major section summarizes important legal contexts in which the PP may be applied. Furthermore, portions of each section consider specific concerns that have been expressed by stakeholders in response to the exigencies of the process thus far. The final form and content of the document addresses both these general and particular needs for understanding the precautionary principle.

Understanding the Precautionary Principle

The Precautionary Principle (PP) is based on common sense notions of harm avoidance. However, these colloquial understandings provide little guidance in complex situations. Even the more rigorous formulations of the principle in legal and policy documents contain indeterminate, value-laden language and rely on ambiguities that open deliberative space for competing interests and differing interpretations. If the PP is to be a rational tool for decision-making, this quality must be explicitly examined and practically addressed.

Ambiguity is both a strength and weakness of the PP.[2] It is a strength that facilitates high-level political agreement that precaution should be taken in situations that are characterized by uncertainty and plausible harm. It also enables specific applications of the principle in diverse and complex situations, ranging from cell phone use on commercial aircraft[3] to international trade in Genetically Modified Organisms.[4] Ambiguity is a weakness in that it is often not clear how, or when, the principle should be applied, and this can lead to applications that are either too severe or too lenient.

Nevertheless, the PP is an important tool for dealing with uncertainty and has gained increasing recognition and support in international, regional, and national legislation and frameworks. Utilizing the PP as a powerful technique for decision-making, while avoiding its possible complications, requires an approach to the principle that both recognizes, and operationalizes, its inherent flexibility.

[2] J Cameron & J Abouchar "The precautionary principle: a fundamental principle of law and policy for the protection of the global environment" (1991) 14 *Boston College International and Comparative Law Review* 27.

[3] European Environment Agency "Late lessons from early warnings: the precautionary principle 1896-2000" 22 *Environment Issue Report*.

[4] Cameron & Abouchar

Therefore, this discussion paper begins with the important observation that the PP gains definition and meaning as it is applied in specific situations. The task of this paper, then, is to provide recommendations for how the PP can be given meaning, through participatory deliberation, in the context of appropriate decision-making frameworks and the specific challenges of Deep Sea Minerals (DSM) mining in the Pacific region. Furthermore, the context for application of the PP will vary from country to country, project to project and with the development of scientific, social and other forms of knowledge.

Significant commonalities and differences exist among various definitions of the PP and its applications within specific contexts. Thus, its historical and conceptual development is important for understanding the principle's possibilities and limits. This paper will provide background and case studies on the PP, will highlight some key debates, and will utilize consensus views to develop guidelines for practically operationalizing the PP in the emerging arena of Pacific Ocean DSM mining. In doing so it aims to provide some overarching principles and guidelines to consider in the application of the PP at multiple scales.

A Principle in Context

Generally speaking a principle provides guidance in a particular direction but does not determine outcomes.[5] More specifically, the precautionary principle provides guidance under the conditions of uncertainty and potential for serious harm.[6] It is an important consequence that particular outcomes result from both the guidance of the PP and the particular contexts in which it is operationalized. Fisher and Harding[7] suggest that several broad contextual considerations are important when applying the PP. These include:

1. The legal and socio-political culture;
2. The specific statutory regime;
3. The nature of the particular environmental problem;
4. The availability of, and capacity to implement, possible precautionary measures;
5. General understandings of legitimate decision-making within the public.

The legal and socio-political culture is, perhaps, the most immediate context for the principle, which is, in the first instance, a deliberative tool for decision-making.[8] However, this means that the results of

[5] R Cooney "The Precautionary Principle in Biodiversity Conservation and Natural Resource Management: An Issues paper for Policy-Makers, Researchers and Practitioners" (2004) *IUCN*.

[6] COMEST "The Precautionary Principle: *UNESCO*.

[7] E Fisher & R Harding "The Precautionary Principle and Administrative Constitutionalism: The Development of Frameworks for Applying the Precautionary Principle", in E Fisher et al (eds), *Implementing the Precautionary Principle: Perspectives and Prospects* (2006) 113.

[8] Fisher & Harding

R Schomberg "The Precautionary Principle and Its Normative Challenges" in E Fisher et al (eds), *Implementing the Precautionary Principle: Perspectives and Prospects* (2006) 19.

applying it to activities such as DSM mining are not always obvious until outcomes are worked out within an appropriate decision-making framework. The existence of a socially, politically and legally legitimate framework, therefore, is an important consideration for policy makers, civil society, industry, regional agencies and other stakeholders as they implement the principle. However, the details of legitimated decision-making frameworks can vary between legal systems[9] and are dependent on norms that constitute who can be a decision maker, what constitutes a legitimate decision, how the process is to be regulated and how decision makers are to be held accountable.

As will be shown in the second section of this paper, an important consideration in situating the PP in a statutory regime is the relationship between procedural and substantive aspects of legal obligations. *Procedural obligations* usually ensure that the decision makers will take certain specified steps along the way in reaching a decision on a particular topic. This helps to make sure that stakeholders are consulted and given adequate time and opportunity to voice their opinions, that appropriate assessments (including EIAs) are carried out, and that the decision is non-discriminatory. Alternatively, when *substantive obligations* are emphasized the decision makers are more concerned with finding adequate means of addressing specific (substantive) issues under consideration. In this case, the procedure for making decisions is de-emphasized in favor of achieving the most desirable outcome in each case. Thus, the powers of decision makers are less constrained but are better able to accommodate uncertainty and ambiguity.

Furthermore, it is important to consider the unique physical environments in which DSM mining will operate. The situation changes, for example, depending on which minerals are being targeted. The processes involved in mining Seafloor Massive Sulfides (SMS), Cobalt Rich Crusts (CRC), or manganese nodules will affect different habitats and species at different depths. CRC, for example, are found on seamounts that are often characterized by dense biodiversity and subject to high levels of uncertainty regarding their role in global ecosystems.[10] In general, the depth at which DSM mining will take place, and the relatively nascent character of scientific knowledge of these environments, results in relatively high levels of scientific uncertainty regarding ecosystem impacts. Applying the PP to DSM mining, therefore, requires as much specific information as possible about the mining process, its spatial relations to other important resources, the extent of initial and secondary impacts, and the extent of uncertainty and knowledge gaps.

The capacity to implement precautionary measures, including a legitimate decision-making process, rigorous and independent EIA review, monitoring, regulation and enforcement also deserves careful consideration with regard to the PP. A balance must be achieved between adequate capacity and measures that are not appropriate due to cost or other factors. It may be important, therefore, to determine what constitutes minimum acceptable capacity at the regional and national scales. Solutions might include a combination of regional and national institutions, and recommendations have already

[9] Fisher & Harding

[10] International Seabed Authority Brochure "Cobalt Rich Crusts" (2008) http://www.isa.org.jm/files/documents/EN/Brochures/ENG9.pdf

been made to address this issue through a regional body that can support countries with these tasks.[11] Because countries are obligated under UNCLOS to protect the marine environment[12] and because obligations within the Area are the same for all countries regardless of capacity[13], these issues should be addressed before mining proceeds.

Finally, it is important to realize that decisions made by applying the PP cannot appeal to adequate scientific or technical information for justification. This results from the need to make decisions despite significant uncertainty. Another basis must be found to justify possibly controversial resolutions. Because legitimate public decision-making aligns with social norms and values, operationalization of the PP should reflect the social and cultural milieu within the normative limits of the principle itself. As a consequence, what is regarded as a legitimate decision-making process cannot be prescribed in a general way. Instead, a sense of what the public accepts as a proper deliberative process should be established.

History of Precaution

The historical legal and conceptual development of the PP is another important contextual factor. Although the sentiment of the PP can be traced at least to Galen's famous dictum, "first, do no harm," its use in environmental law is most commonly attributed to air pollution legislation adopted by Germany in the early 1970s.[14] This formulation of the PP (or *Vorsorgeprinzip*) can also be translated as 'foresight principle'[15] and was designed to counter the dangers of short-term decision-making that are "endemic in all democratic, consumption oriented societies."[16] From these national beginnings the PP has been adopted, in various forms, in numerous international instruments, including both non-binding agreements and binding treaties. The global emergence of the PP in the 1980s and 1990s amounted to a political and legal reconsideration of the dominant development paradigm in which environmental challenges to development projects were systematically disadvantaged.[17] The table below summarizes several relevant international instruments and consensus statements that have adopted, or attempted to clarify, the PP.

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[11] Working Group 3 Report. International Workshop on Environmental Management Needs for Exploration and Exploitation of Deep Seabed Minerals (29 November - 2 December 2011) Nadi, Fiji. http://www.isa.org.jm/files/documents/EN/Workshops/2011/WG3-Capacity.pdf

[12] United Nations Convention on the Law of the Sea (UNCLOS)

[13] ITOS (2011) Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area. Seabed Disputes Chamber of the International Tribunal for the Law of the Sea of the Sea Advisory Opinion. Case No. 17. http://www.itlos.org/fileadmin/itlos/documents/cases/case__17/adv_op_010211.pdf

[14] S Gardiner "A Core Precautionary Principle" (2006) 14 *Journal of Political Philosophy* 33.

[15] S LaFranchi (2005) "Surveying the Precautionary Principle's Ongoing Global Development: The Evolution of an Emergent Environmental management Tool." (2005) 32 *Boston College Environmental Affairs Legal Review* 679.

[16] LaFranchi

[17] Cooney (n 5)

Source	Definition	Key Features
UNGA Resolution the World Charter for Nature (1982)	Contains two concepts that have become important to modern precaution: (1) actions that pose a threat of irreversible damage to nature should be avoided; (2) proponents of activities that pose significant risk to nature must demonstrate that expected benefits outweigh potential harm to nature and where the potential threats are not fully understood the activity should not proceed.	Requires decision makers to avoid actions that lead to irreversible damage and shifts the burden of proof to those proposing the activity.
London Declaration: Second International Conference on the Protection of the North Sea (1987)	"Accepting 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."	Contains qualifying language: 'which may require action.' Allows for precautionary decisions in the absence of causal links.
Houston Economic Summit Declaration, G-7 Meeting (1990)	"In the face of threats of irreversible environmental damage, lack of full scientific certainty is no excuse to postpone actions which are justified in their own right."	Ambiguous reference to 'actions which are justified in their own right.'
Bergen Ministerial Declaration on Sustainable Development (1990)	"In order to achieve sustainable development, policies must be based on the precautionary principle. Environmental measures must anticipate, prevent and attack the causes of environmental degradation. 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."	Calls for the PP to become the basis of development policy. Seeks to 'attack' the causes of environmental problems.
Rio Declaration on Environment and Development (1992)	"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."	Use of negative language renders consideration of precautionary actions alone enough to fulfill requirements of the PP.
UN Framework Convention on Climate Change (1992)	"The Parties should take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of full scientific certainty should not be used as a reason for postponing such measures, taking into account that policies and measures to deal with climate change should be cost-effective so as to ensure global benefits at the lowest possible cost. To achieve this, such policies and measures should take into account different socio-economic contexts, be comprehensive, cover all relevant sources, sinks and reservoirs of greenhouse gases and adaptation, and comprise all economic sectors. Efforts to address climate change may be carried out cooperatively by interested Parties."	Use of negative language and the explicit inclusion of non-environmental considerations.

