

Environmental decision-making in a transboundary context:

**principles, challenges and opportunities for
precautionary environmental impact assessment**

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Acknowledgements

Statement of Originality

This thesis is entirely my own original work. It contains no copy or paraphrase of another person's material except where due acknowledgment is made.



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Abstract

This thesis examines opportunities to improve practice in environmental impact assessment (EIA) for projects or activities that have environmental implications for two or more countries. In particular, the thesis seeks to identify the most suitable legal framework in which to conduct EIA in a transboundary setting, and what opportunities exist to ensure that environmental effects of projects or activities which are distant in time or space, or remote in possibility, are effectively addressed in approval processes for such projects or activities. While drawing upon a number of theoretical debates, emphasis is given to two. These are the 'tragedy of the commons' and the 'precautionary principle'. The first, which emanates from concern in the late-1960s about competitive overexploitation of natural resources in the absence of forceful management regimes, offers a useful theoretical framework to understand the dynamics of governance for regional environmental issues and provides guidance for determining the appropriate legal basis for transboundary EIA. The second provides the main focus of this study. Analysis is provided of the philosophical underpinnings of the precautionary principle in addition to analysis of existing means of applying it. The principle has merit as a component of the sustainable development concept and is applicable as a management approach for transboundary environmental issues that arise from, among other things, large-scale development projects or activities located in proximity to international borders. Opportunities to entrench the principle systematically in EIA practice are identified. A three-step method by which EIA processes could be modified to give effect to the principle is presented. First, the standard EIA trigger of environmental 'significance' must be broadened; secondly, project alternatives and uncertainties must be assessed; and thirdly, environmental uncertainty must have influence in decision-making. Two case studies are then presented to determine the efficacy of the proposed reform steps for actual development issues. These are the recently completed 16 km bridge and tunnel between Denmark and Sweden and the likely future issue of east coast offshore hydrocarbon extraction and transport adjacent to the Canada-United States border. Case study analysis also enables identification of further project-specific measures to advance precautionary decision-making in the context of project approval for developments with potential transboundary environmental implications. The aim is to improve the environmental and project approval aspects of decision-making for large-scale developments located in border regions.

Thesis publications

Some of the work presented in this thesis appears in modified form in the following publications:

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List of Acronyms

BAT	Best Available Technology
BATNEEC	Best Available Technology Not Entailing Excessive Cost
CEA	Cumulative Effects Assessment
CEAA	Canadian Environmental Assessment Agency
CEC	Commission for Environmental Cooperation
CNSOPB	Canada-Nova Scotia Offshore Petroleum Board
DFO	Department of Fisheries and Oceans (Canada)
ICJ	International Court of Justice
IGAE	Intergovernmental Agreement on the Environment
EEA	European Environment Agency
EES	Environmental Effects Statement
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
ESD	Ecologically Sustainable Development
NAAEC	North American Agreement on Environmental Cooperation
SEA	Strategic Effects Assessment
UN	United Nations
UN/ECE	United Nations Economic Commission for Europe

Chapter One

Introduction

1.1. Thesis outline

1.1.1. The problem context

Environmental impact assessment (EIA) has largely proven to be a successful tool for understanding and minimising the environmental impacts of projects or activities since it was adopted in numerous countries from the early-1970s. Its success has been most apparent in jurisdictions which adopt EIA processes in legislative form. This is because a legislative basis for approval processes is better suited than are purely policy approaches to ensure compliance with minimum procedural elements of EIA and to ensure that associated decision-making is undertaken in a manner which is both public and accountable. Difficulties are encountered, however, when projects or activities are located adjacent to international borders. Whereas the jurisdiction – and generally the legal interest – of the country in which the project is located stops at the border, the environmental consequences of the development may not. Further, larger scale environmental problems tend to be more complex and challenging for management than smaller scale environmental problems. The plethora of bilateral and multilateral environmental agreements that have been adopted since the 1970s evidence the recognition by countries that many environmental problems are transboundary in nature and that there is a need for international cooperation to manage shared problems. The need for cooperation is acute in situations where EIA procedures are to be applied to projects or activities located proximate to international borders. Thus, for EIA to be as effective as possible, there must be agreement reached between countries proposing to conduct potentially hazardous activities and countries that may be affected by such activities regarding how possible cross-border environmental impacts should be examined and mitigated.

The first formal steps to advance the practice of EIA for border projects occurred between the mid-1980s and early-1990s. In 1985, the Council of the European

Community (EC) adopted a Directive on EIA, and in 1991 the United Nations (UN) Economic Commission for Europe (ECE) adopted the Convention on Environmental Impact Assessment in a Transboundary Context, currently signed by 32 ECE member countries or countries with consultative status with the ECE, as well as the EC itself. The Commission for Environmental Cooperation in Montreal is currently negotiating a transboundary environmental agreement between Canada, the United States and Mexico that is to include EIA provisions. The two existing transboundary EIA agreements – the EC Directive and the UN/ECE Convention – envisage (although do not explicitly require) that the EIA provisions contained in them be incorporated into the domestic EIA processes of member countries. However, the EIA measures contained in these two instruments are generally weaker than those found in countries with long-standing national EIA processes. This can be explained to a degree by the ‘lowest common denominator’ phenomenon often experienced with consensus documents: such documents are drafted to the highest standard acceptable to the party which is prepared to accept the lowest standard. On the one hand, the international community has recognised the need for concerted international action to address cross-border environmental problems, yet on the other, a range of problems bedevil progress on coordinated management. These include limited rules of international law concerning responsibility for transboundary harm, different legislative and administrative processes in neighbouring countries, and insufficient concern for environmental effects which occur over a great distance or a long period of time from their source.

The ‘tragedy of the commons’ debate provides a useful theoretical framework to understand the dynamics of governance at the international level and offers insights into various approaches to improve regional environmental management. A central issue of the debate is whether, and how, coercive, or ‘top-down’, management approaches could be instituted in situations where individual actors seek to maximise their self-benefit, even when this is to the detriment of other actors. There are parallels here to the conduct of nation states at the international level. For example, a country may be prepared to allow construction of a nuclear power station close to an international border. Whereas that country receives the economic benefit of the development, neighbouring countries may be exposed to a high risk of environmental harm, which is, as is discussed in this thesis, not actionable at international law. As such, the benefits of the nuclear power station accrue to the country in which it is located, yet the costs – in this case principally exposure to increased risk of serious environmental impact – are shared with other countries. In this respect, a project-approval regime that ensures minimum environmental safeguards and

regional agreement on the circumstances in which such a development is acceptable is to be welcomed. It would reduce interstate tension and encourage more responsible developments. Overcoming the reluctance of nation states to have their national sovereignty diminished in terms of their ability to approve development projects located solely within their jurisdiction is one of the main challenges to achieving the more effective regional EIA regime discussed in this thesis. The arguments upon which the 'tragedy of the commons' scenario are predicated are examined, together with the various solutions proposed for this problem. The philosophical roots of the debate are traced to the writings of Thomas Hobbes in the mid-1600s and, in lesser part, to the ancient Greek philosophical tradition. The debate is expanded to the international sphere and assessed in terms of the particular problem attributes of modern transboundary and regional environmental problems.

EIA ideally operates prior to environmental harm occurring by providing for the assessment of the likely environmental impacts of a proposed development so that they can be avoided or mitigated. As will be seen, it operates in advance of rules of international law concerning liability for transboundary harm that are triggered only when harm has been caused. One of the principal shortcomings of the rules of national and international law in the environmental field discussed in this thesis is that it is difficult to establishing liability for environmental harm both across international borders and within jurisdictions. It is necessary to establish, among other things, proof of causation and severity of harm. Difficulties arise because of the great scale of potential environmental impacts, the numerous causes of environmental harm, conflicting opinion in the scientific community concerning how harm is caused, the great distances over which harm can be caused, as well as the common existence of long lag periods between the causes of environmental harm and the detection of impacts. One of these hurdles to establishing liability for harm examined in detail in this thesis is the need for almost unequivocal scientific evidence. Such evidence is normally absent for complex environmental systems, thus rendering legal remedies unobtainable. The uncertainty that exists in the environmental field also hampers environmental managers because they also invariably seek uncontested information as the basis for their decisions. It is in situations of complex and poorly understood transboundary environmental issues that proactive environmental management approaches are particularly useful.

The problem of a lack of environmental knowledge is compounded in situations where a jurisdictional border cuts across the area in which environmental effects may occur. Not only do information-sharing difficulties arise, but also the issue of insufficient

scientific data is exacerbated because of reduced opportunities and incentives to examine potential environmental effects in other jurisdictions. Different administrative and legal processes in the neighbouring jurisdiction, as well as different political policies, hamper attempts to obtain, synthesise and utilise information for decision-making purposes. In recognition of the problems encountered by scientific uncertainty, the 'precautionary principle' emerged in environmental discourse as a new approach to environmental protection, providing the 'philosophical authority to take decisions in the face of uncertainty' (Cameron et al. 1999: 93). It is rooted in misgivings about scientific interpretations of environmental tolerance of human activities and accepts uncertainty regarding environmental outcomes as a sufficient reason for action, recognising that we should not wait for conclusive proof of environmental harm before adopting appropriate avoidance measures. Precaution is the leading policy approach that has emerged to guide environmental decision-makers confronted with inadequate information. It is relevant also to the field of public health, but this thesis focuses on its application in the environmental management context. It is argued that the principle offers useful insights and instructions respecting how to make decisions in situations of scientific uncertainty. It is contended that EIA is an appropriate tool to utilise in order to give effect to it. This is argued in a context in which application of the principle is most appropriate: decisions regarding whether and on what basis to approve large-scale development projects or activities located close to international borders. Central to this discussion are how the limitations of scientific research are typically understated or go unrecognised in existing EIA processes. Thus, a challenge is to determine methods by which EIA's contribution to environmental planning can be enhanced by broadened its role from displaced scientific assessments to operating as a process facilitating, and requiring, sound public environmental decision-making.

This thesis examines aspects of governance and international environmental law to determine the most appropriate legal basis for transboundary EIA regimes. The focus is on government regulated activities. The precautionary principle is analysed to determine its merits as an environmental management objective and to identify methods to implement it. Existing transboundary EIA procedures are examined and specific methods to improve the precautionary aspects of decision-making respecting the approval of projects or activities with possible transboundary environmental effects are identified. Two case studies were conducted to determine whether the reform measures advocated here are appropriate for actual development issues. Case study analysis also enables identification of further project-specific precautionary measures.

The first case study is of the approval process used for the recently completed Øresund Fixed Link between Denmark and Sweden. This development was selected because it is a recent mega-project which provides an example of current world's best practice in transboundary environmental assessment. The project itself is transboundary and it is between two countries with advanced environmental protection regimes. Further, as will be shown, there is reason to believe that the project may cause environmental effects beyond the jurisdiction of Denmark and Sweden and thus affect the interests of other countries. Thus the issue of uncertainty arises regarding the causation of environmental harm beyond the jurisdiction of the two countries which built the link.

The second case study is of the approval process that would be used for future offshore hydrocarbon developments on the Canadian portion of Georges Bank on the east coast of North America. This was selected for similar reasons: the two countries in question – Canada and the United States – have relatively advanced environmental laws and practice in EIA and any future offshore hydrocarbon activity is likely to be on a large scale. Likewise, the environmental impacts of such activity may extend beyond the jurisdiction of the neighbouring countries and reach the high seas. A high level of uncertainty is also associated with the numerous activities involved in extracting offshore hydrocarbon reserves. This case study is to some extent a hypothetical one: Canada has recently extended a moratorium on offshore hydrocarbon activity in the Georges Bank region. However, the recent statutory review process of the moratorium provides a rich source of information and perspectives which can be used to consider whether existing Canadian environmental approval processes can operate in a precautionary manner with respect to projects with transboundary implications. Further, there will be renewed pressure in the next ten years to allow hydrocarbon activity in the region. The Georges Bank case study involves more complex – and unresolved – issues than those associated with the Øresund Fixed Link, such as the issue of exploitation of shared natural resources. This is reflected in the greater length of the chapter in which it is located.

Both case studies are located in developed Western countries with – to a large extent – shared traditions in political and institutional processes between the neighbouring countries. Most notably, these shared traditions include democratic governments subject to the rule of law and commitment (and associated economic ability) to devote resources to environmental management. Thus both case studies offer opportunities to consider methods to improve transboundary environmental decision-making unconstrained by the hurdles of political instability and religious differences between countries. The long history of environmental disputes – and their resolution – on the Canada-US boundary

makes this border an excellent focus for study. As will be seen, the pre-eminent legal decision concerning the liability one country has for causing environmental harm to another – the *Trail Smelter* decision – arose due to a dispute on the Canada-US border in the 1930s. The Oresund Fixed Link is also a useful case study because it is located in Europe. Numerous transboundary issues have emerged in Europe due to the proximity of the many countries. This phenomenon has seen the emergence of legal measures and institutions specifically to address cross-border issues. Thus the European context for transboundary environmental decision-making is instructive for other regions.

It is to be noted that the issues sought to be addressed in this thesis arise with regard to other development projects. Two of these – hydrocarbon development in the Timor Gap (Australia and Indonesia/East Timor), and the construction of dams on the Danube (Hungary and Slovakia) are discussed briefly in Chapter Two. Other development issues are considered in the conclusion. As such, other case studies could have been selected for this thesis. No projects were completed in accordance with the UN/ECE Convention prior to or during the period for research (1999-2000). However, the completion of the Oresund Fixed Link and the Georges Bank moratorium review process during the research period made these two issues stand out as timely in addition to being appropriately-large developments located in regions suitable for study. They also differ in key ways: one is a completed project that is itself transboundary; the other is a likely future development issue that involves polluting activities. Thus, these case studies are contrasting in their nature and location and allow different issues to be explored. The case studies selected also allow conclusions to be drawn respecting the primary research objectives of the thesis: determining the appropriate legal framework in which to conduct transboundary EIA and identifying opportunities to incorporate the precautionary principle in transboundary EIA practice.

1.1.2. Research method

An examination of opportunities to improve the quality of EIA for projects or activities with transboundary environmental implications requires us to:

- examine the nature of transboundary and regional environmental problems;
- examine and analyse world's best practice in transboundary EIA;
- determine the applicability of the precautionary principle to the management of transboundary environmental problems and EIA processes; and to

- identify and critically evaluate appropriate legal regimes and measures for the conduct of transboundary EIA that enable assessment, consideration and mitigation of distant environmental effects.

These principal research objectives prompt a number of subsidiary questions to be answered by research:

- What range of development and environmental issues arise in the transboundary context? Specifically, how is environmental harm caused to other countries by development projects? How does uncertainty concerning distant (time/space) environmental effects present problems for environmental management? What are the aims and guiding principles of environmental management to help in this situation?
- How effective is international law in remedying environmental harm across borders? What environmental impacts are currently actionable? What steps must be met for a successful suit? What is the remedy available and is this satisfactory for environmental protection? What impediments are there to establishing a more effective legal liability regime?
- What management approaches are suitable for cross-border environmental problems? What opportunities does EIA present to improve environmental practice for projects with transboundary implications? What is the existing practice in EIA in the transboundary context? What limitations and challenges are presented by the existence of a jurisdictional border in EIA practice?
- How could proactive EIA improve or complement existing rules of liability for transboundary harm? Can environmental management be advanced by linking the precautionary principle to the practice of transboundary EIA? If so, what steps can be taken to make EIA more precautionary?

1.1.3. Thesis structure

The line of argument that will be followed is summarised in Table 1 (overleaf) which outlines the structure of the thesis. Chapter Two examines the nature of transboundary and regional environmental problems and the legal and management approaches available to address them. It is contended in Chapter Three that more forceful international legal regional regimes are warranted due to the complexity of large-scale environmental problems and the nature of governance respecting environmental issues at the international level. Chapter Four discusses environmental policy and the leading environmental

principle that has emerged to guide decisions about future developments – the precautionary principle. The merits of the principle are identified and common criticisms of it are addressed. It is argued in Chapter Five that precaution is a particularly useful approach for transboundary environmental problems. Chapter Six discusses linkages between the principle and the practice of EIA in the transboundary setting and presents reform methods. Chapters Seven and Eight contain two case study reports which apply the conclusions from the foregoing discussion to recent project and development challenges. Chapter Nine concludes the thesis with an analysis of the case studies in the context of the principal research objectives and discusses the relevance of the study to wider issues concerning exploitation of shared natural resources at the international level.

Table 1. Thesis chapters and main line of argument

Chapter	Main line of argument
One Introduction	Introduction to thesis topic and overview of research methodology and main line of argument.
Two Governance and coordinated management of transboundary and regional environmental problems	Discussion of the range of transboundary and regional environmental problems, focusing on problems associated with developments in border regions. Constraints on management presented by national sovereignty and shortcomings of international environmental law are identified. <i>Thus management solutions are sought:</i>
Three The 'tragedy of the commons' and transboundary environmental problems: reconsidering Leviathan in the international sphere	An analysis of the theoretical perspectives contained in the 'tragedy of the commons' discourse, and the political theory that predates it, is used to support the proposition that environmental and political/legal exigencies warrant the development of forceful transboundary environmental regimes. <i>However, environmental problems also face knowledge problems:</i>
Four The precautionary principle	The lack of knowledge about environmental processes, particularly those that operate at the regional or global scale, warrant attention to the leading policy approaches to address this problem. This chapter discusses the merits of the 'precautionary principle' and argues that it is useful as an approach to address environmental problems. <i>From the merits of the principle it is argued that it should be applied in the transboundary context:</i>
Five Applying the precautionary principle: considering transboundary environmental problems	This chapter discusses current application of the principle and argues that it is particularly well suited for transboundary environmental problems. <i>It is then argued that the principle is applicable to the conduct of transboundary EIA:</i>
Six Transboundary EIA and the precautionary principle	This chapter determines what opportunities exist for EIA to improve environmental practice for projects with transboundary implications. The complementary nature of EIA and the precautionary principle is explained and specific steps to make EIA practice precautionary are identified. From the discussion in Chapters Two and Three of the dynamics of governance and the nature of transboundary environmental problems, it is argued that these precautionary EIA steps need to be placed in forceful regimes. <i>These conclusions are then applied to two case studies:</i>
Seven Principles and challenges for the Denmark-Sweden Oresund fixed link	The first case study is presented here to determine whether the reform proposals are appropriate for a transboundary development project. Analysis of the transboundary environmental issues involved with the project is discussed, and the conclusions from the previous chapters are applied in this context.
Eight Canadian offshore oil and gas development on Georges Bank	The second case study is presented here to determine whether the reform proposals are appropriate for a likely future development issue in a border region. Analysis of the transboundary environmental issues involved with the project is discussed, and the conclusions from previous chapters are applied in this context. <i>In conclusion:</i>
Nine Implications and conclusions	The factors that contribute to the challenge of resource management at transboundary level are synthesised and commentary is made on the wider implications of this research.

Chapter Two

Governance and coordinated management of transboundary and regional environmental problems

The courtyard used by all
Is swept by none.

Chinese proverb

2.1. Introduction

It is axiomatic that human activities need to be modified in recognition of ecological exigencies if there is to be progress toward achieving sustainability goals. The problem of devising suitable environmental management approaches is compounded when it is environmental effects that cross international borders which are attempted to be redressed. The large-scale nature of environmental problems can be exacerbated by jurisdictional conflict between countries due to differences in administrative processes as well as differences in environmental and economic policy commitments.

This chapter identifies the range of environmental problems that are transboundary or regional in scope, in particular, those which are caused by specific development activities within one country. Attention is then focused on cross-border management issues raised by development activities located close to international borders. This discussion draws on various theoretical debates with the aim of determining the most suitable administrative or legal structures for managing transboundary environmental problems caused by large-scale discrete development projects. The tragedy of the commons debate offers insights into the dynamics of decision-making in the regional context, particularly when it is considered that international environmental law has shortcomings for preventing the range of transboundary environmental impacts caused by development activities. Current environmental management discourse tends to focus on

developing more effective modes of communication to empower local people in resource management issues. This chapter does not seek to question the merits of this approach but instead seeks to explore another strategy to enhance environmental decision-making, which needs to be fostered concurrently, and be integrated, with notions of participatory democracy. This chapter, and the one that follows, focuses on the efficacy of strengthening regulatory institutions at the international level and facilitating extensive state activity to enable appropriate responses to transboundary environmental problems and more effective and equitable management of the global commons (areas beyond national jurisdiction) and resources which span jurisdictions. It is argued that coordinated, regulatory approaches, developed from clear decision-making processes, are best suited to the management of such environmental problems.

2.2. Transboundary and regional environmental problems

One of the clearest messages to emerge from the wealth of environmental literature that has been generated since the late-1960s is that environmental degradation does not respect jurisdictional borders. Although many international and provincial borders lie along natural barriers such as mountain ridges and rivers, these barriers do not represent breaks in physical and biological linkages of ecosystems. Further, these linkages are often more pronounced where borders arbitrarily bisect self-contained environments such as river catchments, forests, deserts and marine environments. In addition to the interconnectedness of ecosystems across international borders, environmental problems, which invariably are a result of human activities, are increasingly being understood as complex phenomena which can occur over great distances from their causes, or after a long period of time. They are often intricate in character and may have numerous causes. These causes are also complex and they can contribute to environmental problems in disproportionate ways, such as by being more prevalent during certain climatic conditions or only reaching harmful levels when combined with other causes (consider the greenhouse effect and acid rain). A challenge for environmental management is that environmental effects can occur over large spatial and temporal scales. The dimensions of the environmental effects of human activities have expanded due to, among other things, industrialisation, the effects of technological change, energy-intensive consumer lifestyles, large-scale resource depletion and increasing resource dependency, and other pressures caused by an increasing world population (Ebbesson 1996a: xvii; see List and Rittberger 1992: 3). In addition to an increasing awareness of these structural human factors, the international nature of many environmental problems has been brought into focus by

significant environmental fora and specific environmental incidents. The 1980s and 1990s in particular witnessed a number of well-publicised environmental incidents and phenomena – all human induced – that have been transboundary or international in scope or significance. Incidents such as Chernobyl (1986), the *Exxon Valdez* disaster (1989) and the Southeast Asian smoke haze (1997) and phenomena such as the enhanced greenhouse effect, ozone depletion and acid rain have served to bring attention to the transboundary and cumulative nature of environmental harm. They also have assisted in according 'environmentalism' intellectual legitimacy and provided the impetus for the development of formal mechanisms to ensure environmental protection at the nation state, regional and international levels.

It is now well known that environmental degradation operates on a global scale and that it involves political and economic dimensions as well as ecological dimensions (Elliott 1998b: 3). The trade in hazardous wastes, in particular during the 1980s, is a clear example of how the root cause of some environmental problems can be found in the imbalance of economic power which serves as a division between developed and developing countries. But the range of environmental harm requiring international responses is greater than cases involving localised pollution which simply crosses a border (such as river-borne pollution for countries downstream). It also covers environmental effects, which are sub-regional, regional and global in character. The first significant example of world-wide effects of human activities occurred in the mid-1980s with the discovery of the large hole in the ozone layer above Antarctica – as far removed as is possible from the northern hemisphere where the majority of ozone-depleting substances are released. Other key examples of how adverse environmental effects can be spread over great distances include acid rain and the greenhouse effect. But also relevant are patterns of development and general economic activity. These can result in effects within one country (such as deforestation, loss of biological diversity, desertification, competition and conflict over scarce water supplies, increased consumption of oil and fertilisers and emission of carbon dioxides) which can contribute to interferences in climatic conditions or regional environmental quality. Deforestation, for example, reduces the number of carbon sinks which can partly sequester carbon emissions from other countries. A reduction in the number of sinks could lead to more acute effects being felt elsewhere. Further, harm may be the result of specific pollution emissions, or it may be the result of the emission of substances which by themselves are not inherently dangerous, but, due to high levels of emissions, cause the build-up of concentrations of the substance which then cause effects. Alternatively, harm may only occur after emissions of one substance reacts

with other substances. All these issues, covering various types of transboundary harm on various geographical and temporal scales, require coordinated international responses for their prevention or management. It is normally easier to establish rules restraining state activity where the transboundary harm also involves detrimental effects to the offending country or where harm occurs to the global commons or commons resources such as harvestable migratory fish species. This is because states are more willing to act to prevent environmental harm which they experience, rather than impacts which are felt solely within another country. Administrative capacity to deal with the problems is necessary. For our purposes, we are concerned with local, sub-regional or regional environmental effects such as harm to two or more countries or to the global commons. We now identify the type of environmental issues which can occur at this scale, in particular, how they arise in relation to specific development activities.

2.2.1. Transboundary environmental implications of development projects

The potential for interstate conflict over transboundary environmental harm can occur where there is environmental degradation (such as pollution), scarcity of resources (such as fresh water or where there is overfishing), or when natural or human-induced disasters or accidents occur. We are concerned here with environmental effects of large-scale developments or activities which have the potential to be felt in countries other than those in which the developments or activities are taking place. A review is now presented of a development project which caused interstate conflict between Hungary and Slovakia, as well as a likely future development project with the potential to cause conflict between Australia and Indonesia or East Timor. These two brief case studies illustrate the range of environmental effects which can occur at this scale, the type of disputes they can lead to, and the methods which are used to resolve these disputes.

2.2.1.a. Timor Gap

In 1997, the final portion of the seabed border between Australia and Indonesia in the Timor Sea was finally delineated. This helped to remove a lot of the confusion that existed as to how both countries could lawfully exploit the fish and hydrocarbon resources located in the previously disputed region. Just as this occurred, the Southeast Asian region was plunged into economic crisis with particularly devastating effects in Indonesia. With Indonesia's levels of oil export declining, it has been keen to exploit the hydrocarbon reserves identified in the areas traditionally claimed by both Indonesia and Australia (Mercer 1999: 66). Due to the location of East Timor adjacent to the potentially resource-rich area, it, as well as its former colonial ruler Portugal, have been active in the resource-

access disputes. Most notably, this included an application by Portugal to the International Court of Justice disputing the legality of the Timor Gap Treaty concluded by Australia and Indonesia. There remains uncertainty as to how East Timor will be able to share in the profits of any extraction of resources. Complicating this picture are the significant recent developments toward establishing East Timor as a self-governing region. In fact, in October 1999, the United Nations Transitional Administration in East Timor replaced Indonesia as Australia's partner in the Timor Gap Treaty, requiring amending legislation to be put before the federal parliament.¹ In addition to hydrocarbon reserves, the area also contains commercially exploited fish resources including spawning grounds for the migratory Australian southern bluefin tuna. The Timor Gap dispute highlights the complex political and legal dimensions associated with development activities concerning resources which lie across international borders. These serve to complicate the scene in which development applications can take place. The environmental consequences of fish exploitation and oil production have effectively been sidelined in this case due to dramatic political issues which have arisen, particularly as Indonesia and Australia are vastly different countries in terms of culture, population and political stability. Existing agreements provide little detail on environmental conditions for development.² Although both Australia and Indonesia have advanced legislative domestic EIA frameworks, there are no agreements on what approvals processes will be necessary for the envisaged production sharing contracts implemented by a Joint Authority.

2.2.1.b. *Hungary-Slovakia Danube dam dispute*

In the 1970s, after concluding a bilateral treaty, Czechoslovakia and Hungary commenced construction of the Gabčíkovo and Nagymaros dams on the Danube river. These dams neared completion in the early-1990s at the same time as the end of the Cold War. It was at this stage that Hungary reversed its commitment to the project and decided to halt construction, ostensibly for environmental reasons. But there is much evidence to suggest that the motivation was deep-seated ethnic division complicated by legal and economic conflicts between the two countries. Direct negotiation and mediation by the European Union failed to resolve the dispute which then made its way to arbitration by the International Court of Justice.

¹ *Timor Gap Treaty (Transitional Arrangements) Bill 2000* (introduced 17 February 2000, House of Representatives).