Convention on Biological Diversity (1992)	"...Noting also that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat…"	Use of negative language. Does not explicitly use the term 'precautionary.'
Convention for the Protection of the Marine Environment of the North-East Atlantic (1992)	"the precautionary principle, by virtue of which preventive measures are to be taken when there are reasonable grounds for concern that substances or energy introduced, directly or indirectly, into the marine environment may bring about hazards to human health, harm living resources and marine ecosystems, damage amenities or interfere with other legitimate uses of the sea, even when there is no conclusive evidence of a causal relationship between the inputs and the effects..."	Obligates decision-makers to take precautionary action, under the conditions expressed, despite inconclusive evidence for causality.
CITIES 9th COP (1994)	"RECOGNIZING that by virtue of the precautionary principle, in cases of uncertainty, the Parties shall act in the best interest of the conservation of the species when considering proposals for amendment of Appendices I and II. […] RESOLVES that when considering any proposal to amend Appendix I or II the Parties shall apply the precautionary principle so that scientific uncertainty should not be used as a reason for failing to act in the best interest of conservation of the species."	Makes the best interests of species the primary concern of the PP.
Wingspread Statement on the Precautionary Principle (1998)	"Therefore, it is necessary to implement the Precautionary Principle: When an activity raises threats of harm to human health or the environment, precautionary measures should be taken even if some cause and effect relationships are not fully established scientifically. In this context the proponent of an activity, rather than the public, should bear the burden of proof. The process of applying the Precautionary Principle must be open, informed and democratic and must include potentially affected parties. It must also involve an examination of the full range of alternatives, including no action."	Shifts the burden of proof to the proponent of the activity and explicitly requires 'informed and democratic' process.
EU Communication (2000)	"The precautionary principle applies where scientific evidence is insufficient, inconclusive or uncertain and preliminary scientific evaluation indicates that there are reasonable grounds for concern that the potentially dangerous effects on the environment, human, animal or plant health may be inconsistent with the high level of protection chosen by the EU."	Suggest a meaning for the PP in its application. Explicitly links the application of the PP to the 'level of protection' chosen.
UNESCO (2005)	"When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, action shall be taken to avoid or diminish that harm."	Makes the moral status and plausibility of harm the basis for precautionary actions.

SPREP Working Definition for DSM mining (2012)	"Because DSM mining poses the possibility of irreversible harm and entails scientific uncertainty, measures must be taken to protect the marine environment and the people who value it. These measures should reflect the levels of uncertainty and possibility for harm, as determined by a participatory process, and can range from a moratorium on mining, in one extreme case, to only monitoring of mining projects, in another, but may involve more moderate measures such as the creation of MPAs, an incremental test bed approach, and measures to ensure improved social welfare."	Specific to DSM mining yet flexible enough to be applied in various national contexts

Table 1[18]

The language used in some of these variations is much more common in the literature and in policy and legal instruments than others. The Bergen Declaration was a primary influence on the Rio Declaration definition[19], for example. Very similar language, especially the use of a triple negative (e.g. 'lack of,' 'shall not,' 'to prevent'), has been repeated in others, including the UNFCCC and the CBD. Indeed, a recent meta-analysis of various expressions of the PP has shown that dominant uses of the principle have become weaker over time and largely resemble the Rio Declaration definition.[20]

Common elements

Many analyses of the PP approach these definitions in terms of their common features in an attempt to understand what is essential about the principle. This tends to favor the most cited variations of the PP at the expense of alternatives that may be more appropriate in any particular case, including novel expressions of the principle that could be better suited to emerging geopolitical and environmental situations. However, there are important shared insights among policy makers and scholars into what the PP should consider. For example, one of the most general synthesis statements summarizes the PP as three indispensible components.[21] The first two are conditions that are necessary to trigger the PP. These are: (1) potential for harm and (2) uncertainty about causality or magnitude of impacts. If both these conditions are met, then the third component, precautionary action, becomes necessary. The idea is that precautionary measures, of whatever kind, are dependent on the demonstration of potential harm and uncertainty. Potential harm is necessary since it would be unreasonable to take extra precaution for actions that have only benign or beneficial outcomes. Uncertainty means that our knowledge of potential harm is poor and cannot be expressed through rigorous statistical tools. Uncertainty of potential harm makes precautionary measures necessary because decisions made under

[18] Expanded from COMEST (n 6)

[19] LaFranchi (n 16)

[20] C Pereira Di Salvo & L Raymond (2010). "Defining the Precautionary Principle: An Empirical Analysis of Elite Discourse" (2010) 19 *Environmental Politics* 86.

[21] Gardiner (n 14)

these conditions cannot be based on adequate knowledge. Therefore, the three basic components of the PP are (1) threat of harm, (2) uncertainty and (3) the precautionary response.

Other summary statements add more detail for more specific contexts. For example, a Commission of the European Communities Communication on the Precautionary Principle (2000) outlines four measures for how the PP is to be applied, primarily with reference to international trade law.[22] Accordingly, precautionary actions should be: (1) proportional to the perceived threats; (2) non-discriminatory, meaning that the same level of protection should be achieved consistently and without (geographical) bias; (3) consistent with similar measures taken in similar situations; and (4) capable of assigning responsibility for producing the scientific evidence needed for better risk assessment. The EU Communication also argues that the PP should only be applied when standard risk evaluation is not adequate.

Tickner et al. suggest five common elements of the PP[23]: (1) that precautionary action occurs in the absence of scientific certainty about cause and effect; (2) that precaution encourages planning based on long-term goals, such as phasing out a particular class of chemicals, rather than on risk calculations or forecasting techniques; (3) that precaution includes seeking out and evaluating alternatives to the proposed action; (4) that precaution shifts the burden of proof to the proponents of the activity who must demonstrate safety to human health and ecosystems, take financial responsibility for precautionary behavior and have the duty to monitor activities, promote research, and distribute findings; and (5) that precaution includes the development of more democratic and inclusive decision-making processes. VanderZwaag emphasizes many of the common elements given above but adds important considerations for marine environmental protection[24]. These include: provision of ecological space and margins for error (e.g. Marine Protected Areas and buffer zones), recognition of the well-being and interests of nonhuman entities, a shift in the burden of proof onto those who propose change, concern for intergenerational impact on future generations, and recognition of the need to address ecological debts.

A 2005 UNESCO paper has carefully summarized several of the most dominant themes in the literature[25]. Accordingly, it argues that: (1) the PP applies under conditions of significant uncertainty about causality, magnitude, probability, or nature of harm; (2) scientific analysis, in some form, is mandatory; (3) because the PP deals with outcomes of poorly know probability, the possibility of harm may be expressed qualitatively; (4) the PP only applies to hazards that are in some respect unacceptable; (5) interventions are required before harm occurs; (6) interventions should be proportional to the desired level of protection and the magnitude of possible harm; (7) interventions can include actions that either 'constrain the possibility of harm' or 'contain harm;' (8) ongoing

[22] Fisher & Harding (n 7); Schomberg (n 8)

[23] J Tickner J et al "The Precautionary Principle in Action: A Handbook" (1999).

[24] D VanderZwaag (2002) "The Precautionary Principle and Marine Environmental Protection: Slippery Shores, Rough Seas, and Rising Normative Tides" (2002) 33 *Ocean Development and International Law* 165.

[25] COMEST (n 6)

monitoring and research is needed that can eventually move beyond the PP to more rigorous forms of risk management.

The following table is a simplified synthesis of common elements expressed above. The first two are the trigger conditions of plausible and unacceptable harm and uncertainty. Together, these amount to a shift in the burden of proof from those advocating environmental protection. This does not necessarily imply that the proposed activities cannot proceed, but that precautionary decision-making procedures must be followed. The third element is the precautionary response. While there is no universal agreement on what a precautionary response should include, the five mentioned in the table are

Trigger Criteria: 1. Plausible and Unacceptable Harm 2. Uncertainty	[Shifts burden of proof from those advocating environmental protection.]
3. Precautionary responses:	a) are proportional b) consider alternatives, including a 'no development' option c) constrain or contain harm d) include ongoing monitoring and scientific research e) are consistent with social norms for decision-making

Table 2

suggested as being among the most necessary. Furthermore, the constitutive elements of precautionary response given here are reductive and should be elaborated and expanded as the specifics of a particular situation became clearer.

Additionally, some scholars highlight common conditions that are necessary for the successful operationalization of the PP. For example, Schomberg highlights the deliberative nature of the principle, which results from the need to make decisions beyond the reaches of scientific certainty.[26] This represents a shift from justifying environmental and social decisions with appeals to scientific and technical information to justifying decisions through various forms of public participation that are consistent with broader socio-political and legal milieus.[27] Therefore, conditions must exist for deliberative decision-making that is largely regarded as legitimate by those affected by proposed actions and precautionary responses.

Also implicit in the PP is the notion of a desired level of protection.[28] While this concept is external to the PP, and is useful for implementing forms of risk management other than precaution, it is a logical condition for determining value-laden concepts within the PP, such as 'significant harm.' The EU, for example, requires a 'high level of protection.'[29] Although this is somewhat ambiguous, it does have

[26] Schomberg (n 8)

[27] Fisher and Harding (n 7)

[28] Schomberg supra n. 8

[29] Communication from the Commission on the Precautionary Principle. (2000) Commission of the European Communities.

specific applications, for example that the protection of public health is of more importance than economic considerations.[30] It may prove important to set a broad level of protection at the Pacific regional scale that can guide the establishment of more specific levels of protection at the (sub)national level(s). This simple act would reach beyond the PP and DSM mining by guiding and harmonizing decision-making with regard to environmental and social concerns at a general level.

Weak/Inclusive versus Strong/Narrow Variations of the PP

The various expressions of the PP given above are often categorized into strong and weak versions.[31] These designations refer to the stronger or weaker impact of environmental concerns on decision-making. Strong versions of the PP, such as the Wingspread Statement, obligate decision-makers to take precautionary action. Alternatively, weak versions, such as the Rio Declaration, only obligate decision-makers to consider precautionary interventions. In this case the precautionary response required is careful deliberation over further precautionary action. This suggests that strong versions are preferable to weak counterparts. However, both are characterized by significant benefits and liabilities.

Soule's analysis, for instance, shows that in *strong versions of the PP environmental risk mandates that regulators respond through precautionary action*.[32] However, these are also characterized by predominant concern with environmental risk at the expense of other concerns such as the equity of precautionary impacts and development considerations. These versions are also unable to choose between the lesser of two risks, including two different environmental concerns. Despite these limitations, strong versions are often preferred in light of the large number of cases of environmental degradation that have occurred under weak precautionary regimes.[33]

Alternatively, *weak versions of the principle do not determine the actions of regulators*. This is largely a by-product of opening up the field of consideration to multiple factors and risks, of which environmental harm is one. Because precautionary actions with regard to environmental risk have had negative impacts on the livelihoods of some vulnerable populations[34], the inclusive character of weak versions of the principle is an important advantage. These considerations suggest that classifying variations as either 'weak' or 'strong' can be misleading. Instead, it may be more appropriate to refer to Weak/Inclusive and Strong/Narrow definitions that tend to dominate the spectrum of the precautionary principle.

[30] Ibid

[31] see COMEST (n 6); P Sandin (1999). "Dimensions of the Precautionary Principle" (1999) 5 *Human and Ecological Risk* 889.

[32] E Soule "Assessing the Precautionary Principle" (2000) 14 *Public Affairs Quarterly* 309.

[33] ibid

[34] Cooney (n 5)

	Narrow / Strong		Inclusive / Weak	
Required Precautionary Response		Precautionary action		Precautionary consideration
Scope	One environmental risk considered		Several risks considered	
Capacity for Uncertainty & Complexity	Lower		Higher	
Capacity to Respond to Potential Environmental Harm		Higher		Lower

Table 3

There have been attempts to construct versions of the PP that incorporate the strengths, and minimize the liabilities, of the Weak/Inclusive and Strong/Narrow versions that are most prevalent in policy and legal literature. Some of these are as yet highly theoretical, such as Gardiner's attempt to construct a 'Core Precautionary Principle' that draws upon the Rawlsian notion of 'maximin' risk.[35] Maximin risk, in this case, attempts to 'maximize the minimum,' which means that it considers the worst possible outcome of each course of action as set forth in several scenarios. It then selects the action with the 'least bad worst outcome.' It is thus an attempt to determine the lowest upper limit for negative impacts. While these speculations are intriguing, and point to innovative possibilities inherent in the PP, they are far from operationalization. Other attempts, however, are more practical and derive from legal, policy and technical considerations. One such working definition is the result of a study by UNESCO's World Commission on the Ethics of Scientific Knowledge and Technology.[36] The text of the definition, given below, makes significant advances toward a Strong/Inclusive version of the PP:

> When human activities may lead to morally unacceptable harm that is scientifically plausible but uncertain, action shall be taken to avoid or diminish that harm.
> Morally unacceptable harm refers to harm to humans or the environment that is:
> - Threatening to human life or health, or
> - Serious and effectively irreversible, or
> - Inequitable to present or future generations, or
> - Imposed without adequate consideration of the human rights of those affected.
>
> The judgment of *plausibility* should be grounded in scientific analysis. Analysis should be ongoing so that chosen actions are subject to review.
> *Uncertainty* may apply to, but need not be limited to, causality or the bounds of the possible harm.
> *Actions* are interventions that are undertaken before harm occurs that seek to avoid or diminish the harm. Actions should be chosen that are proportional to the seriousness of the potential harm, with consideration of their positive and negative consequences, and with an assessment

[35] Gardiner (n 14)

[36] COMEST (n 6)

of the moral implications of both action and inaction. The choice of action should be the result of a participatory process

This definition is strong in that it requires precautionary action if the conditions of moral unacceptability and plausibility of harm are met. It is also explicitly inclusive by broadly defining the morally unacceptable to include 'serious and effectively irreversible' harm along with other considerations, such as human rights. It, furthermore, asks that precautionary actions themselves be evaluated for both positive and negative impacts. It is worth noting that although the definition requires scientific analysis, the UNESCO paper also observes that what is thought to be 'scientific' is culturally variable and can include social sciences, humanities, local or traditional knowledge and other epistemic forms depending on where the principle is being applied. It also asserts that 'uncertainty' is not confined to causality or the scale of possible harm. This implies that any uncertainty that is socially or culturally salient, with regard to the proposed activity, is to be taken into consideration. Finally, the UNESCO definition places participatory process squarely at the heart of the PP. This is not an ideological position but, instead, an important practical move toward solving significant theoretical challenges that have always haunted the principle. Namely, it provides a means of legitimately establishing normative standards for the value-laden language that the PP cannot escape using. This definition recognizes that it is impossible to give phrases like 'significant harm,' or 'morally unacceptable' relevant meaning in the abstract. Because these critical moments in various articulations of the PP express social values, we cannot be sure of their meaning until the social is engaged in establishing them. Because of these characteristics, this discussion paper will draw upon the UNESCO definition in elaborating an example decision-making framework.

Other variations of the PP, such as the Rio Declaration, could also be used and would result in slightly different general guidelines. Adopting language similar to Principle 15 of the Rio Declaration would, for example, add caveats that need to be negotiated when operationalizing this version of the principle. In particular, the specific meanings of the phrases 'according to their capabilities' and 'cost effective' would need to be established. However, clues to their general significance are given within Principle 15 and the overall context of the PP's development. Importantly, these phrases both refer to actions taken 'by States.' Thus, it is the capabilities of States and cost effectiveness in relation to them that is at stake, not primarily the perceived cost-effectiveness for, or capability of, a private entity.

Furthermore, given the preceding discussion, it should be clear that the PP is concerned with initializing a deliberative decision-making process. Specifically, it lowers the threshold of scientific evidence needed to trigger public deliberation about the harmful environmental and health impacts of proposed development projects.[37] It is this process that is enabled by the PP and that must be conducted cost-effectively and in accordance with the capabilities of States.

The particular language of Principle 15 sets the general conditions and tone for this decision-making process. Specifically, "…the precautionary approach shall be widely applied by States according to their capabilities…" This statement is obviously not referring to particular outcomes or precautionary

[37] S Maguire & J Ellis "Redistributing the Burden of Scientific Uncertainty: Implications of the Precautionary Principle for State and Nonstate Actors" (2005) 11 *Global Governance* 505.

measures but an administrative course of action. This becomes even clearer when the grammatical structure of Principle 15 is considered. For instance, the use of a triple negative ('lack of,' 'shall not,' 'to prevent') effectively restricts this variation of the PP to deliberation about positive precautionary responses.[38] This is the primary reason Principle 15 is classified as a 'weak' variation that leaves the possibility of precautionary action open. Therefore, the tendency among some to infer that Principle 15 gives guidance regarding precautionary responses is inappropriate.

For instance, those who use this, or similar, language to argue that certain precautionary measures— those that are not cost effective or beyond the capability of States— should not proceed are substituting the concept of precautionary measures for that of precautionary process. In short, results of the decision-making process replace the process itself in this line of thinking. Principle 15 should be read as applying the criteria cost-effectiveness and capability of the State to an appropriate deliberative process. This process must be established and applied to development proposals that raise the issues of uncertainty and plausible harm but does not imply that the standards of the PP should vary from State to State or give guidance about which precautionary measures are appropriate. On the contrary, the foundational trigger criteria of uncertainty and plausible/unacceptable harm remain the same for this and other variations of the principle, as does the need for some form of precautionary response if these criteria are satisfied.

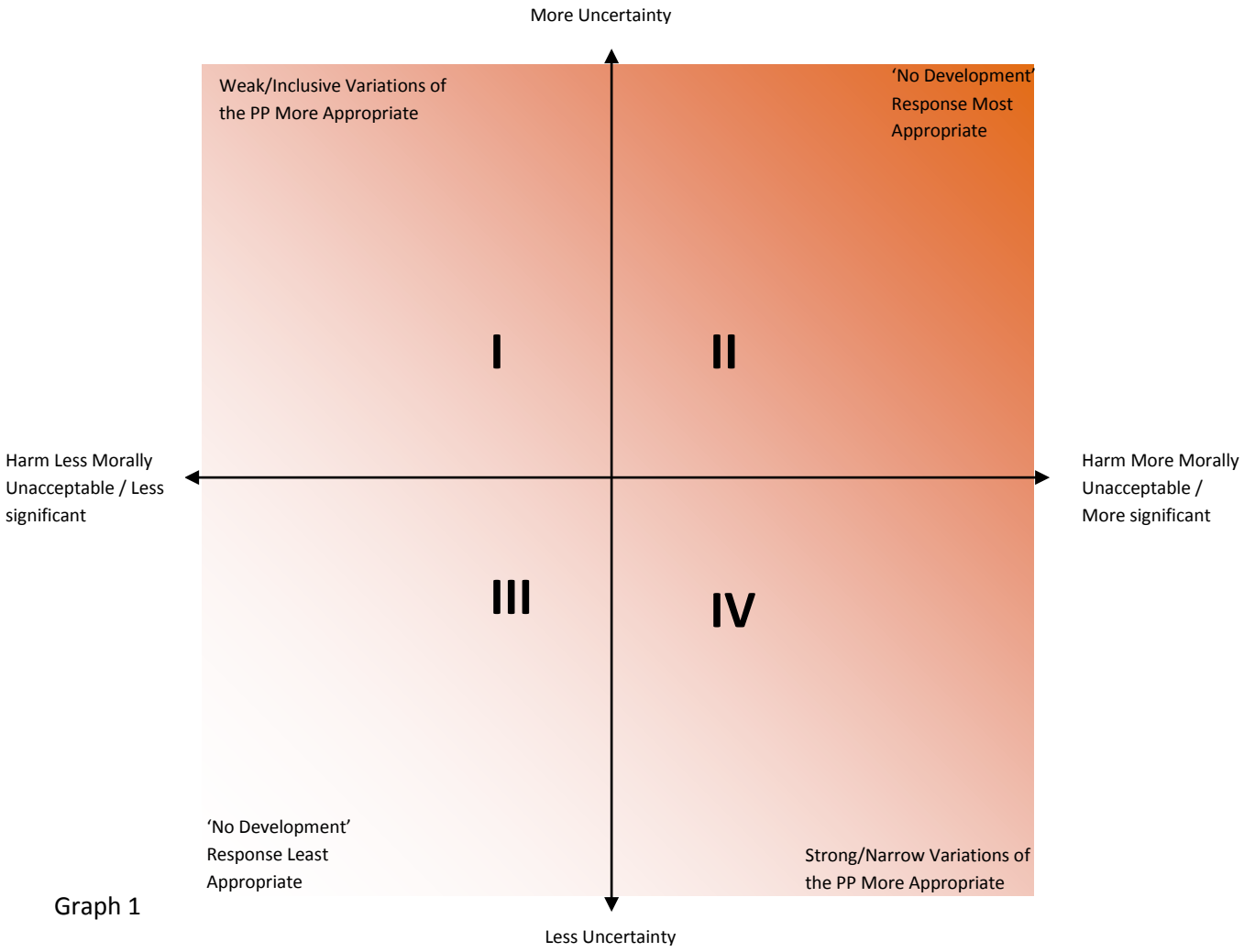
Synthesis: Trigger Criteria, Intensity of Precautionary Response, Variations of the PP, and Decision-making in Context

The discussion above has highlighted several important points. First, the PP is inherently ambiguous and gains definition and meaning as the context in which it is applied becomes more specific. Second, the PP exists in many variations or expressions that range from Weak/Inclusive to Strong/Narrow. Third, at a very general level these variations of the PP comprise trigger criteria (potential for harm and uncertainty) that if met require some form of precautionary response that can be more or less intense. The purpose of this section is to show how these important elements relate.

To begin, the following graph illustrates the relationship between the trigger criteria (degree of moral unacceptability, or significant harm, and uncertainty), the related intensity of precautionary response, and possible expressions of the principle.[39]

[38] COMEST (n 6)

[39] The negative forms of the key terms (*un*certain, *un*acceptable) are not used in a pejorative sense but rather to keep the domain of the graph within the scope of the PP. That is, something that is 'certain' or 'acceptable' does not need a precautionary response at all.



Graph 1

It can be seen that the relevant guideline for determining the intensity of precautionary response is that when a proposed development is judged to be more uncertain and more morally unacceptable it will require more stringent precautionary measures. For example, it is within the upper bounds of quadrant II that a 'no development' response is most appropriate, meaning that the plausible harm is deemed too threatening to environmental or social wellbeing for the proposed action to be allowed. Alternatively, it is at the limit of quadrant III the 'no development' response is least appropriate. That is, as the plausible harm is thought to be less morally unacceptable and less uncertain the precautionary responses will become less stringent.

The most appropriate uses of different definitions of the principle can also be illustrated in these terms. For example, as uncertainty decreases and the moral unacceptability of harm increases, the use of Strong/Narrow variations of the PP becomes more appropriate (quadrant IV). This is because

Strong/Narrow variations are good at requiring precautionary action when faced with an environmental threat but can lead to unforeseen risks in highly uncertain situations.

Alternatively, Weak/Inclusive variations are increasingly appropriate as uncertainty increases and the moral unacceptability of harm decreases (quadrant II). Because these versions of the PP consider multiple factors, including non-environmental impacts, they are better at guiding decisions under uncertainty. However, because they do no required precautionary action, Weak/Inclusive variations can lead to harmful consequences if the plausible harm is more significant. Finally, versions of the PP that move toward a Strong/Inclusive variation, such as the UNESCO working definition, are more generally applicable. These are especially appropriate if some stakeholders strongly disagree about the relative uncertainty and unacceptability of the threat.