² Article 18, Treaty between Australia and the Republic of Indonesia on the Zone of Cooperation in an Area between the Indonesian Province of East Timor and Northern Australia [Timor Gap Treaty] (Timor Sea, 11 December 1989), entry into force: 9 February 1991.

The project, involving the construction of dams either side of the border, demonstrates how political factors intrude on large-scale development projects. The motivation for the project can be found in communist rhetoric in the former Czechoslovakia with its state ideology centring on a commitment to technological development. The dams were to bring benefits of hydro-electricity, improved navigation on the Danube and flood protection. Public participation was effectively absent with planning details of the project remaining inaccessible. Public opposition to the project on environmental and social impact grounds was manifested with the fall of communism in Hungary in 1989. Anti-communist protesters focused attention on the Danube dam project with the aim of stopping it, motivated by the fact that the project had become a symbol of communist power and vision.

In 1990, Hungary stopped construction works, which resulted in Slovakia alleging that Hungary had breached its obligations contained in the 1977 treaty. The dispute was brought to the International Court of Justice for arbitration. Hungary argued that Slovakia, in diverting the river, would commit an internationally wrongful act by depriving Hungary of its right to a fair share of the river. The ICJ in its decision in September 1997 upheld this point. However, the ICJ, in discussing Slovakia's actions, neither appraised the quantitative nor the qualitative effects of the river diversion on the surrounding ecology, thus failing to address scientific evidence. The court thus could not determine if a particular threat was plausible and thus whether it warranted corrective action.

Hungary, in seeking to justify its decision to halt the project, identified a number of unacceptable environmental impacts, which had come to light in the period since the signing of the 1977 treaty which would justify non-performance of its treaty obligations. These included biodiversity loss, the potential lowering of groundwater levels, destruction of the unique ecosystem of the inland delta of the Danube, and, most importantly, endangering the supply of fresh water to Budapest. Slovakia, however, placed faith in mitigation programs and showed a 'general refusal to acknowledge that any such problems exist' (Lipschutz 2000). The project not only highlights that differences in scientific opinion can arise respecting predicted effects, but also how these opinions may be influenced by political goals.

So, not only do large-scale development projects create transboundary environmental impacts, but they also have the potential to contribute to regional insecurity where development goals and political flavours of neighbouring states conflict. This is further compounded by long time periods associated with such projects. In the case of the Danube, a commitment to communism by Czechoslovakia and Hungary in the 1970s was

a unifying feature, yet, close to project completion stage, this unifying feature had evaporated revealing conflicting interests based on ethnic differences. Achieving appropriate management solutions is thus challenging and suggests the need for context-specific solutions.

2.2.2. Transboundary effects and politico-legal context of development activities

Large-scale development activities, such as the extraction of resources located close to or straddling international borders, demonstrate the intractable political divisions which can arise between countries and how interstate relationships can change over the time period of development activities. This is most notable in the Danube dam dispute between Hungary and Slovakia which has taken place over 30 years through a politically tumultuous period in Eastern European history. Further, the current Timor Gap dispute illustrates the difficulties for states to reach agreement for joint development of a resource, and that these difficulties can be exacerbated by internal conflict within one country in which the other country has played a significant role. In this case, Australian-Indonesian troop skirmishes in the 1960s, Australia's wavering official stance on the question of East Timor's independence, and Australia's outspoken role in the events after the 1999 referendum (Mercer 1999: 67). Where activities are to be undertaken jointly, this is normally facilitated by signing and ratifying a bilateral treaty. However, due to the enormous financial stakes involved, the long period over which development takes place allows more opportunities for disagreement to arise particularly as new information comes to light about technical aspects of the project. Bilateral treaties may not end all conflict. There is scope for protracted legal dispute and arbitration in international courts. Differences can emerge in scientific opinion relating to predicted environmental effects, or otherwise on the political willingness of one state to allow a certain level of environmental impact which would be unacceptable to a neighbouring state also arise. The differences serve to highlight the difficulties encountered for countries to reach agreement on the type of development appropriate for their region and what level of environmental impacts are acceptable.

It should also be noted that environmental impacts are not the only consideration relevant to project approval decisions. Social and economic impacts also occur which needed to be considered. However, we are specifically concerned with the range of transboundary environmental impacts that can result from development activities with the view to determining appropriate management solutions. In the case of the Danube dams,

the main concern for Hungary was deterioration of water quality for its capital. With the Timor Gap issue, the potential environmental effects such as oil spills have not entered into the debate at this stage because each country is willing to continue the process for development of the oil and natural gas reserves discovered in 1995 (Mercer 1999: 66). Wider environmental issues such as contribution to the greenhouse effect and the merits of hydroelectricity have not been addressed in a formal setting. These issues tend to be overlooked with development activities, with most attention being focused on likely, significant cross-border effects.

2.3. Management approaches

This section provides an analysis of the theoretical arguments which underpin attempts to achieve effective international environmental governance. Focus is placed on regional environmental disputes and the regional and interstate management issues that are raised by large-scale development projects. Issues which arise include those which bedevil the achievement of regional and global environmental management. Most notably, existing world polity is often fragmented because it tends to be characterised by territorial or nationalistic disputes. The principal reason for this is that the world consists of independent sovereign states with no central administration. Although international law has developed apace in the last quarter of last century, it will be shown that international law frameworks for solving transboundary environmental problems have limitations. This section will attempt to make sense of the various strategies and underlying environmental and political theories for achieving cooperative environmental management at the international level. The next chapter suggests the approach most suitable for regional development issues which would encourage stronger international responses to environmental threats.

2.3.1. The problem context: how to manage transboundary environmental problems

The objective of how to achieve appropriate management of environmental problems that cross national borders has been a central topic for debate in environmental and international relations theory discourse since the late-1960s. Transboundary environmental problems can be classified as either requiring collaboration or coordination solutions. In the first situation, solutions are more difficult to achieve because it refers to problems in which key interests of countries are at stake and there is dispute regarding appropriate solutions, which tend to entail distributional costs. This occurs where a

solution imposes significant economic costs such as for pollution reduction which involves expenses for technical compliance but also prompts fears about loss of competitiveness if other countries 'free-ride' and avoid implementing equivalent standards (Haas and Sundergren 1993: 411). Coordination situations refer to issues whereby countries realise the benefit to them of collective action although there may be dispute regarding appropriate management solutions. There is consensus among environmental analysts and international legal practitioners that harmonised and integrated management processes need to be adopted for problems involving coordination and collaboration, yet there is no consensus on what form such approaches should take. One reason for this is that insufficient attention has been placed on the political implications of creating systems of governance structured to achieve sustainable development. To determine whether such governance is feasible, it is necessary to explore the roots of the debate concerning the most appropriate method of environmental governance at the national and international levels. This necessitates us turning to political theory.

A clear solution to the 'global environmental crisis' has eluded environmentalists ever since the trend of widespread environmental deterioration and depletion of non-renewable resources was identified. The reason for this is that, most likely, such a clear solution does not exist. A matter which is of critical importance to many commentators, is the identification of remedial measures for entrenched structural issues which dominate human activity. In particular, Western political systems and mass consumerism are widely considered to be two of the root causes of environmental ills. Due to the highly difficult, if not futile, nature of combating these structural phenomena, other environmentalists have advocated more immediate but strategic measures. Elliott (1998b: 3), for example, argued that coordinated management of environmental problems between states has become

a necessary (but not sufficient) condition for controlling or preventing the causes of environmental degradation and for finding ways to overcome or at least mitigate both the global environmental impacts of local human activity and the local impacts of global environmental degradation.

Others advocate less ambitious approaches, such as the more orthodox strategies of determining specific targets for pollution emissions and resource depletion quotas and generally modifying, but working within, existing political and legal parameters. Economists concerned with environmental issues and resource depletion have tended to focus on these types of 'solutions' to environmental problems (Taylor 1976: 1). In contrast to this, some 'doomsday' proponents repeatedly state that there is a crisis, both ecologically and in our ability to respond to ecological exigencies – a scenario that

portends disaster – and that this necessitates fundamental changes to human behaviour. Yet many argue that tangible benefits can be achieved through various measures within the parameters which define existing policy capacity and recognise that there is no panacea to global environmental problems, but rather, that numerous measures across numerous disciplines and time scales could be adopted with good effect. It is necessary to identify strategic measures which could be adopted at a number of levels, and which would operate in cohesion with each other to enable the best environmental results. This study attempts to achieve a synthesis between necessary fundamental changes to human behaviour and present opportunities to improve international environmental management utilising and reforming existing environmental protection mechanisms. It focuses on reforming existing legislative and institutional processes in order to enable close and effective cooperation between nation states. Also considered here is the issue of whether it is feasible to establish powerful state action to avert environmental problems. To achieve this synthesis, it is necessary to reconsider the temporal dimension of the debate by understanding the long-term nature of sustainable development and the cumulative, but tangible, gains many piecemeal reforms can have for environmental management.

2.3.2. Current trends in management approaches

There are a number of recent legal and political measures – although piecemeal and haphazard – that have enabled the management of environmental problems that cross state borders to be organised increasingly by international cooperation and coordination. This is evidenced by the preparation of numerous significant policy documents and the plethora of regional and international environmental instruments that have been adopted by countries since the early-1970s (Young 1990: 337; Brown Weiss 1992: 9; Schrijver 1996: 191; see Sands 1996). This trend in international cooperation reflects the recognition of the international community that coordinated management approaches and concerted international action are required for environmental problems. International regimes have achieved some success in protecting the global commons from specific threats, such as the depletion of stratospheric ozone and pollution on the high seas. Also, numerous regional regimes have been established to protect certain areas which span the jurisdiction of two or more countries from specific threats, such as those that control or regulate ocean pollution and the dumping of hazardous wastes, acid rain and trade in harmful chemicals. But not all states are obliged to offer the same level of environmental protection. International reports, such as the Brundtland Report (World Commission on Environment and Development 1987), and specific legal measures, such as ozone instruments and the Climate Change Convention, recognise an equitable basis to international law such that

states, notably North and South, have common but differentiated responsibilities (Dowdeswell 1995: 4). For example, the 1992 Rio Declaration, which has been signed by 178 countries and is arguably the most important document on international environmental matters, states in principle 7 that:

States shall cooperate in a spirit of global partnership to conserve, protect and restore the health and integrity of the Earth's ecosystem. In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility that they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

This recognises the special needs of developing countries that need to be taken into account in coordinated management approaches and investment as well as the differences in the degree of responsibility certain countries have for contributing to global environmental degradation. States have recognised that they need to work in unison, but invariably only agree to act according to their individual capabilities.³ However, administrative problems associated with the management of the global commons and with the provision of remedies for transborder environmental harm present a considerable challenge for the global political and legal system. Due to shortcomings in international agreements, such as the setting of low standards and difficulties with compliance and enforcement, it is necessary to examine what types of international regimes and institutions are, or would be, most effective in dealing with environmental problems which operate on regional or global scales and are caused by countless activities. It seems clear that current administrative structures are not able effectively to address current environmental problems (Bartlett 1990: 81). It is, however, a challenging task to assess, even theoretically, present legal and administrative structures to determine how well suited they are to addressing future transboundary and regional environmental issues. For example, the benefit to a country in preserving the ozone layer is unlikely (or at least unknown) to be proportional to its contribution to preserving it. It is necessary to determine an appropriate formula to distribute among states the costs of preservation, yet it is impossible to distribute the benefits (Jamieson 1994: 208). This is because benefits, such as improved air quality, tend not to be tangible or distributable. Each state has a tendency to 'free-ride' on the efforts of others (Sandler 1997: 19). Innovative measures that do not simply follow

³ See, e.g., Principle 15 of the Rio Declaration *infra* 4.3.1.

established norms of legal precedent are necessary in the evolving and progressive field of international environmental law. An amalgam of strict regulatory and facilitative approaches will be necessary for many problems. It also will be necessary for us to consider more far-reaching measures than treaty strengthening and to take into account the broad body of legal instruments that could be used to assist in the management of these problems. These will include, for example, the development of international regimes to enable the creation of legal obligations for discrete environmental issues (Jurgielewicz 1996: 97; see Porter and Brown 1991: 153 and Keohane et al. 1994).

The mechanisms available to address transboundary environmental harm include bilateral and multilateral treaties, as well as 'soft' international law documents such as the Rio Declaration. Treaty-based law can impose strict standards but these tend to be developed for specific environmental threats such as high seas pollution rather than confining practices within countries. But treaties not only have specific effects, they also have normative value in so far as countries which have signed them tend to feel obligated to implement the spirit of the treaties. Thus, institutions can be effective notwithstanding that power resides in states, not them. Institutions and formal arrangements can produce specific legal effects but they can also have wider, normative influence due to their pronouncements influencing government action. Keohane et al. (1994: 7) note that

While environmental degradation is ultimately the result of aggregated individual decisions and choices, individual choices are responses to incentives and other forms of guidance from governments and other national institutions via laws, taxes, and even normative pronouncements.

Institutional arrangements assist policymakers in facilitating cooperation across borders for specific management tasks as well as further developing environmental policies and commitments to them. There has been a proliferation of international environmental institutions since the United Nations Conference on the Human Environment in 1972 involving numerous multilateral environmental agreements and regimes for the protection of, among other things, stratospheric ozone and regional seas. Agreements are also in place to prevent the occurrence of various transboundary harmful effects such as acid rain. International institutions are defined as international *organisations* (e.g. Food and Agricultural Organisation, United Nations Environment Program) or international *regimes* (e.g. ozone protection regime and European longrange transboundary air pollution regime). It is the organisations which help to form regimes as institutional arrangements for environmental protection. Nonetheless, the effectiveness of these new developments has been questioned, particularly regarding their impact and

contribution to regional governance and their effectiveness in securing better environmental practices. Effectiveness is limited because most regimes aim to resolve only identifiable, discrete problems. However, most analyses have stressed policy content at the expense of policy process (Nye 1994: ix). It should be borne in mind that organisations for cross-border cooperation are not static, but operate in a dynamic context. Nye (1994: x) observed that environmental protection 'is a process, and institutions have contributed to the development of more stringent measures for environmental protection over time'. Thus, institutional instruments contribute to the evolving process of environmental protection notwithstanding weaknesses in their operation.

With the increase in transboundary environmental issues, there have been calls to consider new and different forms of decision and policy-making which are more coherent and responsive to environmental exigencies than existing structures which tend to consist of narrowly-defined treaties and platitudinous statements of policy. This, argues Caldwell (1993b: 10), 'means new forms of governance.' It is argued here that the complexity and large-scale nature of environmental problems requires that there be greater movement among nation states towards collective regulation and centralised management of the global commons and transboundary environmental problems. Existing environmental protection responses are limited in effect and new methods of responding to threats of environmental harm need to be identified and institutionalised. It is necessary for there to be clarity in international law concerning rules for state behaviour to avoid inflicting transboundary harm as well as the consequences which flow from their non-respect. Perhaps the most significant obstacle to more effective regional environmental management is the arrangement of states as individual actors on the international stage. We now turn to the issue of state sovereignty, and then identify the administrative problems that arise due to the nature of state administration.

2.3.3. Sovereignty

Nation states have, like individual people, a number of rights concerning their territory which they can exercise freely. This collection of rights is referred to as national or state sovereignty. The theory of sovereignty refers to the way in which one state (specifically, the supreme legislative power in the state) behaves towards other states and also how it acts towards its subjects. Nation states are considered to be equal and autonomous actors on the world stage with complete power over internal decision-making. However, this right has limits. A state can only exercise its rights to the point where it interferes with the ability of another state to exercise equivalent rights. For example, a state can only exploit its own natural resources to the point where it unduly impinges on the interests of other

states enjoying the same right. Likewise, a state's freedom to act with regard to its own citizens has limits, most notably in the field of human rights. This state of affairs presents a number of challenges to organising effective management approaches for environmental issues which do not respect international borders and has prompted calls for an approach to state sovereignty which better balances national and international interests.

It has often been stated that state sovereignty is the bane of international law (Stephen 1991: 185). This is because it operates to limit the effectiveness of international legal agreements by providing that any limitation on a state's sovereign rights can only be brought about by the consent of the state. Further, the concept of sovereignty promotes a sense of national identity and purpose in international relations, which can work against attempts to harmonise and integrate management approaches to shared problems. In most, if not all, international disputes in the 20th century, states have demonstrated a resolute desire to hold on to sovereignty and not allow it to be diminished. States tend to be resentful of pressure placed on them concerning how they should conduct matters which they consider to be purely of domestic concern. This is particularly the case in relation to developing countries which tend to be most resentful of potential encroachments on their sovereignty (Holsworth 1979: 16; Haas and Sundgren 1993: 419). However, there is a compelling case that, in the environmental arena, this not only is unhelpful, but also, that it often is not in the best interest of individual countries. For example, if all states agree that individual countries are free to produce an amount of ozone-depleting substances which is optimal for the development of their domestic industries, then the combined effect of this decision is deterioration in regional or global environmental quality. This impact is borne by numerous countries, often in disproportionate ways. Further, remedial action could require substantial investment negating individual economic benefit of unfettered production.

The overarching framework of national sovereignty presents an archaic perception of interstate relations and is incongruent to the prerequisites for achieving global ecological security (Mische 1989: 395). The achievement of more effective cooperation and integration of environmental protection policies among countries is hampered by the continual reaffirmation of the concept of state sovereignty in environmental treaties. Most notably, the two most significant international documents dealing with environmental matters – the 1972 UN Stockholm Declaration and the 1992 UN Rio Declaration – both entrench states' commitment to sovereignty. Principle 21 of the Stockholm Declaration states (in part) that:

States have, in accordance with the Charter of the United Nations and the principles of environmental law, *the sovereign right to exploit their own resources pursuant to their own environmental policies...* (emphasis added).

This principle was reiterated virtually verbatim in Principle 2 of the Rio Declaration. Strict adherence to state sovereignty presupposes that states act predominantly in their own best interests without prioritising potential negative impacts to other states. The effectiveness with which root causes of environmental problems can be addressed is diminished when states' policies are focused on maintaining national security and maximising economic growth (Keohane et al. 1994: 3). However, the concept of sovereignty has eroded somewhat with the rapid development of international environmental law since the 1972 UN Conference on the Human Environment in Stockholm.

2.3.3.a. *Environmental limits on sovereignty: treaty law and customary law*

Sovereignty is far from absolute. There have been a number of inroads made into the right of nation states to act independently of influence from others, principally due to developing rules of customary international law brought about by changing state environmental practices and the proliferation of environmental agreements. A component of state sovereignty, as articulated by the Permanent Court of International Justice, is that a state has the right to choose whether it wishes to enter into international treaties (Akehurst 1991: 16). Treaties are entered into purely on a voluntary basis and a state may decide to refuse to accede to a treaty without any legal recourse from other states. However, with the phenomenon of globalisation and the recognition of the interconnectedness of many problems facing nation states, there is much political pressure placed upon recalcitrant states to enter into agreements (see De La Madrid 1997). This was evidenced most poignantly at the 1992 Rio Conference on Environment and Development when the United States resolutely refused to accede to the Convention on Climate Change or the Convention on Biological Diversity. In the case of the Biodiversity Convention, the US argued that its provisions went beyond what was necessary to protect biodiversity and would have the effect of unduly restricting advances in the biotechnology industry (in which the US is the most significant investor). However, the US position was reversed in 1993 amid much political consternation when the Clinton administration took office.

Another dilemma presented by the freedom of states to choose what obligations to accept is the 'lowest common denominator' phenomenon. Treaties are by their very nature consensus documents, such that the standards set can only be the maximum acceptable to the party which is prepared to accept the lowest standards. This has the effect of over-representing minority views. This has prompted calls for different models for international

decision-making such as allowing decisions to be made by majority vote, enabling a more 'equitable balance' of the interests of states with differing environmental and economic policies (Hey 1992: 313; see Young 1990: 339). Some international agreements, such as the London Dumping Convention, incorporate opt-out mechanisms by which states can avoid being bound by certain provisions or standards (Hey 1992: 310). Models of weighted voting have also been suggested for decision-making relating to specific types of environmental problems (Ulfstein 1999). In the absence of revised models for international environmental management, more advanced states are hampered in their efforts to achieve higher regulatory standards which in turn compromises the principle of 'common but differentiated responsibility' of states adopted in numerous international environmental documents. This principle seeks to apply equity in international law by recognising the different capabilities states have in remedying international environmental problems in addition to different degrees of responsibility they have for causing such problems. For example, Principle 7 of the Rio Declaration states:

In view of the different contributions to global environmental degradation, States have common but differentiated responsibilities. The developed countries acknowledge the responsibility they bear in the international pursuit of sustainable development in view of the pressures their societies place on the global environment and of the technologies and financial resources they command.

This principle envisages that states should pursue increasingly higher standards which ecosystems and developments in environmental policy require. Other concepts prominent in international environmental discourse also indicate restrictions on state sovereignty in the interests of the international community. These include the concepts of 'sustainable development' and 'common concern of mankind',⁴ and the principles of 'intergenerational and intragenerational equity'. These concepts and principles have the normative effect of limiting the degree to which states can act oblivious to the larger interests of other states. Handl argues that the combination of these initiatives provides 'a conceptual platform from which the international community advances its claim to review or participate in certain national decision-making processes related to internationally sensitive environmental resources'. As a result, it is arguably the case that the protection of globally sensitive resources is a matter of legitimate international concern justifying interference in

⁴ See for e.g., General Assembly Resolution on Protection of Global Climate for Present and Future Generations of Mankind, UN Doc. A/RES/43/53, 27 January 1989 which recognises that climate change is a 'common concern of mankind', and the preamble to the Convention on Biological Diversity (Handl 1990: 31).

the otherwise purely domestic affairs of countries (Handl 1991: 86; Perrez 1996: 1189, Stec and Eckstein 1997: 41).

2.3.3.b. *Future directions in state sovereignty*

The spectacular increase in international air traffic and technological advances facilitating communication between people from countries far afield, are just two examples of globalisation resulting in increasing internationalisation of people and goods. There have been increasing alliances between people across borders to assist the pursuit of broader economic and cultural goals. These movements operate to diminish notions of national identity in favour of identification with regional interests including issues such as trade, human rights and environmental matters. The increasing prominence of transboundary environmental issues influences the way in which interstate relations are conducted. Elliott, for example, has argued that better governance requires that 'the concept of state sovereignty be reconceptualised and that the practice of global governance be decentralised and democratised' (Elliott 1998b: 118; see also Chayes et al. 1995: 76 and Perrez 1996). Thus, there has been a shift from nationally-focused environmental laws and policies to policies influenced by international legal and policy developments (Boer 1995: 101).

It is clear that concessions are needed to traditional formulations of the concept of sovereignty in recognition of environmental problems. Stephen argues that there 'will have to be a high degree of willing subordination of national sovereignty in favour of the common good of all nations' (Stephen 1991: 185; Panjabi 1992: 197; Haas and Sundgren 1993: 410; Keohane et al. 1994: 4; Hickey and Walker 1995: 430 and Vachon 1998: 718). Rules of customary international law and obligations contained in the plethora of bilateral and multilateral environmental treaties and identified by the International Court of Justice demonstrate that state practice recognises that sovereignty is not a right which should be exercised strictly. Common goals and management approaches are recognised as necessary and states have demonstrated a willingness to allow some diminution of their sovereign rights due to ecological exigencies. What were once matters solely within the national domain are now increasingly shared with other states or devolved upon the international community by way of international consensus or specific agreement (Handl 1990: 31). As a result, states will need to be more cognisant of the needs of the international community in implementing laws and policies previously considered to be matters solely of domestic concern. In fact, the validity of an individual country is greatly weakened unless it acts in concert with other nations (Vachon 1998: 691).

The nature and scope of state sovereignty has experienced quite dramatic changes in the second-half of last century due, in large part, to the increasing prominence being afforded to concepts such as sustainable development. Issues such as pollution and the desire of states to exploit transboundary resources demonstrate that traditional norms and practices of sovereignty are outdated and ill-suited to solving new types of environmental problems (Haas and Sundgren 1993: 402; Buck 1998: 28). However, although states may acquiesce in expressions of international concern over their internal practices, this falls considerably short of accepting emerging international rules which would limit their national resource policies (Handl 1991: 86). The pervasive effect of globalisation – influenced greatly by concern over environmental matters – is sparking more progressive notions of international relations and thus conflicting with traditional conceptions of state sovereignty. Yet despite the phenomenon of globalisation, sovereignty remains the central underlying plank of interstate relations. As a result, any solutions to shared problems must recognise states' continued adherence to the concept.

2.3.4. International environmental law

International law is primarily concerned with the duties of states (rather than individuals) and takes two forms: obligations contained in multilateral or bilateral agreements (treaties) and the more amorphous rules of customary law (derived from long-standing conduct of states).⁵ An 'international custom' (defined by the International Court of Justice (ICJ) as a general practice of nations accepted as law), will be enforced by the ICJ at the suit of a state as a rule of international law. The development of customary law is normally the precursor to the development of treaties, which provide for more explicit obligations. However, the process also works in the reverse way: as treaty law protecting the environment expands, principles expressed in normative terms enter into customary law. States voluntarily enter treaties and are then obliged to implement them domestically. This is the principal method for establishing new international law (Palmer 1992: 264; Szasz 1992: 66).

2.3.4.a. *Principal sources of international law: treaties, custom, and 'soft'*

Treaties concluded between states provide the most specific and easily enforceable obligations in international law. This is because treaties are concluded to establish rules expressly recognised by the party states. These binding agreements resemble contracts in

⁵ The sources of international law are listed in Article 38(1) of the Statute of the International Court of Justice (reproduced in 1976 *UN Yearbook* 1052).

national law and can function in a similar way to domestic legislation. Treaties are the most significant instruments for cooperation in international relations and allow for relations between countries to develop (Akehurst 1991: 24-5). In fields where customary law has developed, treaties are often concluded to codify rules where agreement on content can be reached in order to simplify practices and remove confusion.

The expansion of environmental consciousness has permeated the international community so that many new norms of environmental behaviour have emerged. States have more advanced legal interests and obligations concerning natural resource use and environmental protection beyond their territorial limits. However, while expanding environmental interests and responsibilities of states has altered industrial and other practices, this may not be enough to secure adequate environmental protection. Although customary law adapts to changing norms and has a capacity to impose binding obligations, it is routinely criticised for not having enough force to deal effectively with environmental problems. This is because it lacks sufficient scope, content and provision for regular and effective enforcement. Further, environmental norms take time to harden into enforceable rules of customary law because of the requirement that there be general recognition among states that a certain practice is obligatory (Palmer 1992: 266). However, unlike treaty law (which must specifically be accepted by states), customary law is binding on all states (except those that have consistently excluded themselves from the practice in question) (Szasz 1992: 67; McLoughlin and Bellinger 1993: 158; Dunoff 1995: 271). It thus presents the minimum legal standard to which all states are held.

Since the 1970s, there has also been increasing recognition of another type of international law: 'soft' law. This term refers to norms that, although not binding on states, are generally observed. That particular norms are observed creates an expectation that observance will continue, giving them predictive value (Szasz 1992: 70). They usually are articulated in international declarations or international agreements not concluded as treaties and thus not treated as laws covered by the Vienna Convention on the Law of Treaties (Hillgenberg 1999: 499). They are politically attractive because they leave considerable discretion to states and allow them freedom to agree to certain standards without needing to be mindful of consequences for breaches. In fact, standards set are often so vague that it is doubtful whether it is possible to adjudicate disputes concerning them (Schachter 1991: 490; Birnie and Boyle 1992: 27; K n z 1992: 161; Palmer 1992: 269). Yet, soft laws provide the conceptual basis for advances in environmental protection and, like customary laws, have the potential to develop into hard laws. The distinguishing line between customary law and soft international law is blurred.