Deciding where DSM mining should be located on this graph, and which variations of the principle are most appropriate, will require a participatory decision-making process that includes all relevant stakeholders. However, some general statements can be made given the current status of DSM in the region. First, because DSM mining has not yet begun, the impacts of the actual mining process are more uncertain relative to some time after mining commences and will continue to decrease with time. Thus, uncertainty regarding the impacts of the mining process is currently near a maximum of uncertainty. Similarly, uncertainty regarding impacts on deep sea ecosystems is relatively high due to gaps in research. Further research is likely needed to determine the degree of certainty regarding our knowledge of the social, cultural and political impacts of DSM mining on any particular country. Other forms of uncertainty may also be relevant and should be considered during the decision-making process.

Given these considerations, a working definition of the PP for DSM mining is as follows:

"Because DSM mining poses the possibility of irreversible harm and entails scientific uncertainty, measures must be taken to protect the marine environment and the people who value it. These measures should reflect the levels of uncertainty and possibility for harm, as determined by a participatory process, and can range from a moratorium on mining, in one extreme case, to only monitoring of mining projects, in another, but may involve more moderate measures such as the creation of MPAs, an incremental test bed approach, and measures to ensure improved social welfare."

"Lack of full scientific data": To what does it refer?

This is also an appropriate point at which to address the status of a rather unique interpretation of what the PP means with regard to DSM mining. In the development of the Regional Legal Regulatory Framework (RLRF) certain stakeholders have advanced views about the principle in the following terms:

(1) "Where there is lack of scientific evidence showing negative environmental impact, mining should not be obstructed."

(2) “In any development where there are threats of serious harm to the marine environment, the lack of full scientific data shall not be used as a reason for postponing **that development**. However, that particular development shall use cost-effective measures to prevent environmental degradation.”

While both of these use language similar to accepted variations of the PP, neither are precautionary in the sense established in this paper or in the numerous consensus statements and international agreements it is based upon. It will be most illustrative to begin with (2) by comparing it with the Rio Declaration, Principle 15, from which it derives much of its language:

(3) "… 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**."

It can clearly be seen that (2) replaces the phrase “cost-effective measures to prevent environmental degradation,” found in the Rio Declaration, with the term “that development.” That is, in the Rio Declaration, lack of full scientific certainty cannot be used to postpone appropriate measures to prevent environmental degradation; in (2) lack of full scientific certainty cannot be used to postpone the actions that may cause environmental degradation. In this regard (2) completely reverses Principle 15 of the Rio Declaration and is in direct contrast to anything that can be reasonably considered precautionary.

The last sentence of (2) indicates that if the measures are cost-effective they must be used to prevent environmental degradation. Taken by itself, this does contain elements of precaution. However, in terms of the graph given above it would only be appropriate in the lower left quadrant; that is, where precautionary responses are least needed. In short, (2) contains similar language to the Rio Declaration but is neither a version of the PP nor would it lead to a precautionary approach except, perhaps, in the most trivial situations. Moreover, the thought expressed in (1) is structurally similar to (2), even though the language is more straightforward. It is not a version of the PP for the same reasons.

Furthermore, historical development of the PP strongly indicates that (1) and (2) are not expressions of the PP. Simply put, the PP came into existence as a way of countering the presumption in favor of development[40] as is demonstrated by its early inception in German law and later articulations in international agreements. Before the advent of the PP, a pro-development regime was dominant and squarely placed the burden of proof on those advocating for public health or environmental protection. It is this pro-development paradigm that is expressed in (1) and (2). In other words, these statements are expressions of a pre-precautionary status quo. It is this very perspective that the PP was adopted to correct.

Other Considerations 1: The Precautionary Principle versus the Precautionary Approach

There is debate within the literature over whether the terms ‘Precautionary Principle’ or ‘Precautionary Approach’ should be used. On one hand, some influential international instruments deploy nearly identical language but use different terms. For example, the Bergen Ministerial Declaration on Sustainable Development uses the term ‘precautionary principle’ for the following:

[40] Cooney (n 5)

> "…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."

The Rio Declaration enshrines the term 'precautionary approach' as a principle (Principle 15) as follows:

> "…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."

The Convention on Biological Diversity does not use either term for the following:

> "...Noting also that where there is a threat of significant reduction or loss of biological diversity, lack of full scientific certainty should not be used as a reason for postponing measures to avoid or minimize such a threat…"

There is a great deal of lexical slippage between the two terms for nearly identical expressions of precautionary thinking in international conventions. This situation has led some authors to combine them as Precautionary Principle/Approach.[41] Alternatively, some interests insist on a strong separation between the two. Concerns over this distinction can be summarized as two debates, one over content and the other over legal status.[42]

The term Precautionary Principle is often believed to require preventative action with regard to environmental concerns and as requiring a shift in the burden of proof to those who propose new activities. Alternatively, the term precautionary approach is seen as allowing for more flexible administration of concerns that are context sensitive.[43] For these reasons the fishing industry[44] and the U.S. and Canada in trade disputes with the EU[45] have favored 'approach' over 'principle.' However, this debate is not over the relevance of precaution but rather over what variation of precaution should be applied. In the context of the discussion above, this distinction can be viewed as between strong/narrow and weak/inclusive variations, how administrative frameworks should be constituted, and how they should respond to uncertain and plausibly harmful environmental situations.

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[41] see VanderZwaag et al "Canada and the Precautionary Principle/Approach in Ocean and Coastal Management: Wading and Wandering in Tricky Currents" (2002) 34 *Ottawa Law Review* 117.

[42] Cooney (n 5)

[43] P Mace, & W Gabriel "Evolution, Scope, and Current Applications of the Precautionary Approach in Fisheries" (1999) Proceedings, 5th National Marine Fisheries Service National Stock Assesment Workshop, USA. National Oceanic and Atmospheric Administration Tech. Memo NMFS-F/SPO-40

[44] Mace & Gabriel

[45] VanderZwaag (n 24)

The second debate is over the legal status of precaution.[46] Those who argue that precaution is a principle of environmental law, and therefore think that it should be a broad basis for environmental decision-making, prefer the term 'Precautionary Principle.' Others, who insist that precaution should be one policy/management tool among others that can be applied to uncertain situations, prefer the term precautionary approach. Much of this discussion hinges on the ongoing debate about whether or not precaution is a principle of customary international law.

In light of these discussions, it is perhaps most important to be clear about what is meant by precautionary principle or approach when drafting the RLRF and national legislation. For instance, a reasonable conceptual distinction can be made between succinct expressions of precaution (principles) and the process of operationalizing precaution within national political, legal and policy contexts (approaches). The same version of the principle, in this view, can lead to different outcomes within different approaches, or different obligations. In this sense, the Precautionary Principle encapsulates social values with regard to certain issues while the precautionary approach indicates the social and political process of elaborating, and making decisions based on, these values.

Other Considerations 2: The Public Precautionary Principle in a World of Privatization

Because the application of the principle requires public deliberation among those who may be affected by the proposed development, public-private partnerships can pose challenges to operationalization of the PP. For example, private rights over mineral resources can render important information, both technical and political, hidden from public view. This may include proprietary knowledge about the resource, closed-door consultations between industry and government representatives, and the production of highly technical information that is not easily understood by non-expert advisors, unspecialized decision-makers and the lay public. Hidden information and inaccessible decision-making processes do not imply corruption but do make transparency impossible, by definition. Public consultations may be held under these circumstances. However, they will be circumscribed by super-national agreements or other motives that limit what information may be shared among stakeholders. Furthermore, arguments for the necessity of protecting the proprietary knowledge of private entities do not alter this situation, where hidden knowledge and decision-making processes can pose challenges to the robust application of the PP.

Private interests, therefore, can render operationalization of the PP difficult under certain circumstances. This is not a normative judgment about privatization, which can have significant social benefits, but a recognition of the often opposing tendencies within the private sector (the very name of which signals that hiddenness is necessary) and the public nature of the PP. The possible friction surrounding the application of the PP, between private and public interests, highlights the different objectives of the two sectors. The obligations attributed to states and those demanded of international business interests are often opposed, despite increasing awareness about Corporate Social Responsibility (CSR) and sustainability within the private sector. That is to say, States are assumed to be responsible to citizens while private sector organizations focus on profit maximization. Under normal

[46] Cooney (n 5)

circumstances, the potential public goods that can accrue to the citizens of a State from international business ventures are made possible by tenuous institutional arrangements that transform profit motive into social benefits, not the good will of the private sector. These are often reduced to a common denominator of taxes on industrial activities and jobs provided by them. However, other possibilities exist.

Therefore, strong and innovative institutions must be constituted that ensure the profit seeking motives of the private sector are translated into net public goods and that public deliberation is effective. In fact, the empirical evidence shows that where public institutions are weak, resource extraction tends to impoverish average citizens.[47] This phenomenon, commonly referred to as 'the natural resource curse,' is often associated with the enrichment of national elites who exercise control over resource rents at the expense of public interests.[48] Control of natural resources by a small cadre, either within a particular government ministry or in a more diffuse elite network, can shift the balance of power or exacerbate already poor political situations.

Comparative statistical analysis has shown that mineral wealth tends to hurt civil society and public participation.[49] Countries rich in natural resources also tend to lag behind resource poor countries in economic growth.[50] For example, resource rich countries like Nigeria, Zambia, Sierra Leone and Venezuela have been 'growth losers' even as resource poor countries such as Korea, Taiwan and Hong Kong have been 'growth winners.'[51] While this does not mean that resource rich countries are doomed, as the cases of Canada, Australia and Norway indicate, it does mean that the extraction of resources will not necessarily translate into economic growth or better public participation in the political process. The evidence suggests that resource rich countries only fare well when public institutions are strong and when they favor the public good over private interests.[52]

Furthermore, the possible concentration of political power is not simply a result of the control of rents but can also be a function of the physical properties of the resource itself and the process of extraction, shipping and refinement.[53] While most attention is focused on how revenue will be used, it is important to think about the social and political structure of the knowledge, expertise, and technology necessary for resource utilization. If, for example, these essential components are controlled primarily by one

[47] S Gaille "Mitigating the Resource Curse: A proposal for a microfinance and Educational Lending Royalty Law" (2011) 32 *Energy Law Journal* 81.

[48] M Ross "Does Oil Hinder Democracy?" (2001) 3 *World Politics* 325.

[49] Ross

[50] H Mehlum et al "Institutions and the Resource Curse" (2006) 116 *The Economic Journal* 1.

[51] Mehlum et al.

[52] Mehlum et al.

[53] T Mitchell "Carbon Democracy" (2009) 38 *Economy and Society* 399.

government ministry and a private entity, it would likely be difficult for the public to exercise practical influence over the resource. The highly centralized expertise, capital and technology characteristic of proposed DSM mining is troubling in this regard. It is not clear that this process can, in fact, be easily opened up to adequate public oversight and control due to the highly technical and remote nature of DSM extraction that does not lend itself easily to political engagement by the lay public and non-specialist decision-makers. Discussions about financial benefits and lack of capacity, while important, may obscure some real political implications of DSM by assuming that the extraction and processing of these resources are open to public institutions as currently envisioned and that these institution only need strengthening.

Discussion about the resource curse and privatization is important to considerations of the PP in the context of DSM mining because private interests can challenge public participation. However, these issues are also significant because the actual socioeconomic and political effects of resource extraction are often uncertain. That is to say, the uncertainty surrounding DSM mining is not only scientific or environmental but also economic, social and political. Because it is unclear that DSM mining will actually translate into national economic growth or other social goods even if environmental impacts are minimal, the PP should consider possible negative socio-economic and political impacts of resource extraction, such as weakened public institutions, political corruption and the concentration of power among elites.

Because the stated goal of the EU-SPC DSM project is to expand the economic resource base of the participating P-ACP States, it is important to recognize that the realization of this objective may not result in public wellbeing. While an expanded resource base is a worthy objective, it must be married to strong and adequate public institutions that ensure not only economic growth but also public health, environmental protection and the equitable distribution of benefits. The RLRF can be a strong step in this direction to the extent that it gives clear guidance to member countries regarding the constitution and maintenance of socially and culturally viable public institutions that ensure resource extraction becomes a public good and not a liability.

SECTION II: THE STATUS OF THE PRECAUTIONARY PRINCIPLE IN INTERNATIONAL LAW: PROBLEMS OF DEFINITION, SCOPE AND STATE PRACTICE

Introduction

As has been noted above[54] the precautionary principle or precautionary approach is widely invoked in both soft law and hard law instruments. The table in section one sets out a few of the main and oft-quoted formulations of the principle, however it is acknowledged that at least fourteen different formulations exist[55]. This has led some legal scholars to suggest that the variety of formulations is one of the defining properties of the precautionary principle[56] and others use the fact to uncover problems with the application of the principle in practice.[57] It is not intended to go back over ground covered in Section 1 in the present section, however for the purposes of this section the focus will be on a selection of these.

The most widely used definition of the PP can be ascribed to the 1992 Rio Declaration, in which Principle 15 states that "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'.[58] In a similar fashion, the UN Framework Convention on Climate Change obliges participating parties 'to take precautionary measures to anticipate, prevent or minimize the causes of climate change and mitigate its adverse effects. Where there are threats of serious or irreversible damage, lack of scientific certainty should not be used as a reason for postponing cost effective measures'.[59] The term 'approach' is substituted for the term 'principle' in the Convention on Biodiversity in which the relevant provision is that 'where there is a threat of significant reduction or loss of biological diversity lack of full scientific uncertainty should not be used as a reason to avoid or minimize such a threat'. Finally, the UN Program for Further

> …it is of little surprise that such commodious doubt surrounds the legal status of the PP in international law...

[54] C.f Table 1

[55] D Vanderzwaag; *The Precautionary Principle in Environmental Law and Policy: Elusive Rhetoric and First Embraces;* (1999) 8 Journal of Environmental Law and Practice 355 at p.375

[56] P Taylor; *An Ecological Approach to International Law;* London; Routledge 1998 at p.25

[57] See in particular: C Sunstein; *Laws of Fear;* Cambridge; Cambridge University Press (2005); I Goklany; *The Precautionary Principle: A Critical Appraisal of Environmental Risk Assessment;* Washington DC (2001)

[58] *UN Declaration on Environment and Development*; A/CONF.151/26. Volume 1

[59] *UN Framework Convention on Climate Change*; (May 9, 1992) Article 3 Paragraph 3

Implementation of Agenda 21 refers to the progress made 'in incorporating *principles* contained in the Rio Declaration…including…the precautionary principle'.[60]

These variations are stated to emphasise that the use of different terms and definitions is problematic in a legal context, especially when the cases are considered. In this vein, it is of little surprise that such commodious doubt surrounds the legal status of the PP in international law. In *EC Biotech*[61] the United States vehemently objected the notion that 'precaution' has become a rule of international law and that the PP cannot be considered a general principle or norm of international law because it does not have a single formulation on which there is consensus among States. Indeed, it argued that the opposite was true in that the concept of precaution was an 'approach' rather than a principle of international law.[62] In another statement at the WTO, the United States argued that even if the PP was considered binding on states as a matter of international law, it would nonetheless be restricted as a mode of interpreting individual treaty terms. Article 31(3) of the Vienna Convention was cited in favour of this argument.[63] This is consistent with other WTO cases in which the status of precaution as a principle of international law was raised.[64] This position has in many ways been used as an argument against the position of the European Communities (EC) that the precautionary principle has become a 'general customary rule of international law'[65]. Canada's position (it was also a party in the *Beef Hormones* case), was somewhere in the middle- it didn't accept that the PP was binding *at the moment* but that over time it may 'crystallise' in future to become a principle of customary international law within the meaning of Article 38(1)(c) of the Statute of the International Court of Justice.[66]

What these arguments demonstrate is that 'approach' is taken often to be a softer than 'principle' in international law. A similar reading is supported from the International Tribunal for the Law of the Sea (ITLOS) where it was stated (albeit in a dissenting opinion) that 'adopting an approach, rather than a principle, imports a certain degree of flexibility and tends, though not dispositively, to underscore

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[60] *UN Program for Further Implementation of Agenda 21;* Resolution S/19-2 para. 14

[61] *European Communities- Measures Affecting the Approval and Marketing of Biotech Products;* Doc WT/DS291-293/INTERIM (29th September) 2006

[62] Ibid at para. 4.541

[63] Article 31(3)(b) & (c) Vienna Convention on the Law of Treaties, which states that: 'There shall be taken into account, together with the context: (b) any subsequent practice in the application of a treaty which established the agreement of the parties regarding its interpretation; (c) any relevant rules of international law applicable in the relations between parties'.

[64] See for example *European Communities- Measures Concerning Meat and Meat Products* Doc WT/DS26/AB/RWT/DS48/AB/R

[65] Ibid at p.121

[66] Ibid at p.128

reticence about making premature pronouncements about desirable normative structures'.[67] Further, Judge Treaves, in the same case, associated the term 'principle' with legally binding, customary status[68]. These are statements of opinion of the individual judges concerned but nonetheless shed light on the legal difference in the use of terms. ITLOS has never fully clarified its position, and other judicial bodies have avoided dealing with the issue directly. For example, the World Trade Organisation (WTO) has similarly avoided direct interpretation of the status of the precautionary principle: in the *EC Hormones case* cited above, it indicated that it 'is unnecessary, and probably imprudent, for the Appellate Body in this appeal to take a position on this important, but abstract, question'.[69] Instead, it held that 'at least outside the field of international environmental law, the precautionary principle still awaits authoritative formulation'.[70]

The different formulations used in the various definitions of the PP also give rise to discussions on the status of the principle in international law. Definitions often raise questions of whether they create obligatory rules. This can be seen in the principles in the UNFCCC, of which the PP is one, create an obligation to the member states of the convention, because it is unclear what is meant by the language 'the Parties shall be guided, *inter alia'*[71]. Additionally, the text of the Convention uses 'should' instead of 'must': the Parties should take precautionary measures to anticipate…' (Article 3). The inclusion of 'must' expresses an obligation whereas 'should' indicates something more permissive. In Article 6 CBD a more abstract definition is used which has caused problems for interpreting the principle. In the Cartagena Protocol qualifications such as 'as possible and appropriate' and 'in accordance with its particular conditions and capabilities'. This terminology, and other similar wording, limit the extent to which these norms are legally binding. In other words, a great deal depends on the corresponding domestic laws for their effectiveness. For some, this has led to the conclusion that the PP is a long way from having specific legally binding force.

Whilst this is true to an extent, it offers only one dimension of the picture. In other contexts, most notably the European Union (EU), there is not a clear difference between 'principle', 'approach' and 'measures' and in the absence of something to suggest that there is a meaningful distinction, in some cases the terms are used interchangeably, even synonymously. For example, the European Commission (EC) in its Communication on the Precautionary Principle does not differentiate among these terms and

[67] Separate Opinion of Judge Laing *New Zealand v Japan; Australia v Japan (Southern Bluefin Tuna Case)*

[68] Ibid, Seperate Opinion of Judge Treaves at p.298

[69] *European Communities- Measures Concerning Meat and Meat Products Doc WT/DS26/AB/RWT/DS48*

[70] Ibid at para. 128

[71] L Paradell-Trius; *Principles of International Environmental Law: An Overview*; Review of Community and International Law 2000, 9(2): 93-95

recognizes the PP as a fully fledged and general principle of international law[72]. Bear in mind also that the EC in *Beef Hormones* had argued that it was a customary rule of international law.

There is sometimes confusion in what it means when a rule is said to be a rule 'under customary international law'. The significance of this in practice is that it creates binding obligations for all states, except those that have persistently objected to the practice and its legal consequences. The argument then runs that where the PP is recognized as a rule of customary international law, the application of it would be broader in scope on the international level.

The PP as a Rule of Customary International Law

The Statute of the International Court of Justice defines customary international law as 'evidence of general practice accepted as law'.[73] The *Nicaragua* case[74] and the *North Sea Continental Shelf* case [75]complement and clarify this provision (see text box opposite).

The best indicators of state practice remain instruments of international law and state domestic law, and the fact that there are various formulations of the PP in various international and domestic laws creates difficulty in defining it to a useful degree. From a legal standpoint, this creates a lot of the contention surrounding the PP. These make the task of defining its status vis-à-vis international law all the more difficult. Currently, the PP is used in more than 90 environmental declarations and agreements[76], so as evidence of state practice it is useful to look at the ratification status. By signing an international treaty, a state is committing itself only to not act contrary to the spirit and meaning of the treaty which are usually not positive actions. By ratifying a treaty, a party is enacting domestic legislation to give domestic effect to a treaty obligation therefore it is an important indicator of state practice. The PP is widely used in the domestic legal orders of Germany, Belgium,

- ✓ Customary international law arises when nations follow a practice in an extensive and virtually uniform manner and this practice is followed with the conviction that it is obligatory (*opinion juris)*
- ✓ Uniformity is not an absolute concept, it depends on the circumstances and the nature of the activity
- ✓ Opposition of some states *does not* interfere with the development of a customary rule.

[72] Commission of the European Communities; *Communication on the Precautionary Principle* COM/2000/0001 at p.11

[73] Article 38 para. 1(b) *Statute of the International Court of Justice*

[74] Case *Nicaragua* ICJ Rep. (1986)

[75] Case *North Sea Continental Shelf* ICJ Rep (1969)

[76] L Bonkourt; *Principle of International Environmental Law: Precautionary Principle;* (2007) 7 Review of International Environmental Law p.3

Denmark, Norway, Sweden, Finland and Iceland. The PP is treated as a constitutional principle in France, being part of the 'Environmental Charter' of that document[77] . The PP is not only found in Europe: the principle became part of the National Strategy of Ecologically Sustainable Development in Australia[78] and was incorporated into the countries Environmental Protection Act[79]. Canada defined the PP in its Oceans Act[80] and incorporated it into the Environmental Protection Act.[81] The United States (albeit indirectly) applies the PP in food safety and air pollution issues.[82] Freedstone and Hay point out that the PP may be found in the local laws of around fifty countries.[83] These are just a few examples.

Another aspect of state practice which is important are the decisions of national and international courts where parties have run arguments and defended interests based on the PP. These will now be discussed briefly, however summaries for more interested readers may be found in the Appendices of the Paper. The *Gabčikovo-Nagymoros Project*[84] and the *French Underground Nuclear Tests*[85] cases.