2.3.4.b. Liability for transboundary environmental harm

The proposition that states are responsible for transboundary environmental harm, now incorporated in numerous United Nations resolutions and regional treaties, was first articulated with some degree of specificity in 1941 in the landmark *Trail Smelter Arbitration*⁶ decision. At issue was whether Canada was liable for the transboundary effects of sulphur dioxide emissions from a copper smelter within its jurisdiction. The emissions had, over a period of twelve years, caused damage to farmlands and crops in the United States. The tribunal awarded the United States compensation and stated (at 716):

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

This formulation of state liability – akin to the common law principle of ‘good neighbourliness’ – was extended beyond air pollution to other injurious acts by the decision eight years later of the International Court of Justice in the *Corfu Channel case*⁷ (Rothwell and Boer 1995: 248; see also Francioni 1991: 207). This case is authority for the proposition that every state has an obligation ‘not to allow knowingly its territory to be used for acts contrary to the rights of other states’.⁸ A further responsibility incumbent on states, established in the 1957 *Lac Lanoux Arbitration*,⁹ is the obligation to cooperate with other states to mitigate any transboundary harm which has been caused. Importantly, the arbitral and judicial determinations make no distinction between lawful and unlawful activities occasioning harm. The responsibility placed on the state is an obligation not to cause harm. It is the act of causing harm, which is prohibited, not the activity in question, which caused the harm.

Although the *Trail Smelter* principle became entrenched in international law, the extent to which the rule of liability has improved state environmental practices has been limited for three reasons. First, liability does not arise unless there is a wrongful act. It arises only when harm has occurred and this was reasonably foreseeable. Secondly, the environmental harm must be ‘serious’. Thirdly, evidentiary problems arise in the

⁶ *Trail Smelter Arbitral Tribunal Decision* (United States v Canada) (1941) 35 *American J. of Int'l Law* 684.

⁷ *Corfu Channel Case* (United Kingdom v Albania) [1949] ICJ Reports 4.

⁸ This is based on the fundamental principle *sic utere tuo ut alienum non laedas* (so use your own property as not to injure your neighbour's).

⁹ *Lac Lanoux Arbitration* (France v Spain) 1957 *Int'l Law Reports* 101ff.

establishment of causation. States have often maintained that they are not required to act to prevent harm until 'clear and convincing' scientific proof of actual or threatened harm is adduced (Birnie and Boyle 1992: 97). For example, the United States invoked 'scientific uncertainty' regarding the causation of acid rain by specific pollutant emissions as a reason for non-compliance with remedial measures. Likewise, in the United Kingdom, authorities used the lack of 'certain knowledge' that acid rain is responsible for tree deaths and lake acidification to justify continuing power station emissions (Handl 1990: 22; Yearly 1992: 524). In one respect, even the *Trail Smelter* decision is not as significant as it appears because Canada had accepted liability so the issue of causation did not arise (Charney 1991: 164).

Another limitation of the existing legal approach is that the standard of liability for harm caused to the territory of another state is not the onerous one of strict (or no-fault) liability, but a fuzzy question of 'due diligence', thus requiring an additional element of negligence to be established by extensive investigation for liability to flow (Boyle 1990: 15 and M'Gonigle et al. 1994: 146).¹⁰ This term is generally understood as imposing an obligation on states to promote 'good governance', which, in the environmental arena, is interpreted as requiring action to abate or prevent further transboundary harm. The degree of diligence required may differ from state to state depending, among other things, on the availability of resources (Birnie and Boyle 1992: 93).¹¹ Although states must restrict the use of their territory so as not to harm other states, if harm does occur, a state will only be required to pay compensation where the harm was brought about through a lack of proper care (Gullett 1997: 52-3). This standard falls far short of guaranteeing prevention of harm. For example, if diligent regulation and control over resources is exercised (such as where the state has introduced legislative and administrative controls considered sufficient to prevent transboundary harm), but nevertheless harm is caused to another state (such as where it was not reasonably foreseeable), the harm will be regarded as lawful and the injured state will have no legal redress in the absence of a breach of a specific treaty

¹⁰ However, some treaties do provide for strict liability, typically where activities are considered to be ultra-hazardous, such as the 1972 Convention on International Liability for Damage caused by Space Objects – 1972 *American J. of Int'l Law*, 66: 702. See also Principle 11 of the proposed legal principles for environmental protection and sustainable development adopted in the Brundtland Report. It purports to impose strict liability on states by requiring that they provide compensation 'should substantial transboundary harm occur even when the activities were not known to be harmful at the time they were undertaken' (World Commission on Environment and Development 1987: 349). Stapleton (1994: 186) has argued convincingly for the imposition of strict liability (in relation to product liability) where risks are taken in the pursuit of financial profit. This is apposite for development decisions where environmental risks are involved.

¹¹ See Boyle (1990: 7) for argument that in some circumstances there is no need for due diligence.

provision (see Gehring and Jachtenfuchs 1993: 93; McLoughlin and Bellinger 1993: 165). This allows a source state to conduct a hazardous activity in a reasonable manner and derive the economic benefits from it, while avoiding responsibility to pay compensation at a later time should harm occur to another state (Lefeber 1996: 15). Further, international law imposes no obligation on states to prevent harm *within* their borders. It also needs to be noted that in some circumstances states are not responsible for the harmful transboundary consequences of activities of private parties. In order to attribute liability to a state, normally it will be necessary to establish that the state was under an obligation to control the activity in question and had failed to do so (Gehring and Jachtenfuchs 1993: 93). This is a particularly important point when it is considered that the risk of transboundary harm is now often the subject of industrial activities carried out by private actors. In the normal case, the private operator itself will be held primarily responsible, although states are responsible for prevention, supervision and regulation of risky activities, and provision of compensation for victims (Gehring and Jachtenfuchs 1993: 93, 106). This provision does not affect this enquiry as we are concerned with activities specifically requiring state approval which also, in the main, operate prior to the causation of transboundary harm.

Although the principles emanating from the *Trail Smelter* doctrine establish that one state has an obligation not to cause harm to another state, legal responsibility to remedy the harm will only result under this head if it is established that the first state committed a wrongful act in that it breached an obligation held at international law. A distinction is made between acts which are wrongful in law (as in *Trail Smelter* where the harm was considered to be foreseeable and preventable: Boyle 1999: 77) and those which are not, for example an activity over which diligent control is exercised which nonetheless occasions transboundary harm. The distinction is of state responsibility and international liability. A state is *responsible* to remedy the harm it caused through a breach of an international legal obligation. *Liability*, on the other hand, does not require a breach of international law, merely causation of damage. It refers to the consequences which flow from harm caused by an act which is lawful (and thus permissible). The distinction regarding the lawfulness or unlawfulness of the act is critical – although often difficult – because different remedies flow according to the categorisation. Where the act is wrongful, remedies potentially available include compensation, cessation of the activity and reparation. Liability for non-wrongful acts provides no right to compensation or any other remedy (Boyle 1999: 76). Further, where compensation is available, it presents the difficult task of assigning an appropriate monetary value for the harm caused. It also is

inadequate to remedy irreversible or catastrophic consequences, such as ozone depletion or species extinction. As a result, transboundary environmental harm is usually not repaired (Gehring and Jachtenfuchs 1993: 93).

There is much dispute concerning the merits of the conceptual basis of distinguishing between activities which are or not prohibited by international law (Boyle 1990: 1; 1999: 74), yet nonetheless, international law proceeds on the basis of different rules of liability for harmful effects of acts depending on whether or not the acts are prohibited by international law. Significantly, the UN International Law Commission (ILC) is proceeding on the basis of the distinction in its codification and progressive development of the rules of international liability for harmful consequences of lawful activities in its attempt to remedy the situation where states are not liable to compensate for harm caused by activities it regulated diligently.¹² The object of the project is to enable states to agree on rules for prevention and adopt them in treaties, thus creating obligations prior to any consideration of the lawfulness of an activity. This effectively amounts to formulating rules for strict liability (Boyle 1999: 76). In 1998, after more than 20 years of work, the ILC provisionally adopted 17 draft articles on international liability for injurious consequences arising out of acts not prohibited by international law (International Law Commission 1998). The articles apply to activities which involve a 'risk of causing significant transboundary harm through their physical consequences', which is defined as encompassing 'a low probability of causing disastrous harm and a high probability of causing other significant harm' (Article 2). Conduct which falls into this category is generally termed 'liability without fault' and is equated with 'responsibility for risk' (Boyle 1990: 3). The articles emphasise the need to prevent or reduce the risk of significant transboundary harm using methods such as impact assessment. Where harm is caused, reparation would be required unless this did not fall within the 'shared expectations' of the states such as where the harm had been tolerated (Boyle 1990: 5; see Sucharitkul 1996).

The nature of the rules adopted by the ILC are similar to the rules emanating from *Trail Smelter* for wrongful acts. The duty the ILC seeks to establish of preventing harm cannot amount to an obligation because nothing can flow from a 'breach' of failure to prevent.¹³ It is more appropriate to term this a code of conduct which, if not followed, may

¹² Its attempt at codification is without prejudice to obligations contained in treaties or customary international law (ILC 1998: Article 6).

¹³ It is generally understood so far that the duty of prevention is an obligation of conduct and not of result. Accordingly, it is suggested that non-compliance with duties of prevention in the absence of any

affect determinations of compensation. Under the articles, liability can only be established – as in the *Corfu Channel case* – where the offending state ‘knew or had the means of knowing that an activity involving risk was being or would be carried on in its territory or under its protection or control’ (Boyle 1990: 8). This confirms the point that no liability can result from activities with no foreseeable risk of harm. Thus States are absolved from liability where harm is caused by activities (such as the use of chemicals) which was not, and could not have been appreciated until the harm occurred. This would rule out liability for the use of substances such as CFC and DDT which, when they were introduced, were considered to be safe. Liability can only flow from the point when risk is appreciated (Boyle 1990: 8). Nonetheless, the ILC draft articles are an attempt to refine the rules of liability for transboundary damage caused by hazardous – but lawful – activities. In its negotiations, the ILC was guided by three overarching principles:

1. every State must have the maximum freedom of action within its territory compatible with respect for the sovereign equality of other States.
2. the protection of the rights and interests of other States requires the adoption of measures of prevention and reparation for injury; and
3. the innocent victim should not be left to bear his [*sic*] own loss (quoted in Boyle 1990: 6).

The most significant shortcoming of the legal approach outlined above is that environmental problems must have occurred before the difficult legal progress for liability can be instigated. This ‘post-delictual’ approach, in which states are able to avoid acting to minimise environmental damage until after it has been caused or is inevitable, has been widely criticised in international environmental discourse (Hickey and Walker 1995: 429). The inadequacies of the existing environmental regulatory regime have been particularly acute in cases where environmental harm resulted from the cumulative effects of a number of activities over a long period (such as acid rain). Compensatory redress in such circumstances is almost impossible considering the hurdles in remoteness and foreseeability of damage which must be overcome. There has been increasing acceptance of the need for a more effective legal framework that would require states to take stringent measures to deal with environmental problems. By the 1970s, international jurisprudence had not developed to the point where it addressed the issue of state responsibility to *protect*

damage actually occurring would not give rise to any liability’ (ILC 1998: ch 3, para 32). The duty to prevent transboundary environmental interference which could cause significant harm was also recommended by the WCED Experts Group on Environmental Law (World Commission on Environment and Development 1987: 349).

the environment (Rothwell and Boer 1995: 248). When attention in Stockholm was focused on refining the principles underlying the international responsibility states have for the environment, there was little by way of jurisprudence upon which to build (Lang 1986: 490).

2.3.4.c. *A new duty: to prevent harm to 'the environment'*

Modern international environmental law has its origins in the 1972 United Nations Conference on the Human Environment in Stockholm. Prior to 1972, international environmental law related primarily to the development of responses to deal with specific environmental problems, such as the control of and liability for, pollution of international waters (Stephen 1991: 186; Rothwell and Boer 1995: 242). The Conference adopted a 26-point Declaration on the Human Environment which called for progress in the development of this body of law.¹⁴ The Declaration is a concise reformulation of the general principles emanating from *Trail Smelter* and subsequent jurisprudence. It is generally accepted as binding on all states as customary law (Handl 1991: 86; Chowdhury 1995; contra McLoughlin and Bellinger 1993: 163). The most recent authority for this proposition is a 1996 advisory opinion of the International Court of Justice in which it is stated that the prevention of transboundary harm arising from hazardous activities is now an obligation forming part of the corpus of international law.¹⁵ In 1996, the ICJ made a significant observation on the future direction of international environmental law:

[t]he environment is not an abstraction but represents the living space, the quality of life and the very health of human beings, including generations unborn. The existence of the general obligation of States to ensure that activities within their jurisdiction and control respect the environment of other States or of areas beyond national control is now part of the corpus of international law relating to the environment.¹⁶

The oft-repeated Principle 21 of the Stockholm Declaration contains the most significant statement relating to the obligation on states to protect the environment. The

¹⁴ Principle 22 urged states to 'co-operate to develop further the international law regarding liability and compensation for the victims of pollution and other environmental damage caused by the activities within the jurisdiction or control of such States to areas beyond their jurisdiction'.

¹⁵ ICJ advisory opinion of 8 July 1996 on the Legality of the use by a state of nuclear weapons in armed conflict, *ICJ Reports* 1996, p.15, para 29. (ILC 1998: Ch 4, B.2, para 3.).

¹⁶ Legality of the Threat or Use of Nuclear Weapons, Advisory Opinion, *ICJ Reports* 1996, pp. 241-2, para 29.

Principle sought to balance the 'sovereign right' of states 'to exploit their own resources pursuant to their own environmental policies' with

the responsibility to ensure that activities within their jurisdiction or control do not cause damage to the environment of other states or of areas beyond the limits of national jurisdiction.

Not only did Principle 21 effectively codify the *Trail Smelter* doctrine, but it also went further than the decision in that case in so far as it recognised the responsibility states have to adopt suitable measures to prevent harm outside their jurisdiction. The duty to prevent harm is often expressed in a way which requires states to take all 'practicable' steps to avoid harm. An example is Article 194 of the UN Convention on the Law of the Sea which provides that

States shall take, individually or jointly as appropriate, all measures consistent with this Convention that are necessary to prevent, reduce and control pollution of the marine environment from any source, using for this purpose the best practicable means at their disposal and in accordance with their capabilities, and they shall endeavor to harmonize their policies in this connection.

This suggests that states must make all reasonable efforts to avoid causing environmental harm. However, Principle 21 does not encompass situations where harm may not be identifiable or cannot reasonably be foreseen. As a result, it is not effective enough to cope with some threats (Lynch and Maggio 1997). For example, where cumulative effects of a number of activities occur (such as marine pollution), there is no clear identification of where one state's responsibility ends and another's begins.¹⁷ However, the most important aspect of the principle is its reference to the broad obligation states have to ensure that activities within their jurisdiction do not cause harm to 'the environment'. Since the early-1970s, international environmental law has dispensed with the need to establish direct and tangible injury to the territory of another state. Conventions and international resolutions now recognise the obligation to prevent harm to the global commons.¹⁸ This shift in

¹⁷ Lynch and Maggio (1997: Part IV) suggest a future formulation to include a duty 'to ensure that activities within a state's jurisdiction do not cause damage either by themselves or when considered international in light of activities being conducted by other states'.

¹⁸ See Principle 21, Stockholm Declaration on the Human Environment. Where harm has been suffered in areas beyond the territory of another state, the affected party is not an injured state which is authorised to prosecute a suit in the ICJ, but the community of states as a whole. To overcome difficulties in standing, the ILC adopted a formula in provisional form whereby any state is entitled to invoke responsibility for violation where this 'necessarily affects the enjoyment of the rights or the performance of the obligations' of other states party to a treaty or bound by rules of customary international law (Zemanek 1991: 192).

emphasis has afforded recognition that 'the environment' is itself a legal interest worthy of protection.

The recognition of the responsibility for environmental protection has provided the impetus for the rapid evolution of norms, principles and rules of international environmental law. Nowadays, neighbouring states also have the right to an equitable and reasonable share of transboundary resources (Stec and Eckstein 1998: 45). In addition to this is the duty found in some treaties to cooperate in addressing international environmental concerns (Lynch and Maggio 1997). Other obligations discussed later (see 6.3.2.) include conducting continuing EIA which is derived from the 'duty to continuously monitor the environmental impacts of development projects as facts and knowledge progress', as well as exchange of information (Stec and Eckstein 1998: 48). The transition to global environmental protection arguably was complete with the release of the Brundtland Report in 1987 (Rothwell and Boer 1995: 249). Further, at the UN Conference on Environment and Development held in Rio in 1992, parties adopted the Rio Declaration (a refined version of the Stockholm Declaration) which is an important document recognising newly emergent environmental principles and facilitating their inclusion in rules of international law. That international law is evolving rapidly and in innovative ways, is demonstrated by the decision of the International Court of Justice in the *Gabikovo-Nagyymaros* case. The court stated (at 216):

We have entered an era of international law in which international law not only subserves the interests of individual states but also looks beyond them and their parochial concerns to the greater interests of humanity and to planetary welfare. In addressing such problems, which transcend the individual rights and obligations of the litigating states, international law will need to look beyond procedural rules fashioned for purely inter partes litigation.¹⁹

2.4. Conclusion

International environmental law has developed rapidly since the Stockholm Conference and is set to continue to develop in a progressive fashion (Iwarma 1992: 113 and Dowdeswell 1995: 6). It has developed to a point where customary law and environmental treaties generally provide that states are obligated to 'regulate and control sources of potential transboundary harm, to notify and consult in case of proposed activities which

¹⁹ Case Concerning the *Gabikovo-Nagyymaros* Project (Hung. v. Slov.), (Judgment of 25 September 1997), 37 I.L.M. 162 (1998) at 216.

foreseeably involve transboundary risk, to give warning of known hazards, and generally to cooperate in the management of transboundary risks' (Boyle 1999: 76). Yet its principal limitations are that it is restricted to applying to harm which is considered to be significant, and liability for harm – no matter how serious – is avoided in circumstances where a state acted diligently. Thus, where transboundary harm has been caused which was either unforeseeable, or which, if foreseeable, could not have been avoided by taking reasonable care, the burden falls onto the innocent affected state (Boyle 1999: 77). There is a need for legal rules to be extended to take into account advances in environmental policy which recognise the need to prevent certain types of harm prior to them having occurred or becoming inevitable. At the moment, many specific ultra-hazardous activities are regulated by treaties, yet the problem is more complicated when it is cumulative, distant or uncertain effects which are sought to be addressed. The underlying basis to treaty obligations is that it is assumed all activities are permissible until they are explicitly prohibited or made subject to regulation (Hey 1992: 312; Stone 1993: 35). Compounding this scene is the fact that regulating domestic activities which degrade the commons or territory of other states pose a great challenge to traditional notions of sovereignty (Haas and Sundgren 1993: 407). States may acquiesce to statements of common responsibility for environmental problems, but how far will they go to allow new structures to be established with authority to control the exercise of external sovereignty? The key is to develop principles for good conduct and to determine the extent to which these can be refined and specialised for particular cases of prevention of unknown or distant threats. One option discussed in the next chapter is the opportunity to focus on regional approaches. The argument now turns to the effectiveness of regional approaches that advance norms of conduct and allow application of appropriate environmental protection measures across jurisdictions. More cross-border cooperation is required and there is a need for standard-setting in some areas (Schrijver 1996: 191). A focus is how to implement mechanisms allowing flexibility and the incorporation of the latest scientific information on environmental matters. In this respect, international environmental law cannot just rely on precedent; it must 'extend the boundaries of what we know as international law' and be future-oriented (Dowdeswell 1995: 6). We now examine the political factors that operate at the regional and international level and consider what constraints they place on environmental protection at this scale.

Chapter Three

The 'tragedy of the commons' and transboundary environmental problems: reconsidering Leviathan in the international sphere

That a man be willing, when others are so too, as farre-forth, as for Peace, and defence of himselfe he shall think it necessary, to lay down this right to all things; and be contented with so much liberty against other men, as he would allow other men against himselfe. For as long as every man holdeth this Right, of doing any thing he liketh; so long are all men in the condition of Warre. But if other men will not lay down their Right, as well as he; then there is no Reason for any one, to devest himselfe of his.

Thomas Hobbes's second law of nature. *Leviathan* (1651) ch. 14.

3.1. Introduction

The debate concerning what political structures are appropriate for the management of land and resources enjoyed by large numbers of people is generally regarded as having commenced in 1968 with the publication of Garrett Hardin's seminal paper 'The tragedy of the commons' (Hardin 1968). Hardin advocated the use of authority to achieve appropriate environmental management. By doing so, he triggered a significant turning point in environmental discourse. In the period that followed his publication, an increasing number of commentators seriously began to question the efficacy of individualist and liberal notions of political theory which had flourished from the Enlightenment to the post-war era. They began to advocate the establishment of stronger and centralised forms of

government as the best form of management and control to cope with environmental exigencies. This viewpoint held that Western liberal thought centred on the pursuit of material goods and the sanctified concept of inalienable individual rights and liberties. This had enabled an ideology of individual freedom and unrestraint to evolve which, among other things, enabled the belief that humans could dominate nature. Central to this ideology, nourished by the writings of theorists such as John Locke and Adam Smith, was faith in progress through science and technology and hostility to the concept of limits to human endeavours. This theoretical position placed faith in unregulated market economics, for example, holding that individual rights are freed by the 'invisible hand' of the market (Hoffert 1986: 6). In response to perceived faults in liberal democracy, the early-1970s witnessed the emergence of a theme in environmental discourse which would persist for most of the decade. This was the argument that the insatiable period of industrialisation had to be curtailed and a post-industrial 'modernity' solution to the attendant environmental degradation needed to be found. Most notably, Ophuls and Heilbroner built on Hardin's thesis in the 1970s and added support to the contention that a strong world government is necessary to save us from the 'tragedy of the commons'. This chapter reviews this debate and discusses issues relevant for the management of transboundary and regional environmental problems.

3.1.1. Hardin's parable

Hardin's thesis posits that where there is unregulated use of a resource which is available to many people, individuals, being 'rational' actors, will seek to maximise their personal gains by utilising the resource in ways that best suit them, rather than in ways that best suit the use and management of the resource for everyone. His famous parable involves a pasture, based on a medieval English commons, 'open to all'. There are a number of herdsmen using the commons. Each herdsman will seek to increase his herd because the benefit of each additional animal goes to the herdsman whereas the negative effects of overgrazing are shared by all the herdsmen. Each herdsman realises that the benefit he receives from each additional animal he places on the commons is greater than his proportionate share of the loss caused by a reduction in the overall yield of the commons when its carrying capacity is exceeded. Thus each herdsman 'is locked into a system that compels him to increase his herd without limit – in a world that is limited.' The total yield will be diminished, with the result that every herdsman will suffer a loss. It is not the unfortunate result which is tragic; the tragedy, as Latta (2000: 3) argues, lies in the result being 'foreordained as a necessary outcome of the condition of individual liberty in a commons'. It is the inexorable logic of the commons which is tragic: permitting people

the freedom to act how they please with respect to communal resources results in overexploitation, and thus 'ruin to all' (Hardin 1968: 1244). Thus Holsworth (1979: 10) suggests that the argument for an end to liberalism 'is in the guise of tragic realism'. Hardin also argued that the 'tragedy of the commons' can occur in a reverse way in relation to wastes: where, to an individual, the cost of purifying wastes is greater than the negative effects of polluting the commons, the individual will act 'rationally' and will pollute the commons. According to Hardin, this behaviour continues so long as people behave only as 'independent, rational, free-enterprisers'. The central tenet of Hardin's thesis, which is analogous to the theoretical 'prisoner's dilemma' scenario in which self-interest rather than common-interest or altruism is rewarded,²⁰ is that where a scarce resource is held and used in common, it is likely to be degraded because it will be mismanaged, or rather, unmanaged, due to competing interests of individuals.

3.1.2. Hardin's solution: mutual coercion

Hardin first considered whether privatisation of resources may be a partial way to avoid the tragedy. A benefit of private ownership is that, by having a special interest in their land, landholders are encouraged to maintain its integrity. Yet a flaw in this reasoning is that private use of land is not necessarily consistent with sustainable use because of the tendency of people to act in their own interest rather than in the interests of the wider community (Feeny et al. 1990: 9). Private owners may promote sustainable management, but this is likely to be in a manner which is only either for the term of their lives or until they sell the land or resource. Thus, exploitation is likely to be at a rate inconsistent with long-term sustainability. Further, privatisation raises equity concerns because many people or groups of people would be prevented from accessing resources to which others have exclusive rights. Significantly, as Hardin recognised, the tragedy remains for regions or resources such as air and water which are not amenable to privatisation because they 'cannot readily be fenced' and individually owned due to practical or philosophical

²⁰ The prisoner's dilemma is a hypothetical situation which demonstrates the social trap individuals face when they fail to cooperate when it is in the interests of everyone to do so. As Vogler explains, the dilemma is that confronted by two criminals charged with the same crime when they are being interviewed separately. They are informed that a lesser charge will be laid if they confess and implicate their accomplice. However, if they remain silent, they could achieve the best result because the police may be without sufficient evidence to secure a conviction. The dilemma is this: one criminal may remain silent, yet the other may confess. It is in the interests of both to remain silent, but, due to distrust of the other, the rational course for each criminal to avoid the maximum penalty would be to confess (Vogler 1995: 11; see Sandler 1997: 26-8). Thus collective action is thwarted because each criminal cannot be certain how the other will act. The prisoner's dilemma is also analogous to Hobbes's 'state of nature' (discussed below).

reasons (Hardin 1968: 1245; Gilpin 1980: 2-3). For such regions and resources another solution is required.

Hardin argued that the 'commons' would need to be managed as public property to which rights of access and use could be regulated. In particular, in relation to pollution, Hardin argued what is needed are coercive laws or taxing devices that would act as financial incentives for people to purify wastes rather than to discharge them. Simply appealing to people's conscience to act in the most suitable manner is unrealistic due to the 'rational' individualistic behaviour of people, and the 'natural tendency to do the wrong thing' (Hardin 1968: 1245). Thus we find the kernel of the argument for strong and centralised state power lying in the proposition that people will not voluntarily restrain themselves from using resources in an unwise manner. It is then inferred that coercion is necessary to achieve effective management (Taylor 1976: 3). Hardin, the quintessential rational choice theorist, argued that legitimated authority is required so that a suitable method of management can be instituted. The goal then for Hardin is to facilitate social arrangements that would 'legislate temperance' and produce responsibility among citizens. This would involve some degree of coercion to ensure that hard, but appropriate, management decisions are made. Hardin was careful to point out that his prescription would not lead to abuse of power. He argued that his 'coercive' solution need not involve arbitrary decisions made by 'distant and irresponsible' bureaucrats. In the most often quoted statement from his article, Hardin recommended only one type of coercion. This was 'mutual coercion, mutually agreed upon by the majority of the people affected'. Although this would inevitably be unattractive to some people and would result in foregone opportunities, Hardin argued that '[i]njustice is preferable to total ruin': the solution to the tragedy 'need not be perfectly just to be preferable' (Hardin 1968: 1246-7; De Young and Kaplan 1988: 274). Hardin attempted to allay fears of capricious authoritarian control and – very briefly – articulated an apparently attractive form of coercive decision-making, which would be based to some degree on democratic principles. Who would disagree with resource management decisions which were formulated by majority consensus and then given strong enforcement?

3.1.3. Response to Hardin

Some commentators consider that Hardin's central idea of competitive overexploitation of scarce resources (which have failed to be protected by traditional market economics) has been elevated to such an extent in the environmental discourse that it has become the conventional wisdom of resource overexploitation. This is because Hardin's article came at a time when concerns over the state of the earth were on the rise and activists were

trying to encourage governments to take a more active role in environmental protection (Latta 2000: 1). This was propelled by the adoption and development of his argument by commentators in the mid-1970s, most notably, Ophuls and, to a lesser degree, Heilbroner (discussed below). These two commentators largely agreed that it is necessary to impose constraints on liberal societies in order to provide the most effective planning and administrative structures and to optimise the capabilities and resources of society. This argument also postulated that physical and social systems (in particular, democratic institutions) would be unable to deal with the effects that would be brought about by the combination of overpopulation and resource scarcity in the absence of radical change (Orr and Hill 1979: 308-10). Taulbee termed this view 'world order radicalism', a perspective which holds that

the severe and imminent threat of disaster means that strict limitations and guides *must* be adopted and an enforcement authority with power to make conclusive determinations as to compliance *must* be fabricated. The capacity of states to pursue unilateral policies detrimental to the world community as a whole *must* be controlled (Taulbee 1979: 249).

Hardin's arguments were received favourably in the 1970s when environmental discourse was influenced heavily by the 'Limits to Growth' debate and concern about ecological 'overshoot'. A mentality had developed among many commentators of an impending monumental ecological crisis (due principally to industrialisation, or, according to Marxists, more specifically due to capitalist modes of production) which would be without historical precedent. This fear was a relatively sudden change from widespread post-war optimism which was based on perceived resource abundance and technological progress. According to Enzensberger (1974: 28), the core of this central 'ecological hypothesis' cannot be proved or refuted and as such, it will be 'heuristically necessary to base any thinking about the future on what it has to say'. Writers in this environmentalist 'survivalist' school were concerned with ways to 'build a capacity for foresight into collective decision making' in order to avoid global collapse (Dryzek 1997: 28). Many commentators clung onto Hardin's conclusion of coercive management as the 'Holy Grail' for wise resource use. However, a number of them, most notably Ostrom, attempted to refute many of Hardin's assumptions by adducing evidence of successful management of commonly owned resources (see Ostrom 1990). These arguments have been quite effective for specific local examples of resource management within small-scale property regimes where monitoring is more effective and individuals can more readily appreciate the benefit that will accrue to them as a result of their contribution to collective

approaches. Yet these arguments offer little critique of the applicability of Hardin's tragedy scenario to large-scale commons, such as the atmosphere, and typically ignore the complex interactions which take place between local resource regimes and centralised political power in the broader social and economic context (Latta 2000: 2-7).

At various analytical levels, Hardin's thesis is simplistic, or, at minimum, poorly exemplified. First, the assumption that all people will act 'rationally' and seek to maximise their material gain does not hold in all situations. Elliott (1998a: 520; see Vandermeer 1996: 301) points out that people may act rationally from different premises. Some, in fact, may choose not to seek material advantage over others in order to maximise their leisure time or to enable the achievement of other individual or social pursuits. Hardin does not substantiate his assumption effectively and overstated his point that people are motivated by individualistic desires to act in ways that are not socially beneficial. In his 'general statement' on the tragedy of the commons, Elliott (1998a: 521) argues, however, that Hardin need not have rested his argument on the individualistic nature of people. Rather, his argument could rest on the more general proposition that ecosystems will collapse as a result of societies which continually increase exploitation of finite resources irrespective of any particular political ideology or economic system. Such a pattern of growth is not contingent on individual self-interest but nonetheless requires some form of controls for activities which affect commons area. Many of Hardin's critics have also questioned whether his thesis was soundly based in terms of his deterministic analysis of the problem of common resource use and the efficacy of his solutions which assumes reliable monitoring measures are available and that there are few, if any, costs associated with administration. He has been criticised, among other things, for emphasising the ecological effects of the 'population problem' rather than the disparity in resource consumption between developed and developing countries. Hardin's critics have rejected his argument because of the questionable assumptions contained in it, such as the situation of truly 'open-access' resources, the individualistic nature of human behaviour, and conditions where resource demand exceeds the rate at which the resource can replenish itself. In many cases, Hardin's critics have pointed to the fact that societies do have sufficient internal cohesion and sense of collective good to organise appropriate behaviour so as not to degrade common resources, even in situations of uncertainty. For example, Feeny et al. (1990: 13) argue that:

Societies have the capacity to construct and enforce rules and norms that constrain the behavior of individuals. In many societies and in many situations, the capacity

for concerted social action overcomes the divergence between individual and collective rationality.

Leaving aside this considerable weakness in Hardin's argument, a more substantive and constant criticism of his work is that he misunderstood property regimes. He was essentially concerned with what he termed 'the commons', but he did not explicitly define what he meant by this term. When one considers that his model is based on a medieval English commons, and he considered the issue of water and atmospheric pollution, it appears that he melded essentially two different types of property regimes: *res communes* (common property resources) and *res nullius* (unowned and thus open access resources). The distinction between these two, which Hardin did not make, is significant. This is because open access regimes are essentially non-property, because they, by their very nature, cannot be owned. As such, they are characterised by the absence of rights and duties. However, common property regimes can, and usually do, include defined ownership and controlled rights of access and rights of use – although invariably in a manner different to Western expression of law – and thus are not 'open access'. Feeny et al. (1990: 3) identify two basic characteristics of common property resources. The first is lack of excludability, or the inability or difficulty of excluding or controlling access (e.g. regulating access to migratory fish stock). The second characteristic is subtractability, where, by using the resource, each person thereby diminishes the availability of it to others, thus creating rivalry. Feeny et al. (1990: 3) further note that rivalry exists in this situation even where cooperation is promoted because the nature of common property resources 'is such that the level of exploitation by one user adversely affects the ability of another user to exploit the resource'. Thus, subtractability is 'the source of the potential divergence between individual and collective rationality' (Feeny et al. 1990: 3). Examples of common property regimes include communally owned and operated wells and grazing lands. Yet Hardin's scenario is different. He was principally concerned with 'open access' commons rather than small communally owned patches of grazing land upon which his metaphor is based. His argument would not hold if his example involved animals which were not privately owned. If the herd was owned collectively, but managed individually, each herdsman would be motivated not to overgraze the pasture because the negative impact would be felt by each herdsman equally and no tangible benefit would accrue to any one herdsman for overgrazing. Further, Hardin's critics have routinely argued that most village commons would not result in the 'tragedy' because invariably there exist collective management systems that operate to prevent users from overexploiting resources (see O'Riordan and Turner 1983: 265; Bromley 1989). Hardin

partly addressed this criticism two decades later when he explained that the title of his paper should have been 'The tragedy of the *unmanaged* commons' (Hardin 1988: 76; 1998: 683). Other commentators have defended Hardin by arguing that he was not concerned with an actual commons but rather that his parable serves to illustrate his central point concerning traditional ethical thinking by which every person aspires to a high standard of living and this will result in collapse due to finite resources (Elliott 1998a: 518). Putting aside the criticism of the usefulness of Hardin's metaphor because it confuses two types of commons regimes, we will pursue Hardin's argument that for open access resources, overexploitation of them is an inevitable result in the absence of overarching control.

When we narrow Hardin's analysis from his rather misleading 'commons' situation to 'open access' resources, even his critics tend to support his basic contention that, due to the inability to regulate access to resources, they will be degraded. However, while conceding this point, Feeny et al. (1990: 6) note that there have been examples where Hardin's tragedy resulted only after the creation of open-access conditions due to the destruction of largely successful pre-existing communal tenure systems. Yet this view tends to overlook the fact that the tragedy tends to occur most often when the scale of study and the environmental issues are enlarged. The greater complexity of environmental issues associated with overexploitation of global commons resources, and the decreased likelihood of an individual's harmful self-interested conduct being detected, suggests that communal property regimes would have limited effectiveness at the international level in the absence of overarching regulatory controls. Also, Feeny et al. (1990: 9) concede that Hardin's prediction that incentives for people to exploit open-access resources in harmony with others are either weak or absent.

It is useful to our discussion of effective management of regions or resources of international scale to elaborate upon Hardin's central argument. What is of concern to the writer here is the applicability of 'scaling-up' Hardin's arguments and applying them to the international arena. This is, in fact, an argument which Hardin cast doubt upon in subsequent writings. In his almost as famous 'Living on a lifeboat' paper (1977), he argued that international management would not be effective, thus leaving nation-states to be the highest form of authority. However, there are existing, and emerging, 'global' commons, such as the high seas, where there are attempts at the international level to convert what is an open access resource to a common property regime by regulating pollution or activities such as fishing. Examples of this approach include fishing quotas and measures to limit previously virtually unfettered carbon emissions which contribute to

global warming. Shortly, we turn to the international level to determine whether the central argument of Hardin's critics – that societies can construct codes of conduct for collective management – holds at the international scale. Can we consider nation states to be analogous to Hardin's 'rational' individual herdsmen? Is it possible to have effective international cooperation in the absence of Hardin's 'mutual coercion'? We will focus upon Hardin's central point, 'that physical and biological determinants limit the range of options available for moral and political life' (Elliott 1998a: 519). But first, more aspects of Hardin's thesis – in particular, its historical background – need to be explored.

Although the proposition that everpresent environmental exigencies necessitate the adoption of a strong form of government so that the most equitable and rational resource management decisions are made was first articulated with some degree of sophistication by Hardin in 1968, the philosophical roots of this proposition go back much further. Hardin cites the work of William Forster Lloyd, published in 1833. Hardin's argument can also be found in the following anonymous response in 1764 to Sir Charles Pratt's fencing of common land from public ownership and use:

The law doth punish man or woman
That steals the goose from off the Common
But lets the greater felon loose
That steals the Common from the goose.²¹

But more significantly, most of the core ideas of the tragedy of the commons were treated comprehensively by Thomas Hobbes in his 1651 work '*Leviathan*'. The ideas can also be traced, in lesser part, to Plato's 'philosopher king' and the notion that justice functions society for the social good, and other notions of benign governance which lie within the Greek philosophical tradition. In a later paper, Hardin (1977) correctly credits the original formulation of the idea to Aristotle, yet Socrates too suggested rule by philosophers (Leeson 1979: 304). In fact, many issues with which Hardin was concerned had been treated previously by a number of theoreticians, all concerned with the nature of power and how a just society can be achieved. However, Hardin's greatest debt – although unacknowledged by him in his 1968 paper – is owed to Hobbes's central thesis that human nature is inherently selfish and that this, coupled with a situation of scarce resources, inevitably leads to conflict concerning those resources. Hobbes argued that this situation requires us to establish a '*Leviathan*' (a 'mortal god') to rule over us with absolute power

²¹ Quotation located at www.publicaccessnewzealand.org/files/overview.html (visited 2 June 2000).

so that conflict is avoided. Although Hobbes was concerned with domestic peace and security rather than environmental problems, his rationale for strong domestic power was essentially the same as Hardin's. However, although Hobbes's Leviathan must be understood in its historical context, it has been largely discredited by ecologists concerned with political theory on the basis that it goes too far and that it cannot be transposed neatly to the environmental context because environmental exigencies are more complicated than Hobbes's analysis would allow. Nevertheless, it is an important subject of study because of its influence on the 'environmental crisis' debate of the early-1970s, the subsequent adoption of his thesis by numerous 'neo-Hobbesians' and the support it lends to increased obligations in international environmental law.

3.1.4. Thomas Hobbes's Leviathan

Thomas Hobbes was one of the first modern political philosophers and stands as the most influential advocate for the state. In the mid-17th century he articulated a form of governance for countries which he argued would be necessary to save us from a situation of inevitable turmoil resulting from increasing conflict over scarce resources. The solution that he proposed was for citizens to yield-up power to a sovereign, either a person or a body of people, that would be 'so awesome in its power' that it could rule strongly and fairly in the best interests of society. Hobbes's proposal was an early version of the 'social contract' in which law would provide collective peace and good order due to the agreement of citizens mutually to relinquish individual freedoms in the interests of social cohesion (Walker 1988: 71; Cotterrell 1992: 71). People would benefit from the security of civil society and authority. He described his sovereign as a 'great Leviathan' or 'mortal god' that would rule wisely and be enforced by a civil government (Ophuls 1973: 218). Hobbes contended that his sovereign should have exclusive responsibility for all public decisions because people are incapable of making decisions without being influenced by selfish motives.

The rationale that drove Hobbes's proposed form of governance was his largely pessimistic view of human nature which, according to him, was the basis of the state. Contrary to Aristotle's conception that by nature people are social beings, in Hobbes's atomistic analysis of the 'state of nature' (being the original anarchic condition of humans – prior to laws and property regimes), life is solitary and poor as well as 'nasty, brutish, and short'. People live in continual fear of others and in constant danger of violent death. Hobbes argued that this was because people are preoccupied with self-advancement, both material- and eminence-oriented, because they are governed by their own passions. On this point, Hardin departed from Hobbes's analysis. Hardin's argument is predicated on

material scarcity, whereas Hobbes's argument is based also on the scarcity of relational goods (which are scarce by definition) such as power, status and glory (Latta 2000: 4). In this situation, cooperation among people is even harder to achieve. Hobbes did not, as many commentators assume he did, consider humans to be intrinsically evil (Ophuls 1997: 44). Rather, he considered that people's desire to improve their condition relative to others dominates individual reason. In the nature of man, Hobbes identified three principal reasons why people quarrel: competition, diffidence and glory. In fact, Hobbes believed that all of humankind was inclined with 'a perpetuall and restlesse desire of Power after power, that ceaseth onely in Death' (Hobbes 1985 [1651]: 161, 185-9). To understand Hobbes it is necessary to recognise that he was an adherent to the 'material man' concept. He believed that people act virtually solely in their own interests and that this worked against cohesive social relations. According to Hobbes, this situation leads to enmity and distrust among people such that the natural human condition, as he was fond of saying, was a war 'of all against all'. In the condition of man as understood by Hobbes, every man has a natural right to everything, similar to Hardin's tragedy of the unmanaged commons. As long as this right of absolute freedom to act endures, there can be no security for anyone (Hobbes 1985 [1651]: 190). In Hobbes's view, this is the natural result of the juxtaposition of dissociated individuals in the absence of an overriding power controlling them all. Further, he adhered to the school of thought that saw practical reasoning as a scientific art of measurement and calculation (Johnston 1990). As such, important decisions were best left in the hands of wise and fair rulers.

Due to the consequences of unfettered liberty, Hobbes suggested that some freedoms and rights must be relinquished in order for citizens to obtain greater real freedom. The state of nature requires citizens 'to transferre to another, such Rights, as being retained, [that] hinder the peace of Mankind' so that there could be 'a common Power to keep [the people] all in awe' (Hobbes 1985 [1651] 201, 189). This was because in the absence of societal constraints on people's access to resources, by 'nature', as people are rational beings, they will selfishly seek their own benefits by trying to obtain the fruits of resources for themselves. They will also do this as soon as possible to deny others equal access because of constant competition based on perpetual suspicion and fear of others. In Hobbes's view, people would continue to act selfishly until laws are enacted that would prevent this behaviour. Justice would only come with the creation of the state. In a classic passage, which can be contrasted with the Lockean view which places faith in the 'law of nature', Hobbes stated that

[I]t is manifest, that during the time men live without a common Power to keep them all in awe, they are in that condition which is called Warre; and such a warre, as is of every man, against every man (Hobbes 1985 [1651]: 185).

Underlying Hobbes's thesis is his recognition that people are possessed with *reason*. Importantly, a paradox arises: at the same time that people realise that individual-oriented action benefits them, they also are capable of seeing that cooperative approaches among people would be in the best interests of everyone. However, they realise that unless cooperative approaches could be enforced against everyone equally, there is no point for a person individually to relinquish personal rights and liberties. If one person did so individually relinquish these rights, the result would be that the person would be more vulnerable to others who would not act likewise. Thus, if people cannot agree to act cooperatively, a powerful overruling body must be established to enforce cooperative approaches. Yet a flaw has been identified at this stage of the theory. If people can cooperate so as to be able to establish such a power, then why would it be necessary to have such a power (see Krier 1992: 337)? This may be partly answered by the likelihood that where many people reach agreement, it often is at the lowest possible level and thus not effective to achieve the goal of societal peace. The details of creating such a state are not explored by Hobbes.

Although critics of Hobbes's materialist evaluation of the nature of human behaviour point to other unacknowledged human characteristics such as altruism, his analysis was supported, at least in part, at the time of his writing by the turmoil surrounding the English civil war and also by many conflicts which occurred after the time of his writing. In addition, many analysts of Hobbes have focused on his materialist argument (that people seek material benefits) and have understated the importance that he placed on the desire for eminence. Due to Hobbes's emphasis on people's perpetual desire for power and eminence, it would seem that his argument holds that there would be conflict among people even in the absence of resource scarcity (Walker 1988: 71-3). Thus his justification for Leviathan hangs firmly on his contestable assumptions about human nature.

A crucial problem Hobbes identified was that no laws could be made until people agree on who will make them (Hobbes 1985 [1651]: 187). This was an important constraint on his Leviathan because it must act in the best interests of the people over which it governs, otherwise it would lose their support which is critical to its survival. The legitimacy of the Leviathan was predicated on it continuing to fulfil the purpose for which it was instituted. The Leviathan must rule lawfully and explain its acts to its subjects.

Importantly, Hobbes identified education, rather than coercion, as the central element in sovereign rule (Williams 1996: 219). People would accept the authority of the sovereign because its laws would be wise and they would understand the need for moral restraint, although this may be achieved largely by way of indoctrination and eliminating opportunities for critique. Thus, somewhat awkwardly, to some degree Hobbes based his Leviathan on the consent of the people. People must accept the authority of the sovereign, but it could be resisted if it became a threat to the people. This could be done only *en masse* if the sovereign was not fulfilling its duty to the people. However, the fate for individual dissidents was less sanguine: because the majority had by consent adopted a sovereign, those that would dissent could be discounted. Otherwise they could justifiably be destroyed. For some groups, the Leviathan could rule by conquest in the absence of a covenant.

In Hobbes's analysis of the state of nature, people are not inclined to behave in mutually responsible ways because there is nothing compelling them to do so. However, 'if there be a common Power set over them both, with right and force sufficient to compell performance' such performance will be effected

because the bonds of words are too weak to bridle mens ambition, avarice, anger, and other Passions, without the feare of some coercive Power; which in the condition of mere Nature, where all men are equall, and judges of the justnesse of their own fears cannot possibly be supposed (Hobbes 1985 [1651]: 196).

Thus, according to Hobbes, without the 'sword', words are too weak to hold people to what they covenant. However, he argues that there are two powers which can strengthen it: fear (associated with glory) or pride. Yet Hobbes was pessimistic about this last category because it is a generosity 'too rarely found to be presumed on, especially in the pursuers of Wealth, Command, or sensuall Pleasure; which are the greatest part of Mankind.' Thus, he argued, the most effective passion to utilise is fear, ideally fear of an 'Invisible Power'. There must be some 'coercive Power, to compell men equally' to perform their societal obligations 'by the terrour of some punishment' if they breach their obligations (Hobbes 1985 [1651]: 202). This power requires the establishment of a Commonwealth. In fact, Hobbes favoured, but did not insist upon, a monarch so that one person would hold the awesome power. He even suggested that his sovereign could be a democracy or aristocracy (McDowell 1998: 379). Other commentators have favoured different types of sovereigns due to concerns about power being invested in one individual. For example, a concern for John Locke about individual power was that there would be no

means for citizens to appeal. He argued that the only role of the sovereign should be to maintain peace (Ophuls 1997: 43).

Hobbes's prescription of an absolute sovereign was aimed at facilitating the best decisions for the entire society. Individuals should be able to pursue self-interest but not in ways that encroach on the rights of others. However, he also believed that his solution would have another beneficial effect. The sovereign, while having absolute power, would not encroach on all aspects of people's lives (Ophuls 1997: 31). It would create 'hedges', rather than walls, to guide people. People would be freed from involvement in troublesome political matters because these would be the purview of the sovereign. This would enable people to achieve a high state of advancement in their personal lives by being able to devote more time to the pursuit of matters that would benefit them personally. By relinquishing some individual rights and freedoms they would obtain greater real freedom. Ophuls (1973: 218) noted that citizens of Hobbes's well-ordered commonwealth could 'enrich themselves through industry, practice the arts and sciences, and generally enjoy the fruits of civilization'. This separation of personal matters from political matters seemed not only to be straightforward to Hobbes, but also something that people would relish. He argued that the 'Desire of Ease, and sensuall Delight, disposeth men to obey a common Power' (Hobbes 1985 [1651]: 161). This argument was mirrored by Hardin who argued that once people 'see the necessity of mutual coercion, they become free to pursue other goals' (Hardin 1968: 1248).

Hobbes foreshadowed Hardin in so far as he advocated the renunciation of individual liberties so as to achieve a common goal. In Hobbes's case, the common goal was peace; in Hardin's it was wise use of resources. However, the solution to the tragedy that Hardin proposed was somewhat different, although reminiscent of Hobbes's solution. He envisaged a form of governance whereby there would be social arrangements that produce responsibility. He agreed that individuals needed to relinquish some individual freedoms (principally in relation to the pursuit of resources) so that there would be greater real freedom (in the sense that decisions would benefit the majority). Coercive laws or taxing devices would be instituted so that scarce resources are used in the most suitable manner. Hardin supported John Adams's argument – drawn from Aristotle – for legitimised authority and the creation of strong governments of laws, not 'men'. A strong legal system based on clearly defined rules would reduce the opportunity for corruption. Hardin sought for responsible social arrangements and considered that these would be best achieved through some measure of coercion. In many ways, this is a modern, but less

severe, version of Hobbes's *Leviathan*. We now turn to other influential writers who adopted and expanded Hobbesian and Hardin logic.

3.1.5. Neo-Hobbesians: Ophuls and Heilbroner

The writings of William Ophuls and Robert Heilbroner in the 1970s, who advocated the extension of the scope of state power, are the foremost examples of the modern environmental works which claim the authority of Hobbes 'by purporting to follow the logic of *Leviathan*' (Walker 1988: 68). Although these writers broadly supported the justification of the state put forward by Hobbes, they regretted the scenario of a less or undemocratic future. Rather, they considered this to be inevitable due to the unsustainable nature of existing patterns of production and consumption. In this section, an analysis is provided of Ophuls and Heilbroner's contribution to environmental discourse to assist us in our determination of whether it is feasible to establish a strong international environmental regime.

Of the number of political theorists and environmental writers of 1970s who sought a solution to the 'environmental crisis', it was Ophuls who wrote most closely in the Hobbesian tradition. The central problem with which he was concerned – as indeed were most political theorists – was how the interests of society as a whole could be advanced when people 'behave or are impelled to behave in a selfish, greedy, and quarrelsome fashion' (Ophuls 1973: 216; Ophuls 1977: 151). Ophuls drew attention to the similarities between the arguments of Hobbes and Hardin and argued that freedom in a commons and in a state of nature 'are alike in bringing mutual ruin'. They both argued that it is people's desire for gain in a situation of finite resources which drives them to behave in self-destructive ways. Ophuls noted that Hobbes further observed that this struggle for scarce resources generates a wider struggle for political power and creates the potential for violence (Ophuls 1973: 217). In fact, Hardin himself argued in a later paper that to avoid ruin in an overpopulated world, 'people must be responsive to a coercive force outside their individual psyches, a '*Leviathan*,' to use Hobbes's term' (Hardin 1978: 314). However, Ophuls commented that although political order is not at stake in the tragedy of the commons, in many ways the dilemma is more insidious than that in the state of nature. This is because the tragedy will occur even in the absence of people or groups acting selfishly:

[T]o bring about the tragedy of the commons it is not necessary that men be bad, only that they not be actively good – that is, not altruistic enough to limit their own

behaviour when their fellows will not regularly perform acts of public generosity (Ophuls 1977: 149).

Although Ophuls argued that Hobbes's account of the anarchic state of nature is inaccurate and fictional in so far as it is not supported by anthropological or historical evidence and was 'largely a projection of his fears for the future' based on more recent social disruption (Ophuls 1997: 31), it was readily apparent to Ophuls that people in fact were not altruistic enough for there to be sensible management of commonly-owned resources:

[T]he essence of the tragedy of the commons is that one's own contribution to the problem...seems infinitesimally small, while the disadvantages of self-denial loom very large; self-restraint therefore appears to be both unprofitable and ultimately futile unless one can be certain of universal concurrence (Ophuls 1977: 150).

Much of Ophuls's argument rests on the contention that since the mid-20th century there is no longer a plentiful supply of resources which everyone can access. As a result, the democratic concepts of individual rights and liberties have to be restrained to avoid environmental deterioration, poor resource management and conflict. In fact, according to Ophuls (1977: 133), it was only due to a 'brief historical interlude of apparently endless [resource] abundance' that individual freedoms were able to flourish. This was because in areas where carrying capacity had not been reached, it was not rational for people to impact on their neighbours' rights because they could create their own wealth without doing so. That people were able to achieve independence and individual wealth was largely due to the pervasive influence of the Lockean concept of applying human labour and intelligence to unexploited areas so that 'value' could be created in resources. In fact, Ophuls (1977: 144) noted that Locke's justification for private property and the 'natural right' of people to appropriate resources 'rests on cornucopian assumptions: there is always more left; society can therefore be libertarian.' As a result, he distanced himself from the arguments of Locke, Smith and Marx. The philosophies of each of these writers rest on nature continuing to provide for people's increasing material demands (Ophuls 1997: 43). However, Ophuls argued that the assumptions of unlimited exploitation could no longer be supported due to increasing populations and resource demand and the recognition that resources are not abundant. Ophuls (1973: 222-9) sought to discredit the 'Enlightenment myth that all things are possible for the society of man.' The 'golden age of individualism, liberty, and democracy is all but over'; the 'Great Frontier' of the New World 'is gone now, and we have encountered the limits of the commons' (Ophuls 1977: 145, 154). Concepts such as the individualistic basis of society and inalienable rights

become problematic, requiring modification or even abandonment. Ophuls (1977: 151-2) was led to conclude that if, where there is ecological scarcity, 'individuals rationally pursue their material self-interest unrestrained by a common authority that upholds the common interest, the eventual result is bound to be common environmental ruin.' Although Ophuls broadly supported Hobbes's structure for governance, he differed from him in so far as Hobbes's central aim was to achieve peace through distributional justice, whereas Ophuls was more interested in realising the liberal goal of individual self-development by achieving a polity centred on ecological concerns. The 'existence of ecological scarcity', Ophuls (1997: 44) wrote, 'only strengthens the argument for a powerful sovereign.'

Central to Ophuls's prescription is substantial behavioural change, such as frugality in consumption and the creation of a collective conscience. Yet attitudinal change and the inculcation of rigid social norms may only be sufficient to prevent ecological ruin in small and cohesive social groups. Ophuls notes that his conclusions are extreme and provide radical challenges to Western values. Indeed, he states that 'democracy as we know it cannot conceivably survive' (Ophuls 1977: 152). It is upon these assumptions that Ophuls (1977: 154) reaches his important conclusion: only a government 'possessing great powers to regulate individual human behaviour in the ecological common interest can deal effectively with the tragedy of the commons'. Further, Ophuls argued that it is necessary for planetary common interest to create a strong world government but recognised the difficulty of doing so due to the impediment of the strong ideological commitment to sovereignty of nation states. What is needed is centralised environmental planning, resource allocation and political power. In fact, his prescription was less democratic than Hardin's because he believed mutual coercion was too participatory.

Ophuls advocated the establishment of a 'steady-state' society. What he (and others) have meant by a steady-state society is

essentially one which has achieved a basic long-term balance between the demands of a population and the environment that supplies its wants. Implicit in this definition is the preservation of a healthy biosphere, the careful husbanding of resources, and a general attitude of trusteeship toward future generation (Ophuls 1973: 223).

Thus, the steady-state concept is essentially the same as 'sustainable development' and arguably is the precursor to the more modern concept. Ophuls considered that a steady-state could only be achieved by the creation of a Hobbesian sovereign. He focused his

attention on the political structure and philosophy needed to achieve such a sovereign, or rather, 'the problem of determining the concrete shape of Leviathan'. He argued that people 'must be restrained, and the only question is how to go about achieving the necessary ends with the least odious and most effective means'. He invoked Boulding's (1966) 'spaceship earth' metaphor and noted how Hobbes had demonstrated why 'spaceship earth must have a captain'. If it did not, 'the collective selfishness and irresponsibility produced by the tragedy of the commons will destroy the spaceship, and any sacrifice of freedom by the crew is clearly the lesser of evils' (Ophuls 1973: 224-6).