Dams and Construction Projects

"third-party involvement may be helpful and instrumental in finding a solution, provided each of the Parties is flexible in its position"

ICJ in Hungary v Slovakia

In the first case, the project in question was pursued in order to improve sailing routes, produce electricity and prevent floods. The construction of the project was abandoned by one party and the dispute ended up in the ICJ. Hungary claimed that the standards of environmental protection being adhered to by the other party (under a bilateral treaty) were short of the required actions required under international law, including the precautionary principle. The other side (Slovakia) maintained essentially the Treaty provisions took priority over the general principles of international law which were bearing on the matter. The ICJ observed that both states had agreed to take the required precautionary measures, but disagreed fundamentally on the consequences that this would have on their projects. However, the Court was unwilling to refer directly to the PP, but

[77] *La Constitution- Charte de l'environnement de 2004;* Article 5

[78] Council of Australian Governments; *National Strategy for Ecologically Sustainable Development* (1992)

[79] *Environmental Protection Act* 1993 s.10(1)(b)

[80] *Oceans Act;* Preamble

[81] Environmental Protection Act s. 2(1)(a)

[82] Federal Food, Drug and Cosmetic Act (1958) §409

[83] D Freestone and E Hey (eds) *The Precautionary Principle in International Law;* Kluwer (1996) p.71

[84] *Hungary v Slovakia* (2007) ICJ

[85] *New Zealand v France* (2004) ICJ

recognized that 'new norms and standards have been developed, set forth in a great number of instruments'. These new norms 'have to be taken into consideration, not only when States plan new activities but also when they continue with activities begun in the past'.[86] Importantly for the DSM Context, the Court also recommended that 'third-party involvement may be helpful and instrumental in finding a solution, provided each of these Parties is flexible in its position'.[87]

> *"The legal status of the Precautionary Principle is evolving…however there is sufficient evidence of state practice to justify the conclusion that the principle, as elaborated in the Rio Declaration and the Climate and Biodiversity Conventions, has now received sufficiently broad support to allow a good argument to be made that it reflects a principle of customary law"*
>
> Phillipe Sands QC in *Principles of International Environmental Law*

Nuclear Testing

A second interesting case are the *Nuclear Test* cases between France, New Zealand and Australia. New Zealand, in one of the cases, argued that before France could carry out underground nuclear testing in a marine environment, sufficient evidence must have provided to support the claim that the tests will not introduce radioactive material into that environment. It argued that a risk assessment be carried out pursuant to the PP.[88] In support of the PP being a binding principle of international law, New Zealand led evidence based on scholarly opinion (see text box). However, as in the case before, despite the introduction of scholarly opinion as evidence[89], the ICJ did not evaluate the status of the PP in international law, and rejected New Zealand's argument. The Court, however, was not unanimous, and Judge Weeramantry expressed his regret that the court had considered the issue stating that 'these principles of environmental law fo not depend for their validity on treaty provisions. They are part of customary international law'[90] and 'they are part of the *sine qua non* for human survival'.[91] The PP has also been examined in other cases, however they have tended not to treat the PP as part of customary international law.

The 'crystallisation' of the PP in international environmental law, as we have seen, had relatively humble beginnings. Yet, to the present, there is still a detectable tendency for the ICJ to rely on it as a rule of customary international law. The *Pulp Mills Case* however showed an evolution in this position, and it is to this case which we shall now turn.

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[86] supra n. 31 at para. 140

[87] supra n.31 at para 113

[88] Supra n. 31 at para 105

[89] P Sands; *Principles of International Environmental Law;* 2nd Edition; Cambridge University Press (2003) at p.477

[90] supra n.31 Dissenting Opinion of Judge Weeramantry

[91] Ibid.

Pulp Mills on the River Uruguay[92]

By the time of the *Pulp Mills* case, the ICJ's opinion of the status of the PP had 'evolved'.[93] In that case, Argentina had put forward arguments to which the court had responded that 'while the precautionary approach may be relevant in the interpretation of the [1975 Uruguay River] Statute, it does not follow that it operates as a reversal of the burden of proof'. This statement does not, of course, confirm the status of the PP in customary international law, however the court seems to have recognized that the principle is 'not without effect, even if in a limited way'.[94]

> *"It is for each State to determine in its domestic legislation or in the authorization process for the project, the specific content of the EIA required in each case, having regard to the nature and magnitude of the proposed development and its likely adverse impact on the environment as well as the need to exercise due diligence in conducting such an assessment"*

A very important aspect of the Pulp Mills decision, however, wasn't about the PP directly but is still relevant to the DSM Context in the Pacific. This is the findings of the court in relation to transboundary environmental impact assessment (EIA) as a requirement of customary international law[95]. The Court noted that in order for Parties to comply properly with their obligations under Article 41(a) and (b) of the 1975 Statute[96], the purpose of which is protect and preserve the aquatic environment against activities that may cause significant transboundary harm. However, the Court did not specify the scope and content of an EIA. Argentina partially based their arguments on the 1991 *Convention on Environmental Impact Assessment in a Transboundary Context* and the 1987*United Nations Environment Programme's Goals and Principles of Environmental Impact Assessment* however the court pointed out that neither of these was legally binding- neither country was a party. The Court held that it is for each State to determine in its domestic legislation or in the authorization of the process for the project, the specific content of the EIA required in each case, having regard to the nature and magnitude of the proposed development and its likely adverse impact on the environment as well as the need to exercise due diligence in conducting such an assessment.

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[92] *Pulp Mills on the River Uruguay* (Argentina v Uruguay) 2006 ICJ. This is a case of complex facts- for more information please see the Annexes.

[93] P Sands; supra n.36 at p.224

[94] Ibid

[95] supra n.39 at paras.203-219

[96] The '1975 Statute' refers to the legislation in place between Uruguay and Argentina for sharing of the resources of the River Uruguay which provides for cooperation and joint activities in respect of the river.

This potential for inconsistency and varying levels of rigor in EIA's required under the Court's ruling is apparent[97]. The Court, however, did specifically mention that the EIA must be conducted prior to the implementation of a project, and continuous monitoring of its effects on the environment must be undertaken. As a side comment, this is a welcome improvement, as it arguably means that a greater use of monitoring to verify past predictions and provide the basis for future informed decision making.[98]

As a final note on the *Pulp Mills* is that EIA is clearly part of general international law. While some concerns have been raised regarding the nature, scope and content of EIA, states planning projects that risk causing significant danger to the environment, or threaten shared natural resources, should be on notice to fulfill their due diligence obligations to ensure that these resources are protected from harm.

Areas Beyond National Jurisdiction

So far, the discussion and of the cases and focus has been on the operation of the PP within the EEZ's of sovereign countries. Briefly stated, the case involved a request from Nauru to the ITLOS for an Advisory Opinion on a number of issues related to their recent application of Nauru Ocean Resources (a state-sponsored entity under UNCLOS) for a program of work for deep seabed mining. The judgement is essential reading for anyone concerned with the issues that DSM raises, both in the Pacific region and in general. For our purposes, the most important parts of the judgement are the observations made on the issues surrounding due-diligence, and these will now be discussed.

Due diligence obligations first came up in the arguments surrounding the question of the legal responsibilities and obligations of states in relation to sponsorship of activities. To take part in mining activity in international waters (referred to as 'the Area' in UNCLOS parlance), the entity carrying out the mining is obliged to be sponsored by a state party to the UNCLOS treaty. The Court stated that in its opinion, due diligence is an obligation of 'conduct' and not of 'result', which means that [99] The Chamber also stated that 'the standard of due diligence has to be more severe for riskier activities'.[100]

> the State is under an obligation to 'deploy adequate means, to exercise best possible efforts, to do the utmost to achieve this result'.

The Opinion then points out that the Convention gives guidance on the content of the 'due diligence obligation': 'necessary measures [to ensure compliance] are required and these must be adopted within the legal system of the sponsoring State'.[101] The

[97] D Anton; *Case Concerning Pulp Mills on the River Uruguay* (Argentina v Uruguay) (Judgement) [2010] ANU Research Paper No. 10-84

[98] N Craik; *The International Law of Environmental Impact Assessment: Process, Substance and Integration* (2008)

[99] supra n. 44 at para. 110

[100] Ibid at para 117

[101] Ibid at para. 119

Convention requires the sponsoring state to adopt 'laws and regulations' and to take administrative measures which are, within the framework of its legal system, reasonably appropriate for securing compliance by persons under its jurisdiction'.[102] More details are given on the content of these obligations to which we will return later.

After discussing due diligence, the Chamber identified three 'direct obligations' of sponsoring states under the Convention and under general international law. One of these was the precautionary approach.

The Chamber stated that the precautionary approach and the due diligence obligation were linked and that this was implicit in another judgment.[103] It went on to state that the 'precautionary approach has been incorporated into a growing number of international treaties and instruments, many of which reflect the formulation of Principle 15 of the Rio Declaration'.[104] The Chamber cited *Pulp Mills* (discussed above) for its treatment of the PP[105] and the Mining Regulations, which explicitly require States and the ISA to apply the precautionary approach to substantiate this finding.

What is important about the Advisory Opinion is that the link that the Court draws between the due diligence (an essentially procedural obligation) obligation and the precautionary approach by holding that 'in situations where scientific evidence concerning the scope and potential negative impact of the activity in question is sufficient but where there are plausible indications of potential risks'.[106] In other words, disregarding the attendant risks involved in DSM activities would be held as a failure to comply with the precautionary approach, and accordingly a failure to meet the state's due diligence obligations. The judgement also mentions EIA, and cites the *Pulp Mills judgement* in support of this, and it would appear that the same reasoning applies in the Area as does in national jurisdiction.

…disregarding the attendant risks involved in DSM activities would be held as a failure to comply with the precautionary approach, and accordingly a failure to meet the state's due diligence obligations.

As has been stated, Nauru, who requested the Advisory Opinion, is a small developing country with little resources of its own to oversee the due diligence obligation. In light of this, the question arises of whether the same standard of diligence applies to developed and developing states. This is particularly important for the Pacific Islands, many of which are developing and who have mining resources both within their national jurisdictions and in their vicinity in the Area.

[102] Ibid at para 121

[103] *Southern Bluefin Tuna Cases (New Zealand v Japan; Australia v Japan)* (2000)

[104] Ibid at para 176

[105] Ibid at para 135

[106] Ibid at para 172

The Court found that there is a provision under Part XI of the Convention for the promotion of developing state participation in activities in the Area, however none of the general provisions give sponsoring states preferential treatment. Therefore, the general provisions concerning responsibility and liability apply equally to all sponsoring state.

Conclusion

'the standard of due diligence has to be more severe for riskier activities'

Perhaps more than anything, this Chapter has illustrated the extent to which the practice of states, international organisations and other members of the international community has given rise to various interpretations of the PP now of general acknowledgement. On the other hand, a more difficult question going forward will arise over the legal status, and in many ways more importantly, the meaning contained therein. Philippe Sands offers[107] a useful summary of why this may be the case. International principles, of which the PP is merely one, have emerged over a relatively short period of time, and in the case of the PP, really in the last three decades. A further reason is that the PP has emerged in the context of 'sharp and continuing' differences of view as to what they mean in practice, and what they *should* mean. Of all legal principles, this is most true of the PP. A third point is that state practice interprets and applies these principles and rules is still evolving, and required further consideration by what States do both at the national level and in their international affairs. One thing is also clear: tribunals and international courts are beginning to take a more proactive approach in recognizing the PP in cases brought before it. As we have seen, in this section and in others, the PP has been deployed to require a shift in the burden of proof in cases concerning the conduct of especially hazardous activities, and it seems like only a matter of time before courts apply it more extensively.

[107] P Sands supra n. 83

Part III- Procedural and Substantive Obligations and their Role in Operationalizing the PP

It is useful when thinking about operationalizing *any* principle to keep the decision maker in the foreground. The rule of law provides that when applying such principles, advocates of competing interests are entitled (by virtue of participatory democracy) to a body of rules that determines the manner in which the decision maker will go about making the decision. Indeed, this is the core basis of administrative law (and in particular, judicial review) in many common law jurisdictions. The PP inevitably involves choices between competing narratives. The importance of the PP, at least from a legal perspective, lies in the quality of the decision-making process.