Ophuls advocated 'mutual self-restraint' and argued that citizens must give up some of their 'natural rights' but, like Hardin, argued that this could only be feasible if all did so at the same time. People would not accept restraint unless they were certain that everyone would act likewise. He envisioned a society consisting of 'macro-autocracy' and 'micro-democracy'. He was concerned, however, that Hobbes's Leviathan was too extreme and posed problems for those who wish to express dissent; these people could suffer from the 'irregular passions' of the elite. However, he noted that Hobbes did not consider the creation of a well-ordered commonwealth to be the goal, but the *means* by which citizens can enjoy the 'fruits of civilisation' (Ophuls 1973: 220). What Ophuls advocated was a 'sufficient measure of coercion.' Like Hardin, Ophuls (1977: 150-1) tried to dismiss some of the fears that surround the word 'coercion' which he interpreted as state-imposed structures of incentives and disincentives. According to Ophuls (1973: 227; 1977: 155), Hobbes himself did not have 'Stalinesque tyranny in mind.'

Ophuls envisaged a form of benign autocracy which would amount to elite rule by ecological guardians. This is similar to Plato's argument in *The Republic* that the polity should be run by experts who possess deep philosophical understanding and excellence of character. Plato had argued that the 'ship of state' was analogous to a ship on a perilous voyage: it made sense to give control to the most competent captain rather than to allow others to have significant decision-making power. Ophuls believed that only quite radical changes in policy would enable the achievement of a steady-state. The form of higher authority Ophuls envisaged was international governance and inspiring leadership:

Because of the tragedy of the commons, environmental problems cannot be solved by cooperation between individual sovereign states in a world of scarcity, and the rationale for world government with major coercive powers is overwhelming, raising the most fundamental of all political questions: Who should rule, and how? (Ophuls 1973: 228).

In short, Ophuls (1973: 229; 1977: 152) argued that it is a 'tragic necessity' that we embrace Hobbes's Leviathan. However, his theory has been criticised by Holsworth (1979) for being incomplete and by Hoffert (1986) for not providing an independent theoretical base for the argument for centralised state power. The extreme argument for authoritarian rule is based simply on the 'extremity of the ecological predicament industrial man has created for himself' (Ophuls 1977: 152). Critics of this view mirror Hardin's critics: they contend that Ophuls also overstated the ecological crisis and understated humans' capacity to respond to environmental deterioration. However, Ophuls's argument was not dependent on shortcomings of individualistic human behaviour. Due to the complex nature of environmental problems and the need for expertise to determine appropriate responses, people – even if motivated by altruism – will often be unsure about the best course of individual action. This is exacerbated by the time lag which occurs between when appropriate responses are determined and public understanding and adoption.

Another prominent writer in the 1970s who argued that ecological exigencies demand centralised administration is Robert Heilbroner. However, Heilbroner was more closely concerned with the Malthusian dilemma of resource scarcity and the effects of economic growth coming to an end due to finite resources. In assessing the threats to human society, Heilbroner warned his readers that they must consider 'painful conclusions' about what is necessary for human survival. Dryzek (1997: 32) argued that Heilbroner's sombre conclusion of militaristic and religious-oriented discipline rested on the lack of cohesive leadership in decentralised western political and international systems which fail to provide incentives for people to act with care towards collective environmental resources. However, Heilbroner admitted that his prescription of stronger central control caused him 'great pain' (Heilbroner 1974: 27). His disillusionment with human nature enabled him ostensibly to give his argument more objectivity by allowing him to state that his assessment of the human prospect is not one that accords with his own preferences and interests. Thus, for Heilbroner as well, some form of Leviathan is a tragic necessity.

3.1.6. Environmental backlash against neo-Hobbesians: participatory approaches

The 'neo-Hobbesian' arguments not only run contrary to individualistic notions of liberalism and entrenched notions of liberal democracy, but their emergence in the 1970s coincided – and conflicted – with the rise in support for more participatory forms of

governance. More recent environmental discourse has witnessed considerable attention being placed on the importance of local actors. These include contributions to the literature by Richard Barnett (1980), Lester Brown (1981) and Norman Myers (Myers and Simon 1994) (see Dryzek 1997: 33). These authors, among many others, have sought to foster community involvement in environmental management by drawing attention to the skills and knowledge about surrounding environments which locals can devote to resource management. It is also recognised that it is important to empower locals in decision-making processes. This viewpoint conflicts fundamentally with the argument expounded by the neo-Hobbesians in that by advocating centralised and more powerful authority, there is a concomitant reduction of influence by others in society. It is not surprising that Hardin has been routinely criticised by commentators for thirty years. In an era when public participation is regaled, centralised administration is often castigated. This can be explained by the differences in the theoretical base of knowledge possessed by 'experts' as opposed to local, 'lay' people. As Dryzek (1990: 99) noted, the epistemology of administration is instrumental-analytic due to its 'implicit theory of knowledge'. He continued: 'administration implicitly regards rationality as the capacity to devise, select, and effect good means to clarified and consistent ends'. Woodhill and Röling (1998: 50) argued that instrumental reason and expert culture are dominant forces which have shaped the theory and practice of modern environmental management. It is a rationality based on using instrumental tools 'to manipulate objects or events according to an assumed knowledge about cause and effect relationships'. Faith is placed in science and technology enabling complexity to be reduced by analysing its constituent parts, thus reducing issues and viewing them fractionally. However, it is feared that difficulties can arise when a centralised and hierarchical organisation is used to manage problems which are so complex and long term that this logic and linear thought cannot account for the multitude of interactive relationships (Dryzek 1990: 100; Caldwell 1993b: 16). Thus, it is argued, rather than confining power to an elite few, it is essential to utilise and value the expertise of local actors. This is also a manifestation of democratic principles.

However, the interconnectedness of environmental systems and human activities is too complicated to be tackled at only one of the local or global levels. Because of this interconnectedness, international environmental problems should be viewed as shared common-pool problems requiring collective action (Young 1990: 344; Barkin and Shambaugh 1996: 430). Although the tragedy of the commons scenario pertains by definition to commons, such as areas of high seas including the Baltic and migratory fish stock, the insights it offers are also relevant to transboundary problems solely within the

national jurisdiction of neighbouring states. The problem remains that without effective inducements, states can avoid acting in their joint best interests. For example, the legal situation explained in 2.3.4. indicates that states are less mindful to avoid causing transboundary environmental harm which is non-actionable. Unfortunately, what has been largely missing from the discourse is a serious attempt to determine the implications for Western democratic countries of the implementation of the 'neo-Hobbesian' solution and whether Hardin's premise for coercive management, or even Hobbes's Leviathan, is applicable to the international arena. Will it be necessary to legislate for behavioural change for state practices, just as Hobbes and Hardin argued for individuals? Or can we be optimistic about a general shift in attitudes and behaviour of states in the absence of such a regime, in the spirit of Foucault's conception of 'governmentality' in which notions of sovereignty and the state are transformed by developments in civil society (Foucault 1991; Latta 2000: 11; see Lafferty 1996: 185)? For this discussion, 'the state' should be understood not as a strict authoritarian entity, but as a plurality 'of modes of regulation and management located throughout the society it seeks to govern' (Latta 2000: 13).

3.1.7. Scaling-up the tragedy to the international sphere

Accepting, for the moment, Hobbes's proposition for a strong state because of the relational behaviour of self-interested individuals, let us now consider the dynamics of the world in the late-20th century and apply Hobbesian logic to this situation. This is not a new endeavour. Williams (1996: 213) has commented that the Hobbesian vision of international politics has provided 'a common rhetorical and analytic touchstone' (see Gillespie 1997: 25 and Park 1999: 288). Ophuls (1973: 221; 1977: 152) argued that Hobbes's state of nature 'depicts very aptly the situation of armed peace among competing nation-states owing obedience to no higher power.' He also argued that the extreme situations facing the world in the late-20th century (e.g. nuclear devastation and destruction of the biosphere) might require Hobbes's extreme solution (Ophuls 1973: 221). Although Hobbes was largely complacent about the international level, his arguments offer considerable insight into contemporary international relations. For example, his account of the 'nature of man', in which individuals are led to quarrel, is also applicable to states because it is their independence and continual state of jealousy which, at least in Hobbes's time, produced a posture of war (Vincent 1981: 92). The struggle for power at the international level is intense and of an anarchical nature because it is dominated by virtually unbridled politics and bureaucratic interests. This can be contrasted with domestic governance in which politics is typically circumscribed by law and institutions (Vincent 1981: 93). Although the situation of conflict among individuals is broadly

analogous to that of states, and has long been treated as such by political theorists, anarchy at the international level is seen to be more tolerable than at the individual level because competition among states is less intense, partly due to the greater inequality that exists between states than individuals. People can never reach a secure position because even the strongest are exposed to danger:

NATURE hath made men so equall, in the faculties of body, and mind; as that though there bee found one man sometimes manifestly stronger in body, or of quicker mind then another; yet when all is reckoned together, the difference between man, and man, is not so considerable, as that one man can thereupon claim to himselfe any benefit, to which another may not pretend, as well as he. For as to the strength of body, the weakest has strength enough to kill the strongest, either by secret machination, or by confederacy with others, that are in the same danger with himselfe (Hobbes 1985 [1651]: 183).

Because, in Hobbes's view, people are in continual fear of each other, they will continue to seek personal benefits in competition with others, for example, by quickly accessing as much of an available resource as is possible without concerning themselves with the wise use or distributive equality of the resource. There is also the argument that states have a self-interest in international stability because in conducting a war, a government runs a risk of losing the support of its citizens and thus its position becomes more vulnerable to internal turmoil. Some rationalist commentators consider that Hobbes saw sovereignty of nation states as assisting international order rather than the realist interpretation of Hobbes which sees his arguments and sovereignty, or rather, the plurality of states, leading to international disorder (Vincent 1981: 94-5, 98).

However, there can be no simple 'scaling-up' of Hobbes's model. The 'Hobbesian' model of government has long since given way since the time he wrote to more liberal rationality views of government. The Hobbesian viewpoint contends that individual freedom and state power are conflicting forces whereas the modern liberal governmentality viewpoint sees them as complementary forces (Rose and Miller 1992: 174; Latta 2000: 19). Further, the nature of the threat imposed by wide-scale ecological damage is different in kind, and certainly in degree, than that which concerned Hobbes, which was that of individual enemies. Environmental harm possesses more of an abstract quality which arguably provides greater argument for centralised management (Vincent 1981: 99). International cooperation is necessary and effective for achieving common goals and has seen for the most part the disappearance of cholera, slavery, and atmospheric testing of nuclear weapons. Yet notwithstanding more holistic conceptions of global

problems, 'the political and institutional framework within which they must be addressed remains hopelessly fragmented' (Vogler 1995: 2). The operation of self-interest at the international level has seen setbacks in key areas such as climate change where, despite the gravity of the problem, appropriate responses have not been adopted (Gillespie 1997: 26). This can be seen as the jurisdictional gap between global problems and decision-making taking place by separate national governments (Kaul et al. 1999: 17). The acceptance of the need for coordinated action to respond and prevent international environmental threats and the problems presented by sovereignty and the behaviour of states as rational actors demonstrate that in the absence of effective rules or conventions, opportunities to realise joint gains can be missed resulting in suboptimal outcomes (Young 1990: 338; see Sandler 1997: 15). Hardin's parable and Hobbesian logic are thus relevant to the international sphere, although their solutions require considerable refinement. Nevertheless, solutions will be contrary to strict interpretations of sovereignty and will require constraints on individual and group activities and thus run contrary to liberal ideology, although falling far short of world government (Leeson 1979 304; Keohane et al. 1994: 4; Ulfstein 1999).

The argument for strong, centralised administration as detailed by Hobbes and developed with regard to ecological exigencies by, in particular, Hardin, Ophuls and Heilbroner, has contributed greatly to the theory supporting more forceful international regimes. Although states co-exist in the absence of an international government, there is a trend in many areas of international politics towards a declining role for individual nation states and an increasing role for consensus politics and standards, as explained in Chapter Two in relation to sovereignty and international environmental law (Vincent 1981: 91; see Jamieson 1994: 199). This is evidenced in many areas, particular where treaties have been adopted to address specific and identifiable threats, such as the use of land mines and driftnet fishing. Existing forms of administration, even in advanced industrialised countries, remain best suited to problems that can be neatly and closely defined. There are also arguments about developing 'a more inclusive ecological picture' of the duties and obligations that can be ascribed to people by connecting them transnationally through shared interests rather than by governments (Jamieson 1994: 210). Stone (1993: 40-1), for example, has articulated a model of more forceful decision-making at the international level. He proposed a system of guardians as 'legal representatives for the natural environment' for the commons. These would be drawn from agencies such as the UN Environment Programme or Non-Governmental Organisations to monitor and ensure compliance with treaties and recommend improvements, as well as represent 'victims' of

commons degradation in legal disputes. We now consider opportunities for a specific Hobbesian solution for international environmental problems.

3.1.8. Toward an Hobbesian solution

There is no unified position among environmentalists with respect to the most appropriate form of governance. Many are distrustful of a Leviathan-type response to environmental exigencies because this would be a strengthening of existing administrative structures which, rather than requiring legitimation, are seen as requiring significant transformation to achieve ecological goals (Paehlke and Torgerson 1990: 1; see Bartlett 1990: 82 and Paehlke 1990). There is, among these advocates, much resistance to any measures to diminish democratic processes which are seen to be critical to any successful response to environmental problems (see Holsworth 1979: 11). But is this attachment to participatory democracy anything more than 'naive sentimentalism' when we consider the difficult task of responding to large-scale environmental problems (Paehlke and Torgerson 1990: 2)? While acknowledging the important role local knowledge and participation have to play in resource management, it is submitted that environmental imperatives compel us to form a more rigorous regime for sustainable development, particularly at the international level. What is not advocated is the formation of a strict authoritarian international regime which the writing of Hobbes, Hardin and Ophuls appear to conjure up. Rather, what is necessary is the strengthening of international law and institutions empowered to enforce them to require states to adopt practices within their borders that do not cause deleterious effects to the environments of countries and global commons. When we consider that the dimensions of many environmental problems go considerably beyond the capabilities of individual countries to control them, even when they have reached consensus among themselves concerning management approaches, it becomes clear that there is a need for stronger international institutions which would have the ability to set and enforce stringent environmental standards, and do so early enough to be effective.

The tragedy of the commons debate is often portrayed as an either/or situation in which the outcome is either the tragedy, or the adoption of Leviathan. Yet it is submitted that the answer does not lie in either extremes, but rather somewhere along the spectrum from liberalism to authoritarianism. Opportunities to modify existing decision-making processes allow for incremental yet pervasive change within specific institutions and operating parameters which, considered on a larger scale, facilitate necessary paradigmatic shifts in worldview (Latta 2000: 20). Indeed, Maurice Strong's famous aphorism 'the process is the policy', foreshadows that solutions might not be found solely in end results in specific contexts, but rather in the totality of approaches adopted. Even if states fail to

adhere to newly-imposed standards, there is a 'benchmark of accountability for governments' which – in a normative fashion – allows for continual improvement in practices (Haas and Sundgren 1993: 403). With the direction of international environmental governance heading in the direction of stronger and more widespread regime formation, our task here is to look at opportunities to apply this approach in the context of EIA processes for projects with transboundary implications. In Chapter Six, the opportunities to strengthen transboundary EIA processes is discussed.

3.2. Conclusion

Not only is the direction of international environmental management heading towards improved international structures for cooperation, but there has also been increasing emphasis – for example by UNEP – placed on developing *regional* management approaches (Haas and Sundgren 1993: 406). The benefits of regional approaches are that they can recognise the dynamics of existing ecosystems (such as shared water resources) more easily and thus collective interests are more manifest. Also, the scale is smaller than for global problems and there is more likely to be greater consistency of management and policy approaches for states in a shared region. Arguments for stronger legal approaches for transboundary environmental management influenced by Hardin's 'coercion' solution are not unprecedented in practice. They are evident in existing 'command and control' regulations commonplace in environmental laws which enable standards to be set above the lowest common denominator standard. We now turn to the merits of the precautionary principle as a suitable guide for environmental management and then determine the most effective institutional setting in which to place it according to the conclusions drawn from the preceding analysis of the tragedy of the commons situation as it pertains to transboundary environmental problems.

Chapter Four

The precautionary principle

If a man will begin with certainties, he shall end in doubts; but if he will be content to begin with doubts, he shall end in certainties.

Francis Bacon. *Advancement of Learning* (1605) v.8.²²

4.1. Introduction

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

4.2. Sustainable development and scientific uncertainty

'Sustainable development' has emerged as the principal objective of states in the environment and development arena. The concept was accepted rapidly by the international community following detailed enunciation of it in the 1987 Brundtland Report 'Our Common Future' and the adoption of Agenda 21 at the United Nations conference in Rio in 1992. The modern concept can be dated further back to Boulding's 1966 'spaceship earth' metaphor and the 'steady-state' concept developed during the

²² Quoted in *The Oxford Dictionary of Quotations* (third edition). Oxford University Press, Oxford, 24.

'limits to growth' debate in the 1970s. The most prominent definition of the concept is provided in the Brundtland Report as development that 'meets the needs of the present without compromising the ability of future generations to meet their own needs' (World Commission on Environment and Development 1987: 43). It is attractive to a wide range of interest groups because it adopts a realist approach in so far as it uses science to identify urgent environmental problems, yet it also has more general moral appeal due to it offering broad scale and intuitively obvious approaches for environmental, economic and social solutions (see Lafferty 1996: 185). It responds to concerns about patterns of production and consumption in industrialised countries, which cannot continue indefinitely due to reliance on finite resources and continued environmental degradation – a situation inevitably leading to environmental collapse. Although there is debate concerning definitions of 'sustainable development', the philosophy underlying the concept is less contentious: it captures misgivings about the nature of development and about social and technological ability to avoid further deterioration of environmental quality (Dovers and Gullett 1999: 116 and Dovers 1999: 375). The notion of equity within and between generations has been the main plank of the concept advocated by environmental ethicists and activists since Rawls put forward his 'savings principle' in the early-1970s (Rawls 1971). Achieving equity is quite confronting for policy makers. Intergenerational equity is challenging because of the difficulties of taking into account long time frames for environmental and resource development issues and predicting future community needs. Intragenerational equity is also problematic due to the intensely political nature of achieving equity in all manner of human rights in the present across innumerable societal groups.

A central tenet of the concept is that human activities must be modified due to ecological exigencies. Achievement of sustainable development presupposes strategic intervention, based on detailed research, in current modes of decision-making and behaviour. The legitimacy of this intervention is based on limited understanding of the full consequences of human activities on the environment, and the recognition that environmental deterioration limits economic development. Legitimacy also derives from the 'political absorption of responsibility over this problem' as espoused in development theories that have emerged in the Enlightenment tradition (Schuurman 1993: 25 and Cheung 1997: 2.1.1.1). It is upon the premise of imperfect knowledge about the life support functions of environmental systems, the incapability of humans to substitute for those functions and the fact that loss of those functions are often irreversible that Pearce, Barbier and Markandya (1990: 1) developed their approach to sustainable development.

The authors focus on the necessity of 'maintaining and improving existing levels of environmental assets' or requiring 'that the natural capital stock should not decrease over time'. This adopts a risk-averse strategy in the face of uncertainty and irreversibility by seeking to conserve existing stocks rather than running the risk of 'overshooting' optimal capital stock levels.

Sustainable development has become a normative objective for states and is largely interpreted according to a rationalist approach (see Handl 1995: 39). According to this view, necessary ingredients for solutions to human-induced problems are scientific and technical measures and improved knowledge in analytical and anticipatory power. For the purposes of this thesis, the sustainable development concept is considered to permit only those economic activities that do not jeopardise – and to support environmental management approaches that ensure – the maintenance of environmental quality over an indefinite time period and the advancement of distributional equity among existing and future generations. This study, in the main, focuses on one aspect of sustainable development: the basis of environmental knowledge upon which development projects and activities are allowed to proceed.

4.2.1. Scientific uncertainty

Policy-makers invariably seek uncontested information as a basis for decision-making, often drawing on 'objective' scientific evidence. Environmental management is particularly dependent on scientific evidence and expertise – without it there would be no basis for environmental regulation (see Wildavsky 1995: 431). Yet environmental regulators routinely are presented with inconclusive or ambiguous evidence and divergent opinions as to the likely environmental impacts of particular activities. The uncertainty which attaches to predictions of environmental outcomes is a combination of the difficulties associated with analysing complex systems and the nature of scientific inquiry itself.

Uncertainty abounds in our understanding of the environment, from the local and discrete level through to processes which are transboundary or global. Although there is a degree of scientific uncertainty regarding the precise nature of every human impact on the environment, uncertainty is more pronounced (and has the potential to be more far-reaching) at the global level where the complexity of environmental relationships severely tests understanding. Science is not equipped to comprehend fully the spatial and temporal intricacies of ecosystems which are characterised by interdependence of countless physical processes and non-linear responses to change. Uncertainty arises where baseline data are

unavailable or incomplete due to time or resource constraints or where there are environmental agents which simply are incapable of being monitored or monitored over a sufficiently long period. Not only does uncertainty arise regarding the dynamics of the physical environment, it also arises in relation to the human environment: we cannot be certain about the shape of future societies and we cannot predict the capability and extent of response to environmental exigencies (see Goudie 1993: 137; Dovers and Handmer 1995 and O'Riordan and Jordan 1995).

Despite these limitations, scientists do produce evidence with all the appearance of objectivity. Yet ambiguity, subjectivity and assumptions are inherent in scientific methods and interpretations. As there are no indisputably 'correct' methods for obtaining environmental data, findings will always be open to challenge or differing interpretation. For example, findings invariably are ascribed less weight where the methodology used is generally accepted as not the best available. Further, in many environmental disputes, both 'sides' normally can produce scientific evidence to support their case (Yearly 1992). Where scientists disagree on the evidence itself, or in respect of the correct interpretation of it, there may be little basis upon which to conclude that either argument is correct. Favouring 'majority' evidence (if a clear majority can be found) may be the only permissible approach for decision-makers, but it must be acknowledged that a degree of uncertainty will attach to any approach adopted. According to Wynne (1992: 115), the ignorance that is endemic to scientific knowledge requires that there be 'social discourse about the conditions and boundaries of scientific knowledge in relation to moral and social knowledge.'

When environmental management decisions are made, such as when regulators are introducing new policies or clarifying liability for environmental harm, much demand is placed on scientists to establish 'proof' of cause and effects, or 'hard evidence' of detrimental effects before adopting remedial action. Yet, in many cases, this is a fruitless search for an infinite series of events. The multicausal nature of environmental processes militates against neat findings of causation. For example, a particular pollutant may be linked conclusively to a particular effect, but it is unlikely to be exclusively responsible, and the degree to which it is responsible may be indeterminable. Evidence of causation is always open to be refuted, disputed or otherwise undermined. The existence of spatial and temporal latencies operate to frustrate the establishment of liability for environmental harm because of the legal hurdles of remoteness, foreseeability and intervening causes (M'Gonigle et al. 1994: 133).

4.2.1.a. *Uncertainty in prediction of environmental outcomes*

A corollary of the inability to understand the vast range of environmental interactions is that science will never be able to make accurate long-term predictions about all the consequences of human activities on natural systems. Not all environmental change can be anticipated and any predictions must be provisional. The limitations of science have been illustrated by the history of the ozone debate. On the one hand, we were reliant on science for discovering ozone depletion, yet on the other, the scientific community failed to predict this phenomenon. Other phenomena, including global warming and biodepletion, have been predicted in general terms but remain insufficiently understood (Jackson and Taylor 1992 and Myers 1993: 75).

All predictions of environmental harm are presented in probabilistic terms. Yet, it is necessary to differentiate between *risk* of environmental harm and true *uncertainty* regarding environmental outcomes. Uncertainty exists where the likely direction of change is known, but probability distributions cannot be assigned to outcomes, as can be done with *risk*. Cameron (1999: 37) explained that it does not necessarily follow that an event with a high risk of occurrence is accompanied by a high level of uncertainty. High risk may be associated with an event with a high probability of occurrence with consequences which are known to be relatively serious. Conversely, there may be much uncertainty about the full consequences of an event which is assigned a low probative value of occurring (thus considered to be virtually no 'risk'). For example, justifications for new nuclear power stations typically include the statement that the risk of explosion is statistically insignificant. Yet the full ramifications of such an event can only be speculated upon. Further, perceptions of risk vary and the spectre of another Chernobyl catastrophe, although often dismissed as statistically unlikely, is possible – and *believable* – and should not readily be discounted. Uncertainty is more commonly encountered than risk, but often the situation is better described as one of *ignorance* (that which is not known and thus unmanageable – including being unaware of ignorance), even where there is some uncertainty about the direction of change (for example, regional impacts of climate change). Ignorance may also be 'self-generated' where statutory, institutional, policy and management systems are inadequate to address all issues (Dovers et al. 1996: 1148). Advances in scientific methods and knowledge have traditionally been seen as the solution to this dilemma (Dovers and Handmer 1999: 168). However, risk, uncertainty and ignorance are not defined simply by the absence of 'objective' scientific knowledge. It is partly a social construct in so far as it involves approaches to information affected by, among other things, taboo, distortion, irrelevance and confusion (Smithson 1989; Wynne

1992; Dovers and Handmer 1995 and Fisher 2001). Table 2 presents a taxonomy of uncertainty (see Walker 1991: 572 and Wynne 1992: 114). Recognition of the broader nature and different types of uncertainty presents the challenge of devising methods to deal with its implications (Dovers and Gullett 1999: 121 and Dovers and Handmer 1999: 179). It is clear that science is not well-equipped to document multi-present uncertainty and that ignorance cannot easily be reduced. Wynne (1992) observed that uncertainty can intensify and compound when an increasing number of social and technological decisions are made on incomplete information.

Table 2. Taxonomy of uncertainty

(based on Tickner et al. 1999: 12)

Parameter uncertainty: missing or ambiguous information in specific informational components of an analysis. Parameter uncertainty can often be reduced by gathering more information or using better techniques to gather and analyse information. However, this may not be the case if it is due to variability. E.g. humans or ecosystems may vary in their susceptibility to harm from particular pollutants. Controlling exposure to hazard may be inadequate to protect some individuals or ecosystems.

Model uncertainty: gaps in scientific theory or imprecision in the models used to bridge information gaps. Models are constructed to explain current or past events or predict future consequences of activities. They are only as good as the information used to build them which necessarily is incomplete when models refer to open and interdependent environmental systems. Models can be improved as they incorporate more, and more precise, information.

Systemic or epistemic uncertainty: the unknown effects of cumulative, multiple, and/or interactive exposures. Systemic uncertainty can be an important confounding factor in large-scale or long-term analyses (similarities with ignorance).

Smokescreen uncertainty: the strategies of those who create risks and have a stake in concealing the effects of a specific substance or activity. They may refrain from studying a hazard, conceal knowledge of effects, or design studies to create uncertainty. Critics of regulation may use uncertainty to avoid it.

Politically induced uncertainty: deliberate ignorance on the part of agencies charged with protecting health and the environment. The agency may decide not to study a hazard, limit the scope of its analysis or alternatives to solve a problem, downplay uncertainty in its decisions, or hide uncertainty in quantitative models.

Indeterminacy: uncertainties involved are of such a magnitude and variety that they may never be significantly reduced; outcomes unforeseeable; ontological considerations about the nature of knowledge.

Ignorance: that which is not known. This can include an admission that we do not know how much we do not know. Problems shaped by ignorance can thus be unmanageable.

The complexity of environmental systems results in low statistical power in predictions of the likelihood and severity of harm. This differs from accepted legal notions of proof and expected rational bases for decision-making (see M'Gonigle et al. 1994: 103 and Fisk 1998: 3). Two types of error can flow from scientific studies. The first, 'Type I' errors, occur where it is incorrectly concluded that there is a causal effect when one does not actually exist (false positive). The second and less frequent is a 'Type II' error where it is incorrectly concluded that a causal relationship does not exist when it actually does (false negative). This follows from what Fisk (1998: 5) described as a 'fundamental logical defect in scientific methodology': the assumption 'that the absence of evidence to support a proposition can be taken as equivalent to presence of evidence that refutes it'. This can occur, for example, where results are unknowingly based on an unrepresentative sample. Further, it is not possible to calculate the probability of failing to detect an effect (Buhl-Mortensen 1996: 531 and Underwood 1999: 258). Thus concern about a possible causal link between an activity and an environmental impact is typically dismissed where no 'statistically significant' results have been established. This presents the problem of 'asymmetric information': the disparity that often exists in the level of information available on the benefits rather than the negative consequences of activities (Cranor 1999). Type II errors can lead to significant problems, such as was the case in relation to CFCs and DDT. The development and use of these substances was permitted because they were mistakenly predicted to be safe. Thus the absence of evidence of a causal link should not be equated with a presumption that no link exists. M'Gonigle et al. (1994: 111) neatly encapsulate the dilemma faced by environmental decision-makers seeking to respond to the problems created by uncertainty:

[I]ntrinsic variability in natural ecosystems, cumulative and synergistic effects, confounding factors, large inherent uncertainty, and the prevalence of low statistical power...makes it difficult to establish clearly cause-effect relationships between certain substances or processes and environmental degradation.

4.2.1.b. *A degree of certainty*

Notwithstanding the inevitability of conflicting interpretations of scientific evidence, gaps in scientific knowledge and imprecise predictions of environmental outcomes, there are often areas of general agreement, such as in overall environmental trends. Uncertainty is normally restricted to the extent of threatened environmental damage rather than whether human activities are contributing to such damage (Cameron and Abouchar 1991: 20; see

for example Lutes 1998: 163 and Gollier et al. 2000). So, scientists may be able to identify with certainty particular threats to the environment but remain uncertain as to the scale of potential ecological, social or economic disturbance. For example, there is no disagreement among scientists that there has been a global increase in ambient concentrations of atmospheric carbon dioxide, but the full implications of this phenomenon are unknown. Although we have recourse to a considerable body of knowledge on environmental matters to inform environmental practices, there needs to be awareness of the limitations of such knowledge: both in science and technology and, importantly, in human understanding. Awareness of the existence and nuances of uncertainty in the environmental sphere is a precondition for successfully addressing complex environmental implications of human activities. The paradigmatic shift in the 1970s from the *Trail Smelter* style of environmental responsibility to the development of policies aimed at protecting the environment from risks of harm, has been complemented in recent years by the formulation of precautionary approaches to environmental management. It is to this aspect of environmental management theory that we now turn.

4.3. The precautionary principle

To avoid the paralysis of decision-makers when confronted with uncertainty, the 'precautionary principle' emerged in environmental discourse in the late-1980s as a new approach to environmental protection, providing the 'philosophical authority to take decisions in the face of uncertainty' (Cameron et al. 1999: 29). It is rooted in misgivings about scientific interpretations of environmental tolerance of human activities and accepts uncertainty regarding environmental outcomes as a sufficient reason to implement environmental protection measures. It thus removes 'the conceptual barrier to action caused by our ignorance of nature' (Cameron et al. 1999: 93). At its broadest level, the principle can be understood as a crystallization of numerous concerns about the nature of modern development, ranging from concern about the cumulative, long-term and distant effects of activities to the lowly status often accorded to environmental and health issues in public administration. It moves away from utilitarian approaches to the environment by recognising the intrinsic value of ecosystems and requiring environmental protection as a 'moral right'. The principle has been called an 'ecological buffer' and a 'moral injunction' (Dovers and Handmer 1999: 174). Note, however, Handl's (1990: 23) more pessimistic observation that the 'dominant facet' of the principle may be 'economic utilitarianism', being the idea that restraint is warranted simply to facilitate long-term exploitability of natural resources. It is the best legal response to the tragedy of the commons dilemma

because it seeks collective environmental responsibility and effectively imposes an environmental duty of care to prevent spatially or temporally distant harm. A key element of the conceptual core of the principle has been identified as not delaying the imposition of regulatory mechanisms over activities where there exists uncertainty about cause and effect relationships, or the extent of possible environmental harm (Cameron 1999: 35). It is closely associated with the polluter pays principle and intergenerational equity and is considered a constitutive element of sustainable development (Bellini 1998: 5; Harding and Fisher 1999: 6; Young 1999; Stein 2000: 7 and Stein and Mahony 1997). Gro Harlem Brundtland, former Prime Minister of Norway and chair of the World Commission on Environment and Development, encapsulated the principle thus: 'If we err in our decisions affecting the future of our children and our planet, let us err on the side of caution' (Cameron and Abouchar 1991: 1).

The premise of the principle is that activities should not be permitted where there is uncertainty regarding their effects and there is reason to believe harm may result. Thus, once an activity is identified as posing a potential threat (possibly involving irreversible consequences), decision-makers should be risk-averse and wait to be convinced that the risk is acceptable before allowing it. Also, where there is existing potential for environmental harm, the principle requires anticipatory remedial measures to be undertaken. Perrings (1991: 164) termed this 'reserved rationality': we should proceed cautiously to safeguard against the possibility of unexpectedly severe future costs.

4.3.1. Origin and rise of the principle

The principle of precautionary action has been presented by some of its advocates as nothing less than a monumental paradigm shift in environmental management. It is essentially a new legal response to the scientific uncertainties surrounding the capacity of the environment to cope with the increasing demands placed on it. The origin of the principle lies in the German concept of *Vorsorgeprinzip* (literally 'precautionary principle' or 'foresight principle'), espoused in the mid-1960s in response to concerns about pollution levels. Boehmer-Christiansen (1994: 38) argued that the *Vorsorge* concept actually goes much further than its rough English translation and also embodies notions of ethical responsibility and good husbandry. In the early-1970s it could be found in domestic West German legislation (Milne 1993: 35). It was employed by the West German government to justify vigorous strengthening of environmental protection policies, notably to combat acid rain, global warming and marine pollution (von Moltke 1992: 3; O'Riordan and Jordan 1995: 193). Bodansky (1991: 5 and 1994: 204) argued that the principle had also formed the basis of United States domestic environmental legislation

for many years, citing the 1972 *Federal Water Pollution Control Act Amendments* as an example. The Act *presumed* discharges of pollution are harmful to water quality and required their reduction.

Since the late-1980s, the principle has become established at the forefront of international environmental discourse. It has appeared frequently in academic literature and is referred to in numerous international policy documents²³ and domestic legislation²⁴ and environmental management strategies.²⁵ At the international level, precautionary thinking is evident in the 1972 Stockholm Declaration on the Human Environment, which recognised the need to safeguard natural resources, through careful planning and management, for the benefit of future generations,²⁶ and the 1982 World Charter for Nature, which stated that activities 'likely to pose a significant risk to nature' should not proceed where 'potential adverse effects are not fully understood'.²⁷ The first explicit international endorsement of the principle came in November 1987 in the London Declaration of the Second International Conference on the Protection of the North Sea (reproduced in Freestone and IJlstra 1991). The participants accepted that

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

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

²³ See European Environment Agency (1999) and Agreement on the Application of Sanitary and Phytosanitary Measures (1998), Article 5(7).

²⁴ In Canada, see for e.g. s2(a)(ii) *Nova Scotia Environment Act* 1994-95; s 3(1), Sched. A4 *Manitoba Sustainable Development and Consequential Amendments Act* 1998, and the proposed amended preamble to the *Canadian Environmental Protection Act* 1997 that is, at the time of writing, before the House of Commons (2nd Session, 35th Parliament, 45 Elizabeth II, 1996-97, Bill C-74). The most recent innovative inclusion of the principle in a Bill before parliament is contained in the *Massachusetts Precautionary Principle Bill* which aims to establish the principle of precautionary action as 'the guideline for developing environmental policy and quality standards'. The innovative aspect of the Bill is that it uses mandatory language in relation to the application of the principle by employing the auxiliary 'shall'. (The long title of the Bill is 'An Act to Establish the Principle of Precautionary Action as the Guideline for Developing Environmental Policy and Quality Standards for the Commonwealth' - House Bill 3140).

²⁵ E.g. Australia's National Strategy for Ecologically Sustainable Development (Commonwealth of Australia 1992: 8) and Britain's Environmental Strategy (HM Government, 1994: para 3.12 and 1990: 11; see Harding and Fisher 1999).

²⁶ Stockholm Declaration on the Human Environment, UN Doc A/Conf 48/14 Rev 1, 16 June 1972, Principle 2.

²⁷ UN GA Res 37/7, 9 November 1982, Part II, 11(b).

polluting emissions of substances that are persistent, toxic and liable to bioaccumulate at source by the use of the best available technology and other appropriate measures. This applies especially when there is reason to assume that certain damage or harmful effects on the living resources of the sea are likely to be caused by such substances, even where there is no scientific evidence to prove a causal link between emissions and effects ('the principle of precautionary action') (Article XVI(1); see Freestone 1991: 25).²⁸

The principle has been adopted in such a widespread fashion that it is now difficult to find in either the international environmental arena or countries with advanced environmental protection frameworks an environmental policy document, new environmental law, or even political statement about environmental management that does not include a reference to the principle or reflect some of the core ideas of the precautionary concept. The principle has been advanced most successfully at the international level in relation to marine pollution²⁹ but has also been applied to areas including hazardous wastes,³⁰ climate change,³¹ ozone depletion,³² biodiversity,³³ fisheries management³⁴ and general environmental management at both the national and international levels.³⁵ Arguably the Rio Declaration on Environment and Development³⁶

²⁸ This definition was subsequently updated at the the Third International Conference which seeks to reduce bioaccumulating substances 'to levels that are not harmful to man [sic] or nature.'

²⁹ Examples include the Convention for the Prevention of Marine Pollution from Land-Based Sources (1989); the Oslo Commission decision in relation to the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (1989); the Convention for the Protection of the Mediterranean Sea against Pollution (1989); the Nordic Council's Conference on Pollution of the Seas (1989); the Baltic Sea Convention (1992); and the Convention on the Protection and Use of Transboundary Watercourses and International Lakes (1992).

³⁰ Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989), Art. 4(2)(e) and (g); Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa (1991), Art. 4(3)(f); *Agenda 21*, chapter 22 para. 22.5(C) (1992).

³¹ United Nations Framework Convention on Climate Change, Art. 3(3) (1992).

³² Montreal Protocol to the Vienna Convention for the Protection of the Ozone Layer, Preamble (1987).

³³ Convention on Biological Diversity, Preamble (1992).

³⁴ E.g. Draft Convention on the Conservation and Management of Straddling Fish Stocks on the High Seas and Highly Migratory Fish Stocks on the High Seas, Art. 4 and 5 (1993) and 1995 Agreement for the Implementation of the Provisions of the United States Convention on the Law of the Sea of 10 December 1982 Relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks. The precautionary aspects of the Agreement are discussed in detail by Freestone and Makuch (1996).

³⁵ Bergen Declaration on Sustainable Development, Art. 7 (1990); Bangkok Declaration on Environmentally Sound and Sustainable Development in Asia and the Pacific, para. 19 (1990); Maastricht Treaty Revision to the Treaty on European Union, Art. 130(R)(2); Rio Declaration on Environment and Development, Principle 15, reproduced in (1992).

(signed by over 170 countries) is the most significant international recognition of the principle and the most accepted formulation. Principle 15 states:

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

Notwithstanding the vast number of international and national environmental protection documents which expressly contain the principle, the principle is also implicitly endorsed in a wider array of instruments which adopt the concept of sustainable development (Freestone 1991: 34; Cameron et al. 1999: 98). This includes any requirement for EIA or protection of habitats from present or future risk.

4.3.2. A new environmental standard: rejection of assimilation theory

There is considerable debate whether the principle is a paradigm shift in environmental management or whether it merely institutionalises commonsense practises. Conventional environmental policies are deeply influenced by assimilation theory, whereby it is assumed that ecosystems can tolerate a certain amount of pollution without detrimental changes to overall quality (Cameron and Abouchar 1991: 2; Gray 1996: 133 and McIntyre and Mosedale 1997: 222). The 'assimilative capacity' concept is used universally by regulators when calculating permissible waste discharges. By definition, a level of discharge and associated harm is deemed acceptable (Stebbing 1992: 288). We are compelled to rely on the assimilative capacity of the environment to some degree because human societies will continue to produce wastes and cause environmental impacts. This is implicit in the *Trail Smelter* decision where liability attached only to 'serious' injury.

Although it is rarely disputed that the environment has some capacity to tolerate human activities, the assimilative capacity concept does not provide adequate protection against environmental harm (see Jackson and Taylor 1992: 124-6). A major shortcoming is that it assumes critical thresholds of environmental capacity can be determined. This is a difficult, if not futile, task considering the natural variability and unpredictability in ecosystems and the existence of cumulative and synergistic effects (Barton 1998: 513). Sufficient evidence of the failure of an ecosystem to assimilate a certain level of pollutant may only be adduced once harm has occurred. There are many examples of discharges which were predicted to be safe (including CFCs and DDT) later causing unanticipated

³⁶ UN Doc. A/Conf. 151/5/Rev. 1.

long-term damage. As such, the assimilative capacity concept has been shown not to enable sufficient time to act once indications of possible harm are apparent (see Hey 1992: 308). The precautionary principle essentially is a new and progressive policy vehicle which represents a philosophical shift from the assimilative capacity concept towards a more protectionist approach to maintaining environmental quality. It is far more attentive to environmental vulnerability and the possibility of irreversible environmental damage. In addition, it focuses on the limitations of science to predict threats to the environment accurately. It cannot, and does not, purport to eliminate unanticipated harm or provide a panacea for our environmental ills. Its use is in providing guidance for decisions when confronted with scientific uncertainty, thus foreshadowing where necessary a political process rather than a purely scientific basis to decision-making.

4.4. Interpreting the principle

Notwithstanding the almost universal acceptance of the principle in recent international documents concerned with environmental management, there is considerable confusion as to what is meant by the concept. No commonly agreed definition exists, nor criteria to guide its implementation (O'Riordan and Jordan 1994: 194). This prompted one commentator to describe it as the 'fuzziest' of environmental principles (Hughes 1995: 238). Bodansky (1991: 5) argued that the principle is too vague to serve as a regulatory standard because it does not define the vital concept of precaution or specify how much precaution should be taken. The uncertainties surrounding its content and implications stem from its numerous formulations and the ambiguous wording typically used in statements of policy. The generality of the principle has led to criticism that it is devoid of practical meaning (see Gray 1990a; Handl 1990; Bodansky 1991; Nollkaemper 1991; Costanza and Cornwell 1992; Brunton 1995; and Dovers and Handmer 1995). However, others have pointed to an undisputed conceptual basis to which effect can be given. O'Riordan and Jordan (1994: 194), for example, identified the core of the principle as:

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

In a more recent piece, Jordan and O'Riordan (1999: 15) argue that the precautionary concept is politically attractive so long as it continues to be 'tantalsingly ill-defined and

imperfectly translatable into codes of conduct, whilst capturing the emotions of misgiving and guilt.' Commonsense, but imprecise, phrases abound. For example, 'an ounce of prevention is worth a pound of cure' (VanderZwaag 1994: 1). Critics of the principle have expressed the view that the reason it is popular is because it has 'rhetorical appeal' (see e.g. Cross 1996: 859). While there is no doubt that some encapsulations of the principle are attractive populist statements – who can deny the statement 'It's better to err on the side of caution'? – overuse of such statements contribute to the perception that the principle is simply a pleasant-sounding but vacuous and elusive concept. However, the principle contains a specific instruction that we be responsive to problems created by scientific uncertainty and incorporate consideration of longer time frames in decision-making. The principle is not a hard and fast rule but rather seeks to ingrain flexibility and broader goal-setting in decision-making such as recommending buffers against catastrophe and enhancement of limited capacity (Dovers et al. 1996: 1160). The precautionary concept embodies two key aspirations for decision-making: that we should be confident about predictions of future environmental effects of activities before allowing them; and that we should not wait for conclusive proof of environmental harm before adopting appropriate remedial measures. That is, a lack of certainty about extent of possible harm 'does not legitimate delaying the imposition of some kind of regulatory mechanisms over the activity in question' (Cameron et al. 1999: 99). Although there are varying definitions, the principle contains specific instructions and is considered by some commentators to be an 'action principle' (Boehmer-Christiansen 1994: 38; see Harding and Fisher 1999: 4). A recent and useful encapsulation is provided by the Commission of the European Communities (2000: 10). It states that the precautionary principle applies

where scientific evidence is insufficient, inconclusive or uncertain and there are indications through preliminary objective scientific evaluation 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] chosen level of protection [by the EU].

4.4.1. Content of the principle

Formulations of the precautionary principle tend to be hortatory in character, but, for it to be implemented, a specific and operable content must be determined. This task is made difficult by the wide range of obligations which the principle has the potential to impose. Consensus needs to be arrived at as to the type of regulatory approaches which are appropriate for its implementation in particular circumstances. Precaution potentially involves a scale of options with some options being more precautionary than others. It

tends not to be prescriptive in nature but rather seeks a balance of interests with increased weight being given to environmental protection. At minimum, the principle is understood as requiring the adoption of sound environmental practices and the reduction of emissions of pollutants at source – although other methods for directly and indirectly implementing precaution have been advanced. Direct methods include application of Best Available Technology (BAT), strict prohibition or cradle to grave care with regard to hazardous substances and strict liability. Indirect methods of advancing precaution involve stringent environmental quality objectives, the principle of non-degradation, the creation of incentives and disincentives to generate behavioural adherence to the principle, insurance mechanisms, environmental impact assessments and the integration of environmental policy into wider decision-making (see Gündling 1990; Moffet 1997: 168 and Cameron et al. 1999: 108). Thus, there normally exists a range of precautionary responses ranging from strict bans to guidance, balancing interests and funding for more research (Tinker 1996: 56 and Commission of the European Communities 2000: 16).

Some formulations of the principle require precaution to be implemented by the adoption of 'clean production' methods.³⁷ This requires the use of BAT or the more discretionary 'best available technology not entailing excessive cost' (BATNEEC). Yet these approaches are not without difficulties. As Bodansky (1991: 43) argued, it would be unworkable if BAT was taken to mean 'available at any price' because that would result in environmental hazards always being prioritised ahead of economic costs. There also are difficulties in determining what is the 'best available' technology because of continuous advances in technology and because the concept only permits precautionary action where it is technologically and economically feasible. Further, use of BAT may not give proper effect to the principle. Outright prohibition of activities may be preferable (Bodansky 1991: 43). However, applying strict precaution and insisting on zero discharge of pollutants does not eliminate risk and can be counter-productive. For example, the banning of hazardous waste disposal at sea results in increased disposal on land, simply transferring risk. As an illustration, in Norway there has been considerable debate over the discharge of ilmenite (a black mineral composed of iron titanium oxide), which is insoluble and accumulates in water, but is non-toxic. Environmental groups insisted that it is a pollutant because not all its effects on marine biota are known. They argued that it should be stored in a specially constructed dam on land. On the other hand, local residents and a number of marine biologists have been opposed to the construction of a dam,

³⁷ For e.g., Bamako Convention, Art. 4(3)(g).

arguing that it would be too costly and would have its own environmental impacts and further, that the dumping of ilmenite at sea is not risky (Gray 1990a: 175-6). Application of the principle is controversial and debate tends to devolve to the acceptability of different levels of uncertainty. Some commentators have argued that applying the principle can increase risk because choosing more precautionary alternatives may result in more damage (see discussion in 4.4.5. and Brunton 1995). However, this is misleading because the principle seeks an equal level of protection and consideration for all options. Bodansky (1991: 43) argued that the principle is normally misconceived as a choice between risk and caution, when often it is a choice between one risk and another. It is more accurate to state that application of the principle normally involves accepting a *known* risk of environmental harm to guard against an *uncertain* environmental outcome (possibly involving no harm).

4.4.2. Threshold for operation

While there is widespread acceptance of the need for precautionary measures in environmental management, a controversial aspect surrounding the principle is the determination of the appropriate point at which precautionary action should be taken for a given activity. It is not in dispute that the principle is only applicable where there is a lack of knowledge about or disagreement concerning possible, non-negligible environmental harm. The two key issues for judgment are first, whether to act or not act, and secondly, how to act. The crucial question is, how much evidence of 'unacceptable' harm is necessary to warrant precautionary action (Bodansky 1991: 5)? In 1986, the West German Government explained that the *Vorsorgeprinzip* concept requires the taking of

[a]ctive measures...if general experience or scientific findings *indicate* with *sufficient probability* that damage *will* be caused; any remote possibility that damage will be caused is not sufficient' (emphasis added) (see Jones 1994: 13).

Some formulations fall only just short of calling for proof of significant harm. Various – often overlapping – thresholds have been adopted in environmental agreements and official documents due to subtleties in expression, including where:

- there are threats of 'serious or irreversible' damage³⁸
- there are 'significant' risks of damage³⁹

³⁸ Rio Declaration, Principle 15; Climate Change Convention, Art. 3(3).

³⁹ HM Govt, *Sustainable Development: The UK Strategy* (Cm 2426, HMSO, 1994), reproduced in Department of the Environment (UK) (1995: 41).

- there is 'reason to assume' damage is 'likely'⁴⁰
- there is 'reasonable suspicion' of damage⁴¹
- there are 'reasonable grounds for concern that pollution may be caused'⁴²
- harm 'may' be caused⁴³
- there is 'potential' for damaging impacts⁴⁴
- there is no proof of harmlessness⁴⁵

It is not appropriate to select one evidentiary standard for all situations. The greater the magnitude of uncertainty, the more conservative decision-makers should be (see Gollier et al. 2000: 245). Further, as the risk of harm increases, a greater level of scientific uncertainty (entailing a lower evidentiary burden) can be accommodated when engaging the principle. This means that the greater the level of anticipated harm, the more rigorous precautionary measures should be. The task for environmental policy makers is to formulate appropriate thresholds for different areas of environmental management. There is a need to specify the required degree of confidence before triggering precautionary responses, for example, 'reasonable scientific possibility or probability' (Hickey and Walker 1995: 449). A minimum threshold is necessary to trigger precaution below which no action need be taken. To argue otherwise would be to introduce an unsustainable and utopian basis to the principle (Cameron 1999: 36 and Cameron et al. 1999: 100). The level of severity of anticipated harm must be non-negligible although it should be less than traditional standards of environmental harm. The options the principle gives for action may be a scale with some measures being more precautionary than others. A recent progressive formulation of the principle which offers more depth (and more precaution) than common formulations is provided in the Wingspread statement on the precautionary principle concluded at a conference on the principle in Racine, Wisconsin in January 1998. It explains the operation of the principle thus:

⁴⁰ London Declaration on the Protection of the North Sea, XVI.1.

⁴¹ European Environment Bureau (1999) Position on the precautionary principle.

⁴² Convention for the Protection of the Marine Environment of the North East Atlantic (OSPAR Convention) (1993), Art. 2(2)(a). Underwood (1999: 254) put forward the threshold of 'reasonable suggestion' that outcomes may be serious and/or irreversible.

⁴³ Bamako Convention, Art. 4(3)(f).

⁴⁴ Hague Declaration on the Protection of the North Sea (1990).

⁴⁵ Oslo Commission decision in relation to the Convention for the Prevention of Marine Pollution by Dumping from Ships and Aircraft (1989).

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 (in Raffensperger and Tickner 1999: 353).

4.4.3. Shifting the burden of proof

A unifying feature of most formulations of the principle is a shifting of the burden of proof in the legal context. Traditionally, an activity will be permitted unless there is proof of likely and unacceptable harm. The burden of proof necessarily falls on opponents of the activity. In many cases sufficient 'proof' is only available *after* harm has been caused. This occurred in relation to drift-net fishing where tens of thousands of seabirds and porpoises died before regulators were satisfied that drift nets damage marine life (Earl 1992: 184). It is the inability of the conventional burden of proof to provide an effective legal response for environmental damage which cannot conclusively be traced to the activities of one legal identity which gave rise to the principle of precautionary action. The principle generally seeks to reverse the situation by providing that a party cannot be permitted to act unless it is shown with a reasonable level of confidence that the proposed activity will not adversely affect the environment. The impact of the principle on the burden of proof can be understood in two ways (Cameron 1999: 46 and M'Gonigle et al. 1994: 138). First, there is a lower standard of proof: it is no longer necessary to have conclusive proof of harmful effects to justify the imposition of a particular regulatory regime – environmental harm need only be plausible to support an inference of causation. But more importantly, the evidentiary burden shifts as a result of changing the party required to discharge the burden, usually that of showing that an emission or development will not cause serious environmental degradation. An example is the 1990 Ministerial Declaration of the Third International Conference on the Protection of the North Sea (para 11) by which the participants agreed that urban areas and industries should be connected to sewage treatment plants with secondary (or equivalent) treatment 'unless...comprehensive scientific studies demonstrate...that...[sewage] discharge will not adversely affect the North Sea environment on a local or regional level'. M'Gonigle et al. argued that

[s]tandards must no longer be set without the recognition of uncertainty. Instead, the inescapable presence of uncertainty should lead to a shift of the regulatory

burden onto those seeking to utilize, and profit from, our common environment's questionable assimilative capacity.

When legal regimes are adopted to implement the principle, different evidentiary burdens may be advanced. For example, it may be that a prospective developer would be required to present a persuasive case of the unlikelihood of harm occurring, but then opponents may be given the opportunity to respond to the evidence. This was the approach adopted recently by the South Australian Environment and Resources Development Court with regard to a merits review decision concerning the licensing of tuna farms.⁴⁶ Where the party challenging the establishment of the project establishes that there is 'a prospect of serious or irreversible damage to the environment', the burden switches to the proponent which must implement practical measures to avoid such damage and show that the likely consequences of the development do not suggest that serious or irreversible damage would be sustained. A flaw in this approach identified by Fisher (2001) is that the focus of the dispute is evidentiary matters relating to the burden of proof rather than the broader balancing of interests required of decision-makers. This approach disguises the fact that application of the precautionary principle takes place within the sphere of public interest administration rather than adversarial processes of dispute adjudication between two parties.

4.4.4. Economic considerations

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

prepared to take precautionary action to limit the use of potentially dangerous materials or the spread of potentially dangerous pollutants, even where scientific knowledge is not conclusive, *if the balance of likely costs and benefits justifies it*. This precautionary principle applies particularly where there are good grounds for judging...that action taken promptly at *comparatively low cost* may avoid more costly damage later (emphasis added) (HM Government 1990: 11).

⁴⁶ *Conservation Council of South Australia v. Tuna Boat Owners Assoc. (No. 2)* [1998] SA ERDC 86.

Significantly, the Rio Declaration formulation refers to 'cost-effective' precautionary measures. Cameron (1999: 42) argued that, to some extent, this is necessary because there are dangers in applying precaution at any cost. For example, if high cost regulatory action is imposed and it is subsequently shown to be unnecessary, arguments will surface about economic inefficiency, 'thus reducing the force of subsequent precautionary arguments'. Thus, the possible costs of over-responding to uncertainty should be taken into account when applying precaution (see also Deville and Harding 1997: 18). Further, precautionary measures which have been imposed should be attenuated if they are subsequently found to be unnecessary.