As Fisher and Harding argue 'the principle is concerned with reasons and process [and] it requires decision makers to reflect on how they justify their decisions, what factors are relevant to a decision, how that decision should be made, and who should be involved in the decision-making process'.[108] This is the essence of the issue in considering the PP as part of a legislative framework, along with the rights granted to individuals when the decision made falls short of what is expected in one of these areas. Furthermore, one of the core reasons for the indeterminacy of the PP lies in the fact that these decisions are inherently value-balancing, and so the quest to define with any degree of specificity the meaning of the PP in such a broad legal context may be a difficult enterprise. What matters from a legal perspective is the accountability and consistency of the regime, and the resultant legitimacy, which together provide the basis for assurance that the principle isn't used arbitrarily.

It has been noted above that overarching legal principles provide guidance in a particular direction but do not provide assurance of concrete outcomes. However, to be of any value, a principle must entail tangible guidance for decision makers in arriving at a course of action in a particular set of circumstances. One purpose of this is practical: a decision maker is often a non-expert in the technical aspects of the decision under scrutiny. Another is democratic: the decision of an elected official, and those appointed by them, ought to be held to account against a specific measure of the quality of a particular action. Finally, legal safeguards ought to be in place to guard against a decision with a flawed rational basis, the sort of decision which one could regard as inadequate given, for example, a limited scientific consensus on a given issue. The PP can provide such guidance to the decision-making process by imposing either *procedural* or *substantive* obligations.

Procedural Obligations

Procedural obligations are usually concerned with ensuring that a decision maker will take certain specified steps along the way to reaching a decision on a particular topic. These procedural obligations are baseline guarantees to ensure (1) that interested parties are consulted and given adequate time and opportunity to voice their opinions (the duty to consult and the duty to notify); (2) that appropriate assessments (including EIA) are carried out in respect of the decision prior to action; (3) that the process is non-discriminatory. This list is not exhaustive; however, the principal aim of these obligations is to ensure the accountability of the decision maker and that he or she carries out certain tasks that have been identified as important in rendering an appropriate decision. On this view, the decision maker is

[108] Fisher & Harding (n 7)

constrained to the procedural obligations in the sense that he cannot decide on the criteria outside of this procedural framework. A decision in this context is presumptively valid so long as it concurs with the established values. Thus, a decision maker would be under a procedural obligation to ensure certain aspects of the (pre-meditated) procedure are fulfilled.

This procedural approach is seen most predominantly in the European Union context. Under this version, the decision maker is an entity whose power ought to be constrained to a set of limited tasks, which contain a prescribed level of discretionary powers. Further, any discretion that is exercised is done so on what can be described as an 'objective' basis, namely that given the information available the decision arrives at a conclusion based on a methodology. The definitive attribute in this model is that the types of information that can be considered by the decision maker are enshrined *a priori* in the rules which provide the framework for the decision-making process. As can be seen, this approach is clearly premised on a view of administrative power that ought to be legitimately constrained. As can be seen in Appendix I, this is a model that has been adopted in, for example, the WTO cases concerning application of the PP to a set of circumstances.

In practice, an important demonstration of this approach has manifested itself in the European Commission's Communication on the PP. This document states, *inter alia*, that decision makers are carrying out a series of discrete tasks in arriving at their decisions, namely: (i) a scientific process of risk assessment; (ii) a political process of risk management; and (iii) a process of risk communication. The Communication states that the PP applies only to the second of these steps i.e. where a risk assessment has identified a *potential* risk and the accompanying uncertainties surrounding it. It does, however, prescribe a course of action for the first step. The PP only applies to situations where a risk assessment has identified a potential risk. This risk assessment 'requires reliable scientific data and logical reasoning, leading to a conclusion which expresses the possibility of occurrence and the severity of a hazard's impact on the environment, or health of a given population including the extent of possible damage, persistency, reversibility and delayed effect'. The document does recognize the fact that scientific uncertainty may make this problematic. Nonetheless, an assessment ought to be made on all of the available evidence.

Thus, for these purposes, risk is procedurally defined: hazard identification, hazard characterization, appraisal of exposure, and risk characterization are all stages in the process of arriving at an informed assessment of a particular risk in a particular situation. If the risk assessment identifies a negative effect after scientific evaluation, there must be a decision to act or not to act and the PP applies directly to this. The Communication emphasizes the need for an assessment of the uncertainties involved in the evaluation and an assessment of the potential consequences of inaction or waiting for more scientific information. Further, the *process* of applying the principle in the decision-making context must be transparent and inclusive, especially in assessing the consequences of different forms of action and inaction. It also is essentially a political decision, yet the Communication doesn't provide a comprehensive set of guidelines for the process of evaluation. Instead, the document sets out a series of standards by which the measures taken ought to be judged and these follow traditional principles of administrative law: proportionality, non-discriminatory, consistent, based on cost-benefit analysis, and other considerations. The model followed by the Communication is based on operationalizing the PP by

means of a framework, which demands that the decision maker both assesses and manages the risk involved. It specifies the methodologies to be applied, and so long as these are adhered to, and are not invalid according to the principles listed above, are *prima facie* valid.

Substantive Obligations

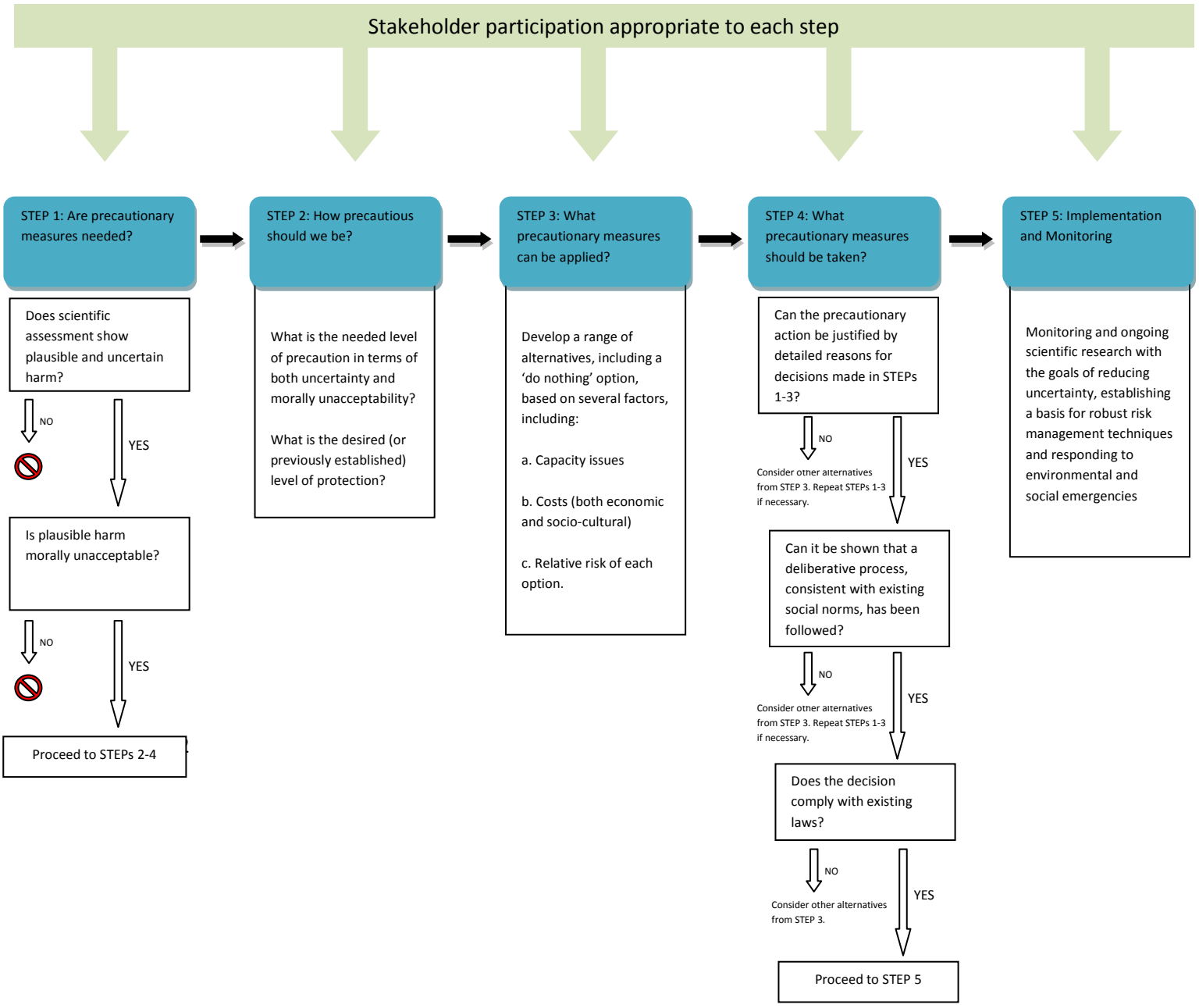
On the other hand, *substantive obligations* (see Table 4) usually provide more discretion for decision makers to pick and choose how they identify and characterize scientific uncertainty. Under this view, the decision maker is given broad deliberative powers to decide on the factors that will be taken into account, which is then bolstered by a concomitant responsibility to issue reasons. Substantive obligations also require a deliberative process in which a wide range of actors are brought together in a problem solving process. Finally, it is often argued that these offer more opportunity for a regime to react to developments in science. One of the advantages of this approach is that it is ostensibly realistic in the face of complex problems that cannot be solved by a set pre-meditated approach. As Fisher and Harding argue, such approaches offer an institutional structure that can deal with the problem in an ongoing manner by developing a process adapted to the problem which can be flexible in light of new information.[109]

The graph shown below illustrates one possible way of imposing substantive obligations, including considerations of socio-political and cultural contexts. It is based on the language found in the UNESCO working definition that was chosen, as noted previously, for the combination of benefits it exhibits from both Weak/Inclusive and Strong/Narrow definitions. Although actual decision-making will diverge in some respects from what is presented here, the ability of decision-makers to (1) understand the concerns of various stakeholders and (2) justify actions taken will be common to substantive uses of the PP.

In the context of this paper, "stakeholder" refers to any group of actors that may be affected by the proposed action or the application of the PP. This includes (sub)national governments, NGOs and other civil society groups, village and island councils, the private sector, and others. However, the term usually implies an equivalence between interest groups, which tends to hide differences in access to power and resources.[110] In many cases the distribution of power among stakeholders, within the decision-making process, is not consistent with the distribution of possible negative impacts. These socio-political realities should be considered during the decision-making process and should include measures to ensure that vulnerable populations are empowered in proportion to possible impacts. In a perfect system the distribution of power and possible negative impacts would be congruent

[109] Fisher & Harding (n 7)

[110] N Roome "Stakeholder Power and Organizational Learning in Corporate Environmental Management" (2006) 27 *Organizational Studies* 235.


Stakeholder participation appropriate to each step
STEP 1: Are precautionary measures needed?
Does scientific assessment show plausible and uncertain harm?
NO
YES
Is plausible harm morally unacceptable?
NO
YES
Proceed to STEPs 2-4
STEP 2: How precautious should we be?
What is the needed level of precaution in terms of both uncertainty and morally unacceptability?
What is the desired (or previously established) level of protection?
STEP 3: What precautionary measures can be applied?
Develop a range of alternatives, including a 'do nothing' option, based on several factors, including:
a. Capacity issues
b. Costs (both economic and socio-cultural)
c. Relative risk of each option.
STEP 4: What precautionary measures should be taken?
Can the precautionary action be justified by detailed reasons for decisions made in STEPs 1-3?
NO
Consider otner alternatives from STEP 3. Repeat STEPs 1-3 if necessary.
YES
Can it be shown that a deliberative process, consistent with existing social norms, has been followed?
NO
Consider otner alternatives from STEP 3. Repeat STEPs 1-3 if necessary.
YES
Does the decision comply with existing laws?
NO
Consider other alternatives from STEP 3.
YES
Proceed to STEP 5
STEP 5: Implementation and Monitoring
Monitoring and ongoing scientific research with the goals of reducing uncertainty, establishing a basis for robust risk management techniques and responding to environmental and social emergencies

STEP Zero: The objectives of the proposed development

The "zeroth" step, like the desired level of protection, is both independent of the PP and a helpful means of operationalizing it. It is during this stage that the participatory process should consider:

a. What the goals of the proposed development are,
b. Whether these goals can be achieved through other, less uncertain means, and
c. How the proposed development will impact ongoing activities that are contributing to the same goals.