Industry has tended to be critical of unpredictable applications of the principle, arguing that this inhibits efficiency and corporate planning, and 'increases the costs and risks of doing business' (Hickey and Walker 1995: 425). However, decision-makers need to guard against economic considerations attaining paramountcy when considering precautionary measures. Otherwise the principle will be weakened substantially because the most appropriate precautionary measures may not be taken. The greater the weight placed on economic considerations, the less precautionary responses are likely to be (see Cameron 1999: 40). The principle would become little more than a cost-benefit analysis which contradicts the central tenet of the principle by assuming certainty in determining and weighing 'costs' and 'benefits' of precautionary actions (European Environment Bureau 1999). The Commission of the European Communities (2000: 19) suggested that the 'pros and cons' of precautionary action or inaction should be examined, although this 'cannot be reduced to an economic cost-benefit analysis'. This is different to the popular but weak formulation in the Rio Declaration which undermines the application of precaution due to its focus on economic concerns rendering it 'a largely uninformative and platitudinal goal statement' (Hickey and Walker 1995: 442). The essence of precautionary philosophy entails that some 'unnecessary' caution (with its associated costs) *must* be accepted. This may include what is perceived as a disproportionate allocation of regulatory resources to avoid uncertain threats even though other known threats exist. Fisher (2001) quotes a recent judgment of the UK Master of the Rolls which succinctly states the problematic nature of basing decisions on precaution:

The Department faced the classic dilemma of any regulator; if strong action is taken and apprehended harm to the public does not ensue, the authority is criticized for taking unnecessary draconian action and causing damage which would otherwise have been avoided; if, on the other hand, the authority holds its hand and harm does follow the authority is castigated for abdicating its

responsibility to exercise powers which Parliament has conferred for dealing with such a situation.⁴⁷

Fisher then comments

The decision maker's answer in such a situation will depend upon how she chooses to reconcile the available scientific information, public concern, collectivist values of environmental and public health protection, and liberal concerns of not unduly infringing upon private action. For the primary decision maker there is no easy way to answer this question and there is no simple methodology which will derive a 'right' answer. The one major limitation on the exercise of discretion in both cases will be the statutory and constitutional framework, but even that will more than likely allow a number of different solutions.

This dilemma can be partly reduced by incorporating worst case results and pessimistic assumptions into planning. It is preferable to run the risk of overstating risks rather than understating them (Cameron et al. 1999: 104). Also, no barriers to trade are presented where approaches are harmonised (Commission of the European Communities 2000: 12). The approach the Commission adopted is to accord protection of public health and environmental quality greater weight than economic considerations. Where industries are required to comply with regulations to reduce pollutions based on the precautionary principle, this may also reduce costs by increasing efficiency and improve long term environmental quality. Also, where costs are incurred, they are borne by the party responsible for producing the risk, rather than the wider community. As such, implementation of precautionary measures may enhance economic efficiency. Where specific costs are to be incurred, most formulations of the principle require or envisage that these are balanced against other interests, or accorded less weight. Stricter versions of precaution accept the necessity of some economic costs for the added environmental protection provided by precautionary measures.

4.4.5. Criticisms of the principle: an appropriate response to scientific uncertainty?

As the precautionary principle seeks to justify decision-making in the absence of full information, it has been viewed as a critique of modernity and scientific authority (Fisher 1999: 184). Yet, due to vague and conflicting definitions, it is common for it to be

⁴⁷ *R v. Secretary of State for Health, ex parte Eastside Cheese Company* [1999] 3 CMLR 123 at 140.

described in terms such as a 'nice sentiment' but 'devoid of practical content' (Fisher 2001: 2 and Gollier et al. 2000: 231). There is vigorous debate in the literature regarding whether the principle is a scientifically sound approach which is adequate to deal with uncertainty, or whether it is purely a political concept with little practical application. Gray (1990a) argued that the principle 'has nothing to do with science' because it is a wholesale rejection of scientific methodology as a basis for decision-making. It is seen as undermining optimism that science can solve environmental problems. Yet, as Cameron (1999: 44) argued, the actual limitations of scientific endeavour provide an argument for the application of precaution. The polarisation of views among the commentators centres on the issue of whether precautionary action should be taken in the absence of scientific proof of causal links between activities and environmental harm (Christie 1993: 480). Gray is concerned by the rejection of statistical predictions (or 'scientific evidence') of environmental outcomes in favour of acceptance of mere 'suspicion of effects' as sufficient for the introduction of precautionary measures. This is perceived as taking objectivity out of the process (Gray 1990a, 1990b, 1996; Gray et al. 1991; see also Warren 1993). He warned against 'crying wolf' and referred to the North Sea Declaration formulation of the principle (where precautionary measures are to be introduced 'even where there is no scientific evidence') as an example of 'unnecessary caution' (Gray 1990b: 600). Likewise, Wildavsky (1995: 428, 445), who was a prominent critic of the principle, described it as a 'marvellous piece of rhetoric' which supports the elimination of activities which *could* cause harm, thus reducing decision-making to a 'hedging mechanism'. He believed that there is no need to be prepared for all possible eventualities: 'why organize our lives around predictions unlikely to come true?' Brunton (1995: 32), in his attack on the principle, argued along similar lines:

The principle...provides a justification for taking seriously all kinds of spurious or non-existent – but supposedly deleterious – links between human actions and environmental effects and so offers the basis for potentially massive, and frequently counterproductive, regulatory intervention.

Brunton argued that the best strategy for dealing with uncertainty would be to develop 'resilience' by increasing our understanding by trial and error. In fact, he contended that a conservative 'do-nothing' approach, 'which would seem to be the one supported by the precautionary principle', may ultimately prove to be 'unacceptably risky'. In a sense, Brunton argued for a *reverse* precautionary principle – that we should not prevent certain activities because they might reap unknown *benefits*.

Gray, Wildavsky and Brunton misdirect their attack on the principle. They view its application as ensuring the loss of profits and opportunities which are traded off for benefits which are unquantifiable, distant and possibly non-existent. In doing so, they place little weight on the higher penalties which may be incurred by society as a whole and by future generations. The principle recognises that inaction in the face of uncertainty may be far worse than coercive action which is taken too late to be effective. It is implicit in the acceptance of precautionary philosophy that some opportunities may be foregone in order to avoid the consequences of unknown, but potential, harm. No apology is offered for such 'costs' being incurred. Further, the principle does not abandon scientific evidence. All formulations of the principle require some indication that harm may result before the burden shifts to the proponent of an activity to negate the possibility of unacceptable harm. For example, the North Sea Declaration asserts the need to apply the principle 'to avoid *potentially* damaging impacts' of *toxic* substances. A high level of scientific understanding is required before the principle can be applied in weaker formulations, such as in the Rio Declaration, where the threshold for application is threats of 'serious or *irreversible* damage'. Precaution is not 'unscientific' but the principle does recognise that decisions often need to be made in the absence of adequate scientific information. As a result, application of the principle is inescapably political which suggests the need for an increased public role in the construction of knowledge and weight placed on risks and uncertainty rather than leaving interpretations solely in the hands of scientists (Lutes 1998: 161). In recognition of irreducible uncertainty and complexity in ecosystems, ecologists have proposed that management interventions be framed as testable hypotheses, with feedback mechanisms established so that management experience could inform system understanding and thus improvements in management. This notion of adaptive management envisages situations of multiple uses and stakeholders that incorporate learning dimensions whereby policy processes and institutions could adapt in a persistent yet flexible and informed manner (Dovers and Mobbs 1997). As a result, application of the principle is set to take place within the context of broader policy and institutional settings. Approaches to uncertainty developed as part of such institutional evolution will need to have regard to adaptive processes thus providing new settings for the application and interpretation of the precautionary principle (see also Fisher and Harding 1999). The precautionary principle encourages the inclusion of as many relevant interests because it operates in circumstances of uncertainty and thus legitimates a partly non-scientific and policy-oriented basis to decision-making (Weintraub 1992: 200;

VanderZwaag 1994: 10; Dovers et al. 1996: 1149; Moffet 1997: 169; Cameron 1999: 43 and Cameron et al. 1999: 105).⁴⁸ It thus seeks transparency and democracy in collective decision-making which, by definition, is based partly on judgment. This is most aptly explained in the European Environment Bureau's (1999) comments on the principle:

Risk perception has a cultural dimension. There is a considerable degree of subjectivism in choosing for a risk averse or risk friendly approach, different within and between different societies. Decisions on the acceptability of technologies and activities, as well as on the intensity of their control cannot be defined by 'sound science' alone, but requires a mechanism to identify the preferences of the society. Therefore, accountable, transparent public and democratic decision-making within the [European] Community institutions is a prerequisite to intelligent decision-making that will serve all citizens of the EU according to the principles set out in the [Maastricht] Treaty.

The debate about the merit of the principle based on it undermining scientific evidence and resting on judgment tends to overlook the growing recognition that the principle has far more substance to it than is indicated for example in the oft-quoted misstatement that it simply prohibits development projects wherever there is uncertainty. The principle does not equate a 'no risk' policy, which also is impossible to establish (Harding and Fisher 1999: 19). Rather, the principle requires greater weight to be given to environmental and public health protection in the all too common situation where there is insufficient scientific information available upon which to base decisions. The principle is a broad commonsense approach aiming not for zero risk, but for reduced risk. This does not necessarily mean stopping activities but rather imposing moratoriums to delay decisions with irreversible consequences to enable further research and the identification of safer alternatives. In this context, specific negative consequences of precautionary action can overshadow the less-tangible merits of a precautionary approach.

4.4.6. Shortcomings of risk assessment

Many organisations responding to the challenge to implement the principle consider that its application should take place within the existing framework and practice of risk assessment. For example, the Commission of the European Communities (2000: 3, 9) stated that the principle 'should be considered within a structured approach to the analysis

⁴⁸ Consider Moffet's (1997: 169) contra view that too much public participation can be anti-precautionary in the sense that results can be skewed to vested interests and hinder government ability to make rapid precautionary decisions.

of risk', and that it intends to apply it 'when faced with taking decisions relating to the containment of risk'.⁴⁹ However, although management decisions based on risk assessment can be considered to be preventative in so far as issues and projects are examined prior to their implementation, they cannot be described as precautionary because the focus is on defined cause and effect relationships with outcomes which are relatively well known. The precautionary approach differs from a risk management approach in so far as it operates where risks cannot be defined. Uncertainty analysis – which the precautionary principle requires – goes beyond the reductionist risk assessment approach which involves identifying quantifiable hazards with (known) risks. By focusing on quantifiable outcomes, risk assessment – as currently practised – does not include consideration of problems influenced by uncertainty, indeterminacy and ignorance. Thus, risk assessment is much narrower than a precautionary approach to EIA (Suter et al. 1987: 295). In addition, there is the issue of *incommensurability*. That is, aggregating risk preferences by comparing risks which cannot readily be compared (often referred to as 'comparing apples and pears'). When risks are ranked to determine acceptability, the process is unavoidably subjective involving different, but potentially equally valid, judgments (see Stirling 1999). Further, the focus of risk assessment is managing risks rather than preventing them. For example, a risk assessment of the construction of a new nuclear power plant may deem it to be acceptable because the risk of explosion is less than one in a million and thus statistically insignificant. Yet options such as fundamental alternatives including cleaner production options and waste minimisation options do not factor into the process. Thus the risk assessment process assumes the non-precautionary assimilative capacity concept (Tickner et al. 1999: 14). Rather than seeking to determine 'acceptable' levels of impact, the precautionary principle starts from the premise that 'no risk is acceptable if it is avoidable'.

An unavoidable but sometimes overlooked shortcoming of risk assessment is that rarely, if ever, is full scientific certainty achieved in relation to predictions of environmental outcomes. Risk analysis assumes that the statistical likelihood and magnitude of environmental harm can be quantified. However, the magnitude of uncertainty can render meaningless any assessment of environmental risks (Costanza and Cornwell 1992: 13; Reckhow 1994: 161; Shere 1995: 476 and Gullett 1997: 54, 2000a). According to Santillo et al. (1998: 941), risk assessment 'captures neither the spirit nor the

⁴⁹ See also Australia's Intergovernmental Agreement on the Environment which seeks a 'risk weighted' approach to the principle.

intentions' of precaution (Santillo et al. 1998: 941).⁵⁰ There is a tendency for information to be simplified due to the constraints of decision-making. This further obscures the limitations of available information and the value judgments contained in interpretation of them. However, because results are quantified, this creates the impression of 'sound science' (Tickner et al. 1999: 14 and Fisher 2001). Denning (1997: 26) argued that the numerical estimates of probability and severity of harm provided in risk assessments can create 'a false security that the numbers derived are legitimate and correct' despite the process being partly subjective and non-scientific. Most significantly, according to Fisher (2001), 'the reliance on science often has very little to do with a concern with the truth *per se* but rather it is a way of resolving disputes and giving the appearance of objectivity and thus accountability'. Yet even in well-bounded circumstances, ignorance should not be discounted (Deville and Harding 1997: 35).

Risk assessment is allied to the precautionary principle in the sense that it is proactive because it seeks to determine future impacts as a basis for informing decision-making. Yet the fundamental differences between the two approaches suggests that precaution cannot be implemented adequately simply by reforming risk assessment processes. A contrary opinion was expressed by the Risk Assessment Policy Unit (UK) (1999: 31) which argued that risk management can be 'safeguarded' so that it is consistent with the precautionary principle. It stated that this could be achieved by attaching more weight to hazards leading to irreversible effects, giving more weight to the consequences of a risk rather than its likelihood, and considering worst case scenarios. Yet the need to consider uncertainty is not satisfied by this approach of building pessimistic or conservative assumptions into risk assessments because the focus remains on *risks*, which are, by definition, outcomes that are identifiable and quantifiable rather than largely unknown. Consideration of the various types of uncertainty can complement risk assessment, but the basis of risk assessment falls short of a truly precautionary approach (see Harding and Fisher 1999: 10). Risk assessment is necessary, however, for the precautionary principle due to the need to identify and analyse the risks, costs and benefits associated with issues and projects. Yet a broader approach is necessary, one that would, for example, take into account cumulative effects and strategic planning. Specifically, a more explicit attempt to include uncertainty analysis is needed to make the existing, rather

⁵⁰ See also arguments about the dangers of risk-tradeoffs and false positives ('Type I' error) which have done much to undermine the precautionary principle by incorrectly asserting that the principle does not enable consideration of negative consequences of precaution. On this point, see Cross (1996) and Weiner (1995).

narrow-focused risk assessment process truly precautionary. However, greater flexibility is also needed in decision-making to allow for the legitimacy of scientific analysis to be challenged (Fisher 2001). Precaution is relevant here because it encourages more critical examination of scientific information by reminding us of the subjective and imprecise nature of many scientific endeavours, thus moving from a purely scientific basis to decision-making to one which is more collective and flexible.

4.4.7. The principle as a legal principle

Although the principle advances a progressive policy approach to environmental management, as a legal concept it is not as radical as it may appear. International environmental law already addresses some aspects of precaution (Handl 1990: 24 and Birnie and Boyle 1992 95). In fact, the principle is best understood as a development of existing legal obligations rather than a departure from them (Freestone 1991: 37). The existing preventive principle in international law obliges states to abstain from conduct which carries 'significant risk' of 'reasonably foreseeable' harm. Further, international jurisprudential developments of the *Trail Smelter* doctrine have expanded the requirements of due diligence to include the obligation to investigate the likelihood of environmental harm and to assess whether risk of harm is serious (Handl 1990: 21, see also Experts Group on Environmental Law of the World Commission on Environment and Development 1987: 80-5).

The innovative quality of the precautionary principle lies in the requirement of prevention not only where there is 'significant risk' of harm, but also where there is uncertainty whether harm *will* result. The preventive principle requires risk and causation to be scientifically proven; the precautionary principle extends the preventive requirements of due diligence where there is uncertainty as to environmental outcomes. Gündling (1990: 26) argued that it is a more stringent form of preventive environmental policy because it requires action 'irrespective of the existence of risks'. Although risks are relevant, 'the crucial point is that environmental impacts are reduced or prevented even before the threshold of risks is reached'. Thus, he argued, precautionary action must be taken even where risks are 'not excluded'. Yet this interpretation of the application of the principle is too wide. It is inconsistent with most formulations which do not call for action unless there is some indication non-negligible environmental harm may result (Cameron 1999: 36).

Debate exists concerning whether the precautionary principle is a hard and fast '*principle*' or rule requiring specific regulatory prohibitions or whether it advances a more

flexible 'approach' to guide future policies (Hey 1992: 304 and MacDonald 1995: 256). The dilemma exists because of the numerous formulations of the principle and the differing circumstances in which it is to be applied. If it is considered to be a principle, a clear course of conduct to undertake is difficult to discern because no absolute obligations are set out (Freestone and Hey 1996: 251). There is no substantial difference between the precautionary principle and approach and differences in terminology have not altered practice (Hey 1992: 304). The principle is, at least in its strictest forms, quite a radical departure from traditional concepts of property law which have developed out of a perception that the environment is a resource to exploit rather than to conserve, and as a result, it requires innovative methods to be implemented (Barton 1998: 542). It is a departure from traditional tort based notions of liability in which no harm is presumed until evidence is presented of damage and causation (Weintraub 1992: 178). The vagaries of the instructions for action in the principle as currently formulated suggest that it is incapable of mandating particular outcomes. An issue here is whether precautionary responses to identified hazards should be proportionate to the threatened environmental impact which is sought to be avoided. Haigh (1999) argued that the principle is 'unworkable' unless it is linked to the principle of proportionality because it would have negative effects for industry. Thus, it is assumed, different thresholds for precaution could be adopted depending on cost benefit analysis and use of the BATNEEC concept. This would arguably increase the level of subjectivity involved in applying the principle and be difficult to formulate as a legal standard (see Freestone and Hey 1996: 265). The Commission of the European Communities (2000: 18) adopted the precautionary principle but stated that it must be applied consistent with the principle of proportionality:

Measures based on the precautionary principle must not be disproportionate to the desired level of protection and must not aim at zero risk...In some cases a total ban may not be a proportional response to a potential risk...[T]he potential long-term [environmental] effects must be taken into account in evaluating the proportionality of measures in the form of rapid action to limit or eliminate a risk whose [sic] effects will not surface until ten or twenty years later or will affect future generations.

Restricting application of the precautionary principle to proportionate responses thus undermines values inherent in precaution. Proportionality assumes that we have adequate knowledge of outcomes to balance responses to them and shapes application of the precautionary principle consistent with cost-benefit analyses. The Commission's stance on the application of precaution can be seen more as a preventative approach because it needs

to identify the threat with relative certainty in order to determine a proportionate response. Thus, threats which are unquantifiable would arguably receive little precautionary action.

4.4.8. The status of the principle in international law

Although it is common for the principle to be formulated in mandatory terms in non-binding 'soft' international law instruments,⁵¹ when it is incorporated in binding conventions, it often is contained in non-operative provisions or is relaxed and expressed in permissive terms.⁵² The question is whether, in the absence of a mandatory treaty provision, is a state required to implement the principle under customary international law? Articulations have not evolved it to a 'predictable substantive rule of precautionary obligation' (Hickey and Walker 1995: 437). Because it is difficult to determine a precise minimum content in the precautionary principle, any obligation would be one of conduct rather than result (Bellini 1998: 51).

A number of commentators have suggested that, because strong evidence of state practice and *opinio juris* is absent and because the parameters of the principle remain elusive, it is doubtful whether the principle is part of customary international law, or even whether it can evolve into an international canon of environmental practice (see Gündling 1990; Handl 1990; Garcia 1994; MacDonald 1995; Tinker 1996 and Bellini 1998). Others have argued that, because the principle has been invoked so frequently in international environmental resolutions, it has crystallised into a basic normative principle of international law (see Cameron and Abouchar 1991 and 1996; Freestone 1991; Hey 1992; Cameron 1994 and 1996; Hohmann 1994; Fullem 1995; McIntyre and Mosedale 1997 and Commission of the European Communities 2000).⁵³ As the principle has been expressly adopted in a plethora of international instruments (as well as being endorsed implicitly in many more), it seems any doubt as to its legal validity goes to determining its specific requirements rather than to its existence as a principle of law. Freestone (1991: 37) argued nearly a decade ago that the 'bottom line' is that a state which has endorsed the principle would be liable if it caused harm in the future through activities which today are strongly suspected (but not proven) to cause substantial harm. This opinion is relevant for all states that have adopted the principle by signing a number of international documents which contain it. For those states which have not assumed the responsibility to implement

⁵¹ For e.g., Principle 15 of the Rio Declaration employs the auxiliary 'shall'.

⁵² For e.g., Art. 3(3) of the Climate Change Convention employs the auxiliary 'should'.

⁵³ Reilly (1996: 802) argued that where there are global environmental harms which are 'both substantial and probably irreversible', the principle would serve as a basis for action by the UN Security Council.

the principle, their environmental conduct should nonetheless be influenced by it because its entrenched status as 'soft' international law means that increasingly it will shape future determinations of international legal liability. This is largely accepted as also taking place adhering to the subsidiarity concept by which the lowest jurisdictional and political level is to be given authority where possible.

Where a precautionary obligation can be discerned, Freestone and Hey (1996: 253) argued that the concept of foreseeable harm 'might over time develop to include a wider concept of risk' so a state must take precautionary remedial action once possible damage is signalled. Tinker (1996: 55) argued that international law and state responsibility must expand to meet imperatives addressed by the principle. Thus expanded legal use of the precautionary principle has the potential to avoid the legal hurdles in liability at international law by avoiding harm in the first place. The principle needs greater articulation as a general principle of international law and given specific operation in treaties which currently tend to operate from the basis that it is assumed all activities are permissible until they are explicitly prohibited or made subject to regulation (Hey 1992: 312). An issue is whether states should have a degree of flexibility in interpreting the principle or whether clear and uniform precautionary procedures should be adopted.

4.5. Conclusion

It has been seen that the principle has evolved in response to the dilemmas faced by environmental managers when confronted with a lack of information about the environmental implications of proposed or continuing activities and that it is a sound way of facilitating decision-making in this context. However, definitional uncertainties remain and no universal formulation exists. Although the Rio Declaration is the most widely cited, it is also possibly the weakest formulation that exists; at least in so far as it fails to offer concrete guidance as to how precaution should be applied. It is to the challenge of applying the principle that the thesis now turns.

Chapter Five

Applying the precautionary principle: considering transboundary environmental problems

5.1. Introduction

The precautionary principle is an overarching principle of environmental management and protection and is relevant to a number of different fields including waste management, planning regulations, habitat conservation, public health, and, obviously, in relation to the relatively discrete problem of pollutant emissions. With regard to pollution, the problem context is well defined and the decision-making concerns whether and on what basis to permit a particular pollutant. However, when it is environmental problems at the regional or global level which are sought to be addressed, the situation is often remarkably more complex. The principle is particularly suited and useful for large-scale transboundary environmental problems. These tend to be multi-faceted, complex, uncertain, spatially and temporally diffuse, interconnected with other issues and pose major threats to natural systems: and be inconsistent with human systems of governance (Dovers et al. 1996: 1146, 1151). Further, the problematic nature of large-scale transboundary environmental problems can be exacerbated by jurisdictional conflict between countries due to differences in administrative processes as well as differences in environmental and economic policy commitments. This chapter discusses the challenges involved in applying the principle. The Australian experience with the principle is reviewed to identify the precautionary approaches that have been adopted in a country with a well-known commitment to the principle. Shortcomings of approaches are reviewed as well as challenges for implementation and then shift to broader context.

5.2. Applying the principle

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

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

The ‘no regrets’ doctrine permits action in response to uncertainty only when it is certain that there will be other benefits, such as reductions in health risk. Australian governments have concentrated on ‘no regrets’ actions in relation to the first stage response to the 1992 National Greenhouse Response Strategy which is the primary vehicle meeting Australia’s commitments under the Framework Convention on Climate Change (Intergovernmental Committee on Ecologically Sustainable Development 1995: 8; see Jurgielewicz 1996: 64 and Moffet 1997: 167). Cameron (1999: 41) explained the conceptual and practical distinction between precaution and ‘no regrets’: ‘[t]he no-regrets doctrine seeks to avoid regretting regulatory inaction because of the uncertain consequences of taking such action. The precautionary principle seeks to avoid regretting regulatory inaction because of the uncertain consequences of such inaction.’

Formulations of the principle vary greatly as to their substantive requirements. In the particularly bland Principle 15 of the Rio Declaration state parties agreed merely that they will not use ‘lack of full scientific certainty’ as a *reason for postponing* ‘cost-effective’ precautionary measures where there are threats of ‘serious’ or ‘irreversible’ damage (essentially a BATNEEC approach). There is a further subjective proviso: states

are given latitude to apply the principle 'according to their individual capabilities'.⁵⁴ Stricter formulations call for much greater social and institutional change. The strongest formulation of the principle can be found in the 1989 Oslo Commission decision on the reduction and cessation of dumping of industrial wastes in the North Sea. The parties agreed that:

[T]he dumping of industrial wastes in the North Sea shall cease...except for inert materials of natural origin, and except for those industrial wastes for which it can be shown to the Commission through the Prior Justification Procedure (PJP) both that there are no practical alternatives on land and that the materials cause no harm in the marine environment (reproduced in Freestone 1991: 25).

The burden of proof is thus reversed and it becomes necessary for the applicant to demonstrate that the activity will cause 'no harm' before it can be sanctioned. Such strong formulations of the principle have provoked criticism because of the almost impossible task of proving a negative proposition – that no harm will be caused (Freestone 1991: 32). As Stebbing (1992: 292) pointed out, only disproof is logically conclusive because repudiating what is false is the only act scientists can perform with complete certainty. According to Popper (1959), for a statement genuinely to be scientific, it must be conclusive. Only statements which *falsify* (rather than verify) propositions can be conclusive. 'Proof' of harmlessness is a universal statement which is *falsifiable*.⁵⁵ Insisting upon application of such formulations of the principle is quixotic because, taken to its logical conclusion, the principle entails the prohibition of all activities about which there exists uncertainty as to environmental effects – virtually every human activity.

Selecting appropriate thresholds for precautionary action will be challenging. While precaution is essentially preventative in nature, not all preventative standards can be described as precautionary, because the principle goes further than prevention (Cameron 1999: 32 and Cameron et al. 1999: 99). As Cameron (1999: 35) pointed out, the use of precautionary language is often accompanied by the setting merely of preventive standards

⁵⁴ Similarly, Art. 4(2)(e) and (g) of the Basel Convention provide that each party shall take appropriate measures to prevent the import or export of hazardous wastes 'if it has reason to believe that the wastes in question will not be managed in an environmentally sound manner'. However, this provision will have little force as its interpretation falls to individual states. Thus states which receive economic or environmental benefits from the transfer of hazardous wastes will be inclined to 'believe' export is being conducted in an environmentally sound manner.

⁵⁵ Thus Popper (1992: 4) suggested searching for mistakes so they can be corrected, rather than vainly searching for certainty when 'we can never know anything for sure'. However, in civil law, the burden of proof is the balance of probabilities. It may well be that, in a particular case, on the balance of probabilities, the scientific evidence that is presented suggests that there will be 'no harm'.

rather than precautionary standards. This occurs where parties act to reduce a risk because they are acting in the knowledge that a dangerous outcome is possible (or probable) rather than because they are uncertain as to any environmental effects. The more that is known about a possible outcome, the less precautionary any measure will be to prevent it. The National Pollutant Inventory (NPI), established in Australia May 1996, is an example. The Commonwealth Environment Protection Agency (1996) employed assimilative capacity language when it stated that 'for a chemical to be included on the NPI, it must be known to, or reasonably expected to, cause serious health problems or severe damage to the environment'. Thus, only those substances which represent a clearly identified hazard potential are listed. A substance about which there is much uncertainty as to its environmental effects will not make it onto the list because its risk has not been identified. Conceptually, this is a preventive approach. A truly precautionary approach would involve applying regulatory standards to *all* substances about which there exists uncertainty as to their environmental effects. This can be achieved by 'reverse listing'. The conventional regulatory approach, as illustrated by the NPI, involves listing substances which cannot be discharged. Reverse listing entails a blanket prohibition except for listed substances which have been demonstrated to be safe (or within acceptability criteria). Further, over time, precautionary standards can turn into preventive standards. For example, the Vienna Convention for the Protection of the Ozone Layer,⁵⁶ signed in 1985, is itself precautionary because it was established before there was conclusive evidence of ozone depletion (Cameron and Abouchar 1991: 17). However, with the increase in scientific knowledge, much more is known about the environmentally damaging effects of CFCs so the standards set prescribing controls for their production and consumption are now better described as preventive rather than precautionary. Thus prevailing uncertainties can be partially resolved over time (Gollier et al. 2000: 230). As knowledge increases, justification for precaution is replaced by other approaches such as cost benefit analysis as a balancing process between regulatory action and the acceptable level of risk.