The stated goal of the SPC-SOPAC EU Deep Sea Minerals Project is to expand the economic resource base of the participating P-ACP States[111], and individual countries may have additional goals. Thinking about the proposed development in terms of its objectives allows it to be compared with other possible development options that might be less threatening to the marine environment, such as tourism, or sustainable forms of resource exploitation. Perhaps these options will be explored in addition to DSM mining. However, it is important to consider the possible impacts of mining activities on other existing, or developing, industries.

STEP 1: Trigger Criteria

The first step in the decision-making framework determines if precautionary measures are appropriate. When faced with a proposed action two questions must be answered.

1. *Does scientific assessment show plausible and uncertain harm?*
In addressing this question the deliberative process must work out the socially embedded meanings of three ambiguous terms: *scientific*, *plausible harm*, and *uncertain harm*. While it is clear that scientific knowledge is vital to the process, the UNESCO paper has suggested that other ways of knowing, such as traditional and local knowledge, may also have scientific status, depending on the country or culture under consideration.[112] In addition, plausibility and uncertainty, like all value-laden terms, cannot be determined in the abstract but must be socially negotiated. This implies that *plausibility* does not mean that cause-effect relationships must be established. Instead, expert opinion and views based on other relevant epistemologies can be sufficient to establish plausibility of harm.[113] What is considered *uncertain* must also be determined through stakeholder engagement and may include cause-effect relationships, the area and scale of impact, the likelihood that benefits will be distributed equitably, or the chances that benefits will actually accrue to future generations and not be squandered through political corruption or poor management. Importantly, what is thought to be plausible or uncertain will be grounded in the socially and culturally relevant ways of knowing mentioned above. In short, decision-

[111] See draft Regional Legal and Regulatory Framework, SPC-EU Deep Sea Minerals Project; SPC (2012)

[112] COMEST (n 6)

[113] COMEST

makers and stakeholders need to be attentive to, and respectful of, the diversity of knowledge systems (epistemologies) that may be held by other stakeholders. This is especially important in the Pacific, where customary knowledge is often in use, particularly with regard to the ocean and its resources.

If culturally relevant scientific assessment and stakeholder engagement shows that harm is plausible and impacts uncertain, then a second question must be addressed. If harm is not plausible or uncertain, then the precautionary action is not appropriate.

2: Is the plausible harm morally unacceptable?
In the UNESCO working definition, moral unacceptability includes, "harm to humans or the environment that is:

- Threatening to human life or health, or
- Serious and effectively irreversible, or
- Inequitable to present or future generations, or
- Imposed without adequate consideration of the human rights of those affected."

Each of these dimensions of morally unacceptable harm opens a deliberative space in which stakeholders can engage in discussion about principles that presumably all agree to in some sense. Decision makers will need to engage stakeholders in meaningful dialogue about each of the points above to get a sense for what these value-laden terms mean in their particular socio-cultural and political contexts. For example, what do people feel is *threatening*? What sort of harm is thought to be *serious*? What constitutes *adequate consideration*? What rights are considered *human rights*? As discussed above, it is a strength of the PP that these terms are not rigorously defined in that these ambiguities allow it to work across may cultures and in other diverse contexts. However, decision-makers will only come to understand these terms if they talk with the relevant stakeholders.

If decision makers conclude that the plausible harm is morally unacceptable and can justify the decision by referencing stakeholder input and existing legal and administrative norms, then precautionary actions will be necessary, and the process should proceed to Step 2. If not, precautionary actions are not necessary.

Because DSM mining is an as yet untested and invasive activity, the answers to both questions will be affirmative given the current state of knowledge. It has been broadly agreed at Pacific regional meetings sponsored by the SPC-EU DSM project that the precautionary actions will be necessary. In addition, the International Tribunal on the Law of the Sea has stated that the precautionary approach must be applied to DSM mining.[114] At this stage, because DSM mining meets the two trigger criteria, it is more useful to establish which potential impacts are believed to be plausible and uncertain and the extent of moral unacceptability and uncertainty.

STEPs 2-5: The Precautionary Responses

[114]Seabed Disputes Chamber of ITLOS Advisory Opinion issued February 2011; the International Seabed Authority's Mining code [add full citation]

STEP 2 is focused on determining the intensity of precautionary response. For a situation that is relatively less uncertain and less morally unacceptable, the response will be less precautious and vice versa. Graph 2 (above) showed how the intensity of precautionary responses varies with the degree of uncertainty and moral unacceptability of potential harm. At very high levels of uncertainty and unacceptability, a 'no development' response is necessary, meaning that the development under consideration will not proceed. At the other end of the spectrum, if uncertainty and unacceptability are insignificant, decision makers may allow the development to proceed with little or no additional intervention. Furthermore, if a desired level of environmental and social protection has been previously established it should be referred to at this stage. If not, it may be worth establishing how important environmental and public health is relative to other potential social goods, such as economic development measured in GDP.

Where STEP 2 seeks to establish an appropriate level of precaution, the objective of STEP 3 is to generate a list of precautionary measures that can be applied within the particular circumstances under consideration. A range of alternatives should be considered and should include a 'no development' option, especially if some stakeholders view the plausible impacts of the proposed development as highly uncertain and morally unacceptable. Importantly, a 'no development' option may become appropriate under circumstances that are unrelated to the trigger criteria, such as when a country lacks the capacity or means to implement other appropriate precautionary responses.

All possibilities should be evaluated according to relevant criteria, including capacity, costs and relative risk. Capacity issues will be especially important to consider in the case of DSM mining undertaken by Pacific Island Countries. At the very least, countries should be able to perform, or have access to, objective and rigorous EIA review, be able to monitor the mining process and enforce sanctions if DSM mining projects are implemented. Regional cooperation will be helpful in setting standards for capacity and lending assistance when needed. Socio-cultural and economic costs should also be clearly established for each proposed precautionary measure. This recognizes that precaution implies its own burden. Precautionary measures can carry risks (e.g. to the livelihoods of vulnerable communities) and should be evaluated accordingly.[115] Measures should also be evaluated according to their proportionality. This means that possible responses should seem reasonable when compared with the level of desired protection, uncertainty, and moral acceptability established in STEP 2.

In STEP 4 the precautionary measure(s) chosen by decision-makers are considered by the relevant stakeholder groups. At least three criteria should be met:

1. The precautionary action can be justified by detailed reasons for decisions made in STEPs 1-3;

2. It can be shown that a deliberative process has been followed and that the process is consistent with existing norms for decision-making;

3. The precautionary measure(s) decided upon comply with existing laws.

[115] A classic example of harm caused by the implementation of a precautionary approach is the alienation of indegenous peoples from resources through the establishment of Protected Areas.

If these criteria are met, then decision-makers can present a strong case for pursing a course of action even when consensus among stakeholders is not achieved.

Unless a 'no development' alternative is chosen, STEP 5 will involve the implementation of precautionary measures that require monitoring of the development project and ongoing scientific research. The ultimate goals of this step are to either constrain or contain harm (depending on which measures were chosen) and to reduce or eliminate the uncertainty that makes the PP necessary. Reducing uncertainty through ongoing research implies that the possible outcomes of the development process can become statistically knowable, allowing more rigorous forms of risk management to be used. Monitoring, furthermore, must involve the ability to respond appropriately to any unacceptable outcomes of the development process.

Regimes can, and do, include both procedural and substantive obligations to varying degrees, and both frameworks for operationalizing the PP share a number of characteristics. For example, both frameworks regulate the process of decision-making in a manner that is transparent and inclusive and ensure, in their own ways, that the types of information involved in the decision-making process are elaborated. However, there are some differences that arise based on a few fundamental assumptions. One of these is how each approach categorizes the problems they seek to address. From the perspective of substantive obligations, problems of risk are complex and thus require a framework that can adapt to specific problems. With procedural obligations, problems of risk can be addressed by applying the established methodology. Thus, the fundamental task for any procedural framework is to ensure that a decision maker remains within this methodology, with any other considerations being presumptively invalid. Another difference arises in the manner in which they approach the process of decision-making. Namely, with procedural obligations, the decision maker is required to carry out clearly defined tasks whereas with substantive obligations, the scientific and political process are not separated, owing the complexity and inherent uncertainty of the particular problems involved. Furthermore, while both frameworks are emphatic on the need for participation and transparency in the decision-making process, they do so for different reasons. The procedural obligations insists that the decision maker has carried out the tasks assigned to him, whereas substantive obligations, including transparency and broad participation, are concerned with the effectiveness of the decision in addressing the problem.

The differences between the two frameworks are usefully summarized by Fisher and Harding in Table 4 below:

	Substantive Obligations (Fisher and Harding)[116]	Procedural Obligations (Communication)[117]

[116] Fisher & Harding (n 7)

[117] Communication (n 29)

Relevant Theory of Administrative Constitutionalism	Deliberative- Constitutive	Rational- Instrumental
Role and Nature of Public Administration	Institution constituted with broad deliberative powers that can be adapted to the problem at hand	Instrument of legislature that carries out a limited set of tasks on the basis of a rational methodology
Characterization of Problems being regulated	Socio-politically and physically complex	Manageable by methodologies
Nature of Administrative Process	Scientific analysis and deliberation combined	Division between scientific and political processes
Nature of Public Participation	Contributing to a deliberative problem solving process	Aid to accountability and a means of identifying preferences
Basis for Justifying Decisions	Reasons and deliberation	Showing that a decision maker adhered to predetermined methodologies and standards
Catalyst for developing the framework	Showing how the principle can be implemented in any institutional setting	Showing that action pursuant to the principle is accountable and consistent with pre-existing legal obligations

Table 4

Summary and Conclusion

From the discussion above, several key messages can be highlighted. The Precautionary Principle:

1. Gains concrete meaning as its context becomes more specific and includes geophysical, biological, socio-cultural, legal and economic dimensions;

2. Is dependent on language that expresses social values and must, therefore, engage stakeholders to make these dimensions of the PP meaningful;

3. Comprises trigger criteria (potential for harm and uncertainty) that if met require some form of precautionary response that can be more or less intense;

4. Has a primary goal of initiating a legitimate decision-making process even when full knowledge is not available;

5. Has many expressions, including Weak/Inclusive, Strong/Narrow, and Strong/Inclusive variations, that are appropriate in different circumstances;

Furthermore, the PP is not about ensuring specific outcomes. It does not generally declare that development should not proceed in the absence of full scientific certainty and plausible harm. However, it also does not mean that proponents can necessarily move ahead with a particular development if they take 'cost effective' measures to protect the environment or human health, especially where 'cost effective' is taken to imply a private sector entity's willingness to pay. Instead, the PP is primarily concerned with implementing a decision-making process. This process is initiated by the criteria of uncertainty and probable/unacceptable harm. As noted, because the meaning of these terms depends on socio-cultural factors, and because decisions are made under conditions of uncertainty, the decision-making process must also involve public participation. While public participation in decision-making is necessary, it should be consistent with existing norms of who has the power to be a legitimate decision-maker and what constitutes a valid decision.

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