Environmental threats can take a variety of forms depending on the knowledge available concerning the likelihood of its occurrence and the extent of harm. There are six basic risk classes. These are events where there is risk of

- high damage with low chance of occurrence;

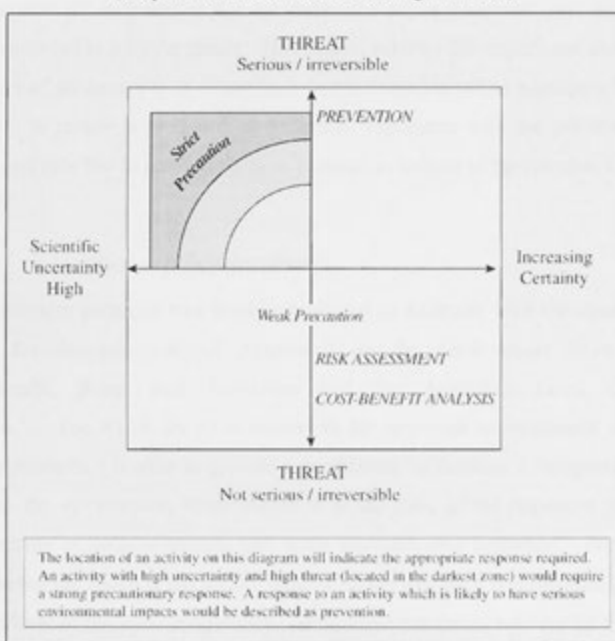
⁵⁶ See also the preamble of the 1987 Montreal Protocol to the Vienna Convention which expressly adopted a precautionary approach.

- high damage with unknown probability;
- possible damage (but probability and extent of damage uncertain);
- damage of uncertain extent (and probability unknown);
- known probability of damage (but effects distant and uncertain); and
- low damage (and probability known to be low).

The conceptual framework for the application of precaution is illustrated in Figure 1.

Figure 1. Spectrum of degrees of precaution

(adapted from Deville and Harding 1997: 28)



The most effective operational approach would be to modify the burden of proof to require a potential polluter to present evidence of a high standard pointing to harmlessness or negligible harm. Precautionary measures would be introduced where the magnitude of uncertainty (influenced by indications of potential harm) outweighs indications of benefit from a proposed activity. This would enable precaution to be implemented quickly and activities would be permitted only where there is confidence that they would not result in unacceptable harm. Deville and Harding (1997) articulated a number of steps for a framework by which the principle could be applied. These steps are to ascertain whether precautionary measures are needed (depending on the severity of the threat and the level of

knowledge attaching to them), how precautionary should we be, and what precautionary measures can and should be applied (see (Harding and Fisher 1999: 16). Their framework develops Cameron's (1999: 36) two essential questions to precaution: what triggers the threshold of non-negligible environmental risk, and what regulatory action is justified? We now contextualise practical application of the principle by examining the adoption and use of it in Australia – widely perceived as one of the most advanced countries in terms of embracing the principle in policy and law.

5.2.1. The Australian experience

There has been considerable interest in Australia's experience with the principle due to the early and systematic inclusion of it in environmental policy documents and legislation and the status accorded to it by the courts. This section reviews this experience and shows that the adoption of the principle in Australia is better characterised as widespread rather than innovative. A review is presented of Australia's experience with the principle in policy, legislation and case law to place this reform proposal in context of the principle's institutional setting.

5.2.1.a. *Inclusion in policy documents*

The precautionary principle was firmly established in Australia with the signing, in May 1992, of the *Intergovernmental Agreement on the Environment* (IGAE) by the Commonwealth, States and Territories and the Australian Local Government Association.⁵⁷ The IGAE set up a framework for improved environmental management throughout Australia. It aims to provide a mechanism to facilitate a co-operative national approach to the environment, better definition of the roles of the respective governments, greater certainty in decision-making and better environmental protection. Although as a political accord the IGAE is not legally binding on the parties, it is influential because it is the highest level of environmental policy commitment that exists between all three spheres of government (federal, state and local). The precautionary principle is listed as one of four principles intended to inform environmental policy and programs within the purview of each of the parties, thus covering all Australian public environmental policy and management decisions. Under clause 3.5.1, the parties agreed that:

⁵⁷ Australia has a federal system of government which consists of the Federal (or Commonwealth) government and the governments of the six states and two territories. There also exists another level of government: local government. Many environmental responsibilities which had been the purview of state governments in the period following federation now rest with local government. In effect, there are three levels of government with environmental responsibilities (see Doyle and Kellow 1995: 145).

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

This is the traditional formulation of the principle – closely resembling that contained in the 1992 Rio Declaration – which embodies the notion that cautious actions should be taken whenever uncertain environmental risks are encountered. However, clause 3.5.1 expands upon this core requirement thus:

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

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

Schedules to the Agreement identify specific areas of environmental policy and management where the principle 'should' be applied. These are:

- data collection and handling;
- resource assessment, land use and approval processes;
- environmental impact assessment;
- national environment protection measures;
- climate change;
- biological diversity;
- national estate⁵⁸;
- World Heritage; and
- nature conservation.

Part (ii) above is an important expansion to the Rio Declaration formulation because it gives more substance to the principle by indicating that precaution requires careful assessment of various management options and that they be balanced in any final decision. However, it does not greatly assist implementation of the principle or remove confusion about its content because further necessary detail is lacking about exactly how, for example, decision-makers should assess 'risk-weighted consequences'. Another concern

⁵⁸ National Estate areas are protected by the Australian Heritage Commission under the *Australian Heritage Commission Act 1975* (Cth). Section 4 specifies that for a place to be listed on the National Estate, it must be part of Australia's natural or cultural environment and have aesthetic, historic, scientific or social significance or other special value for future generations as well as existing generations.

with this formulation of the principle is that it is phrased in preventive rather than precautionary language. It does this by focusing on risk (including 'serious' and 'irreversible' damage) rather than uncertainty, which, as explained in 4.2.1.a, is the essence of the principle.

Another important document which includes the principle is the *National Strategy for Ecologically Sustainable Development*, also released in 1992, which outlines essential approaches for achieving ESD (Australia's version of 'sustainable development') (Commonwealth of Australia 1992). These approaches include some which are consistent with precaution, such as considering national implications of local activities and taking long-term rather than short-term views in environmental decision-making. The Strategy, although not employing the term 'precautionary principle', does adopt the principle by mirroring the first part of the IGAE definition.

The recognition of pervasive and irreducible risk and uncertainty associated with sustainability issues has led to a crucial rethinking of approaches to environmental management. At a practical level, the Australian Standard/New Zealand Standard 4360 Risk Management has been developed for generic use in risk assessment and management. Given the IGAE definition of the precautionary principle to include 'risk-weighted assessments', the Risk Management Standard may well become a major mechanism for interpreting whether the principle has been adequately applied in decision processes, as it is the only formalised framework available. Proposals to insert widely applicable 'duty of care' provisions in resource and environmental laws in Australia state that principles of risk identification, prediction and management would be central to such legal reform (Industry Commission 1998). The principle's prevalence in Australia is evidenced by its inclusion in numerous specific Commonwealth and State environmental policy documents,⁵⁹ as well as overarching policy documents such as the IGAE and the NSESD. It is now rare for an Australian environmental policy document not to mention the principle or to adopt it implicitly by referring to ESD.

5.2.1.b. *Inclusion in legislation*

In the later part of the 1990s, the precautionary principle appeared in Australian statutes with increasing frequency. Due to its now entrenched status in Australian environmental policy, it is normally mentioned in some form in new statutes dealing with environmental

⁵⁹ These include the Guiding Principles for the Sustainable Management of Coastal Resources, the National Strategy for Rangeland Management, the National Strategy for the Conservation of Australia's Biological Diversity, the National Waste Minimisation and Recycling Strategy, the National Greenhouse Response Strategy, and the Tasmanian State Policy on Water Policy Management.

protection. Further, a number of provisions in environmental legislation enacted prior to the principle's widespread adoption in policy instruments in the early-1990s have been updated to include the principle. For example, an important reference to it in Commonwealth legislation is contained in the *Environment, Sports and Territories Legislation Amendment Act 1995* (Cth) which by s 31 amended s 39z of the *Great Barrier Reef Marine Park Act 1975* (Cth) to require the Great Barrier Reef Marine Park Authority to be informed by the principle in preparing management plans and protecting World Heritage values. The Act adopts the IGAE definition of the principle. Also, schedule 2 of the *Fisheries Legislation Amendment Act 1997* (Cth) amended s 3(1)(b) of the *Fisheries Management Act 1991* (Cth). The amended section provides that the Minister, in the administration of the Act (and the Australian Fisheries Management Authority in the performance of its functions), 'must' pursue the objective of, among other things, 'ensuring that the exploitation of fisheries resources and the carrying on of any related activities are conducted in a manner consistent with the principles of ecologically sustainable development and the exercise of the precautionary principle, in particular the need to have regard to the impact of fishing activities on non-target species and the long term sustainability of the marine environment'.⁶⁰

The most recent and progressive inclusion of the principle in Australia is contained in the federal *Environment Protection and Biodiversity Conservation Act 1999* (*EPBC Act*). The method by which it is incorporated in the statute is discussed in 6.5.1.b. Although the principle is espoused in a handful of Commonwealth Acts, there has been greater explicit endorsement of precaution in State legislation. This is because authority to legislate on environmental matters is traditionally seen as the preserve of the State parliaments because they have authority to legislate on any matter not specifically reserved to the Commonwealth parliament by the Australian Constitution. The conventional view is that the Commonwealth has no environmental power (or at least no exclusive environmental jurisdiction) because of the absence of a head of power specifically dealing with environmental matters in s 51 or s 52 of the Constitution.⁶¹ The first legislative

⁶⁰ The principle is also contained in the *Ozone Protection Act 1989* (Cth) by way of the inclusion in Schedule 3 of the Montreal Protocol on Substances that Deplete the Ozone Layer.

⁶¹ In the period 1976 to 1989, a number of legal challenges regarding the constitutional validity of Commonwealth environmental legislation were prosecuted. The High Court of Australia delivered four pivotal decisions incorporating expansive interpretations of a number of relevant heads of Commonwealth power and upheld the validity of each enactment challenged (see e.g. *Murphyores Inc. Pty Ltd v Commonwealth* (1976) 136 CLR 1). It confirmed that the main source of Commonwealth environmental power relates to the implementation of obligations in treaties, or (in the absence of a

inclusion of the principle in Australia is found in the New South Wales *Protection of the Environment Administration Act* 1991. Section 6(2) outlines the principles of ESD and specifies that it can be achieved (in part) by implementing:

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

This section is referred to in a number of subsequent NSW statutes where the Parliament considered that principles of ESD should be complied with in other fields.⁶² Another early inclusion of the principle is found in the *Environment Protection Act* 1993 (SA). The objectives of the Act include ensuring that 'all reasonable and practicable measures are taken to protect, restore and enhance the quality of the environment having regard to the principles of ESD' and 'to apply a precautionary approach to the assessment of risk of environmental harm'.⁶³

Despite the now common appearance of the principle in Australian legislation dealing with environmental matters, specific references to the principle, separate from its inclusion as a major component of ESD, are rare. The principle is often contained in statutes as a specifically mentioned component of ESD or by way of inclusion of the IGAE in schedule sections of legislation. Australian examples include:

- *Environment Protection Act* 1997 (ACT) s 3(2)(a)
- *Gungahlin Development Authority Act* 1996 (ACT) s 7(3)(a)
- *National Environment Protection Council Act* 1994 (Cth) Schedule 1
- *Contaminated Land Management Act* 1997 (NSW) s 10(2)(a)
- *Local Government Amendment (Ecologically Sustainable Development) Act* 1997 (NSW) Schedule 1
- *Native Vegetation Conservation Act* 1997 (NSW) s 4(2)(a)

Some Acts do not specifically refer to the principle but do enable consideration to be given to the essence of the principle by, for example, prohibiting the postponement of measures

treaty) in the more problematic concept of legitimate 'international concern' (see *Koowarta v Bjelke-Petersen* (1982) 153 CLR 168 at 220).

⁶² See, e.g., *Coastal Protection Act* 1979 s 54A; *Environmental Planning and Assessment Act* 1979 s 112D(g); *Energy Services Corporations Act* 1995 ss 5(1)(b), 8(1)(b); *Fire Brigades Act* 1989 s 10A; *Gas Supply Act* 1996 s 3(1)(a); *National Parks and Wildlife Act* 1974 s 91CC(2)(a); *Threatened Species Conservation Act* 1995 s 4(1)(b); and *Waste Minimisation and Management Act* 1995 s 3(2)(h).

⁶³ Section 10(1)(b)(iv).

to prevent environmental degradation simply due to an absence of scientific certainty with respect to threats of serious or irreversible damage being caused.⁶⁴ There is also a compelling argument that legislative intent requires decision-makers to consider the principle, even where it is not specifically referred to in legislation. As precaution is accepted as a guiding principle of ESD, it must be recognised as implicit in any statement of ESD (Harding and Fisher 1994: 257). Thus, references to ESD in legislation would entail a consideration of principle.⁶⁵ The existence of the principle in Australian legislation is extensive when one considers the 75 Commonwealth, state and territory statutes that include the ecologically sustainable development (ESD) concept (which includes the principle) and the 30 proceedings in courts and tribunals that have dealt with these principles (see Rose 1999).

A recent inclusion of a version of the principle is contained in the NSW State Environmental Planning Policy No. 58 – Protecting Sydney's Water Supply issued under the *Environmental Planning and Assessment Act 1979* (NSW).⁶⁶ The Policy, which commenced effect on 1 February 1999, provides that for any development that has significant potential to impact on drinking water quality in Sydney's catchment, the developer will need to provide evidence that the development will have either a neutral or beneficial impact on water quality and that the methods of containing and treating any pollutants generated are sustainable in the long term. Neither the precautionary principle nor scientific uncertainty are mentioned in the Policy. However, the Policy embodies a strong version of precaution in the sense that it places an obligation on the developer to establish that the proposed development will not adversely impact on water quality.⁶⁷ Approval can be refused on the grounds that a developer has not furnished the consent authority with an assessment of these matters.

Although the inclusion of the precautionary principle in Australian legislation is widespread (particularly in relation to other developed countries), the formulations of it in statutes are not strong. The new *EPBC Act 1999* is a notable exception in so far as it provides for mandatory consideration of the principle, although it provides a relatively weak version of precaution. Most existing Acts adopt the IGAE definition, which is itself only a slightly expanded form of the rather weak Rio Declaration version. As such,

⁶⁴See, e.g., *Natural Heritage Trust of Australia Act 1997* (Cth) s 21(3)(b)(ii).

⁶⁵ Acts which fall into this category include the *Endangered Species Protection Act 1992* (Cth) ss 32(3)(c), 34(3)(c), 60, 70, 81; *Natural Resources Management (Financial Assistance) Act 1992* (Cth) s3(2)(b); and the *Agricultural and Veterinary Chemicals (Northern Territory) Act 1995* (NT) preamble.

⁶⁶New South Wales Government Gazette no. 178 at 10163 (24 December 1998).

⁶⁷ Also, the Policy contains a notification requirement where a proposed development has less than a 'significant' potential to impact on water quality – clause 12.

current legislative incorporations of the principle in Australia are worded generally and reflect an intent to advance precautionary decision-making but not to mandate particular environmental outcomes based on precautionary criteria. Legislators have not turned their attention to giving the principle clearer expression so that it will be implemented in discrete cases.

5.2.1.c. *Judicial application*

The true test of effectiveness of the principle is not simply the inclusion of it in legislation, but rather the willingness of the courts to uphold its application as expressed in statutes (Harding and Fisher 1994: 255). However, due to the weak incorporation of it in Australian legislation, there is little Australian jurisprudence on the principle. It has been judicially considered in a handful of cases, most notably in a series of decisions of the NSW Land and Environment Court, and, more recently, by the Federal Court of Australia in the *Friends of Hinchinbrook* case.⁶⁸

The first and most significant judicial consideration of the principle was in 1993 by Stein J in the NSW Land and Environment Court in *Leatch v National Parks and Wildlife Service*.⁶⁹ The Shoalhaven City Council proposed to construct a road in an area known to be a habitat of the Giant Burrowing Frog, listed as an endangered species. The Council applied to the Director-General of the National Parks and Wildlife Service for a licence to 'take or kill' endangered fauna, as was required by the *National Parks and Wildlife Act* 1974 (NSW). The definition of 'take' in s 5 includes the disturbance, injury or 'significant modification of the habitat of the fauna which is likely to adversely affect the essential behavioural patterns'. The licence was granted and an appeal on the merits of decision was instituted. His Honour noted the inclusion of the precautionary principle in Commonwealth strategies respecting endangered species and biodiversity, the IGAE and the *Protection of the Environment Administration Act* 1991 (NSW), and concluded, in relation to the *National Parks and Wildlife Act* 1975, that:

⁶⁸ *Friends of Hinchinbrook Society Inc. v Minister for Environment* (1997) 142 ALR 632 (see Lyster 1997 and Gullett 1998: 155).

⁶⁹ (1993) 81 LGERA 270. The decision in *Leatch* has been referred to in most subsequent Australian judicial decisions which discuss the principle. It was considered by the High Court in *R v Secretary of State for Trade and Industry ex parte Duddridge* (decision delivered 4 October 1994), although held to be of no relevance to English law. *Duddridge* is English authority for the proposition that where a government has adopted the precautionary principle there is nothing to prevent it applying a threshold it chooses. The government could not be held to the threshold it chose in *This Common Inheritance* (HM Government). Smith J held further that the government was not required to rely on the principle. See Hughes (1995).

While there is no express provision requiring consideration of the 'precautionary principle', consideration of the state of knowledge or uncertainty regarding a species, the potential for serious or irreversible harm to an endangered fauna and the adoption of a cautious approach in protection of endangered fauna is clearly consistent with the subject matter, scope and purpose of the Act.⁷⁰

His Honour held that the Director-General must have regard to the distribution, habitat depletion and ultimate security of the species and to this end the 'commonsense' principle is not an 'extraneous consideration'. He continued (at 284): 'Application of the precautionary principle appears to me to be most apt in a situation of a scarcity of scientific knowledge of species population, habitat and impacts'. He noted (at 283) the 'dearth of knowledge' about the population, habitat and behavioural patterns of the frog and refused the licence because of inadequate scientific understanding of the possible impacts of road building on the species. The decision-making process had discarded less risky alternatives too early the principle was to be considered in the overall way the decision was made. *Leatch* provides a clear example of how the precautionary principle can operate as a determining factor in environmental decisions.

Optimism that the NSW Land and Environment Court was going to establish a firm basis for the application of the principle was shaken by obiter dicta in a decision less than one year later. In *Nicholls v Director General of National Parks and Wildlife Service*,⁷¹ a case concerning the same legislative provision that was considered in *Leatch*,⁷² a sharply contrasting judgment was delivered. At issue was the applicant's contention that the precautionary principle should be invoked to refuse the granting of a license for forestry operations to 'take or kill' endangered fauna because there were shortcomings in the fauna impact statement (required to accompany any application for such a license) which prevented the determination of appropriate ameliorative measures as required by the Act. Talbot J stated that the applicant's contention went beyond that argued and endorsed in *Leatch* and upheld the issuance of the license. He continued (at 419):

...the statement of the precautionary principle, while it may be framed appropriately for the purpose of a political aspiration, its implication as a legal standard could have the potential to create interminable forensic argument. Taken literally in practice it might prove to be unworkable. Even the applicant concedes

⁷⁰ (1993) 81 LGERA 270 at 282.

⁷¹ (1994) 84 LGERA 397.

⁷² The definition of 'take or kill' in s 5 (since repealed) *National Parks and Wildlife Act 1974* (NSW).

that scientific certainty is essentially impossible. It is only 500 years ago that most scientists were convinced the world was flat.

Just two months later, in *Greenpeace Australia Limited v Redbank Power Company Pty Limited and Singleton Council*,⁷³ in dismissing an appeal against the grant of a development application for the establishment and operation of a coal-fired power station, Pearlman J stated (at 18):

The application of the precautionary principle dictates that a cautious approach should be adopted in evaluating the various relevant factors in determining whether or not to grant consent; it does not require that the greenhouse issue should outweigh all other issues.

Such differing interpretations are perhaps predictable in these early days of the principle's incorporation in domestic law, but they reinforce the inoperational nature of the principle as currently expressed in legislation and policy documents.

The principle needs to be adopted in a manner which would establish it as a mandatory consideration in environmental matters due to the reasons stated above. That this is not yet the case is unsatisfactory because decision-makers can ignore the principle in circumstances in which its consideration or application is appropriate. An example of this shortcoming is the decision of Martin CJ of the Supreme Court of the Northern Territory in *Northern Land Council and Ors v Energy Resources of Australia Ltd and the Minister for Mines and Energy*.⁷⁴ The case concerned an application by the Northern Land Council and six Aboriginal residents for an interim injunction restraining the defendant from releasing water into the Magela Creek or its environs from Ranger Uranium Mine Retention Pond No. 2.⁷⁵ The second plaintiff, Mr Big Bill Neidjie, deposed that he was 'frightened by the proposed release of water' in that he feared it would 'kill the trees, waterlilies and other water plants'. Concerns were also expressed that people who drink the water or eat produce from the area after the discharge may be affected. In dismissing the application, Martin CJ stated (at 7) that the

fear arises from a *belief* that the water is contaminated — 'poisoned' — by uranium and other toxic substances. There is *no evidence* to show that the proposed discharge *would* have any such affect [sic]. On the other hand, the

⁷³ NSW Land and Environment Court, unreported, 10 November 1994.

⁷⁴ Supreme Court of the Northern Territory, unreported decision, 24 March 1995.

⁷⁵ The need to release water owed much to the inadequacies of the Environmental Impact Statement and environmental management plan prepared prior to construction of the mine.

evidence on behalf of the first defendant is that the contaminants in the water to be released...will cause *no harm* to people or the wider environment...Although this is the first time it is proposed that water be released from Retention Pond No 2, water from Retention Pond No 1 is allowed to be released fully every year, and since the mid 1980's, water from Retention Pond No 4 has been released in most years. The dilution requirements in respect of the release of water from Retention Pond No 2 means that the impact on the environment of the water released from it will be *identical* to that released from the other two ponds in respect of which there has been *no noticeable affect* [sic]...Though the individual plaintiffs may genuinely have been frightened as to the possible consequences to arise from a release of the water, there is no foundation for that belief. The evidence is all the other way (emphasis added).

The case demonstrates the inappropriateness of the existing burden of proof by which plaintiffs (often concerned residents) must adduce evidence to 'show' that activities 'would' result in environmental harm. Difficulties also arise due to the fact that production of evidence is itself a costly business which places a disproportionate burden on litigants who do not have 'deep pockets'. Further, the scientific evidence led by the defendant was unchallenged by the plaintiffs or Martin CJ. Considering the preceding discussion, it is untenable to argue that there is evidence that the release 'will cause *no harm*'. Likewise, the complexity of environmental interactions means that the argument that environmental impacts will be 'identical' to that of similar releases elsewhere cannot be sustained. The claim that there has been 'no noticeable [e]ffect' concerning released waters needed to be analysed in terms of the effectiveness of existing monitoring programs. The decision also glossed-over the potential for *future* environmental effects which may only manifest themselves after a long period. Although consideration of the precautionary principle in this case may have resulted in the same decision, the proceedings would have commenced from the position that the release of water would not be permitted *unless* the weight of adequate scientific evidence dispelled any reasonable concerns about possible environmental harm.

Despite the absence of legislative expression of an enforceable standard of precaution, since 1997, the principle has been argued in court cases more frequently, mostly by applicants or respondents seeking to have planning decisions influenced by precaution. For example, in *Grishin v Conservator of Flora and Fauna*⁷⁶ the applicant

⁷⁶ [1998] ACTAAT 250 (23 April 1998).

sought a review of the decision not to allow her to ride a horse in a designated nature reserve. The respondent, in seeking to have the decision upheld, argued that the precautionary principle should apply to the decision. The ACT Administrative Appeals Tribunal stated (at para 15):

We...believe that the adoption of a cautious approach to the protection of the environment is consistent with the object and purpose of the *Nature Conservation Act* [ACT 1980] and the management objectives applying to Aranda Bushland. However it is a matter of judgement as to whether the granting of permission to take horses into Aranda Bushland at the present time would be incautious.

The tribunal considered evidence given by an expert witness that baseline data should be obtained so that there could be scientific measurement and evaluation of any future environmental impact by horses on the land. In summarizing the evidence, the tribunal stated that it appeared that 'well-controlled and cared for horses pose only a small risk.' It stated (at para 21) further that it was not persuaded:

that horses admitted under the controls envisaged...would contribute significantly to soil erosion. However the possibility that they may carry weed seeds into the Aranda Bushland and that the seed growth may be promoted by horse manure cannot be ruled out, particularly if horses step off the formed gravel tracks.

In deciding to uphold the decision, the tribunal had regard to the 'desirability' of first obtaining baseline scientific data so that there could be assessment of any future impact of horses on the Aranda Bushland. Quite remarkably, the tribunal based its decision, in part, on precaution. It did so even though it was not certain that the activity in question would cause significant harm. It was sufficient to base the decision on the mere possibility of harm being caused, given that this approach was consistent with the intent expressed in the relevant statute under which the decision was based.⁷⁷ This recent administrative appeals case demonstrates that tribunals conducting merits review (where all aspects of a decision can be reviewed), but not necessarily courts conducting judicial review, of environmental decisions are prepared to consider arguments based on the precautionary principle.⁷⁸

⁷⁷ What is also of note is that the *Nature Conservation Act* 1980 (ACT) does not mention the precautionary principle or even ESD.

⁷⁸ See *R v Resource Planning and Development Commission; ex parte Aquatlas Pty Ltd* [1998] TASSC 82 (9 July 1998) where, in reviewing a decision made by the Resource Planning and Development Commission, Cox CJ of the Supreme Court of Tasmania stated that the Tasmanian State Coastal Policy, which includes the IGAE formulation of the principle, requires that, '[i]n the application of the principle, decisions must be guided by a proper process of evaluation to avoid damage and of assessment of the consequences of possible choices.' However, on the facts his Honour held that the Commission's

Yet even when courts find that the principle is a relevant consideration (or rather, find that it is not an irrelevant consideration), it seems that they will not be rigorous when considering whether decision-makers have acted with requisite caution in the absence of clear instructions to do so in legislation.⁷⁹ Due to absence of clearly defined legislative inclusions of the principle, courts have generally interpreted it as no more than a vague 'duty to act cautiously' which impedes its translation into legal discourse and implementation (Fisher 1999: 183; Gullett 1997: 65). This indicates that there is still a pressing need for clearer expressions of the principle and more debate by environmental practitioners and theorists about what the principle should require in specific circumstances. What the courts have found to be precautionary is wide ranging. Nonetheless, in Australia the principle has been afforded a degree of legal recognition by the courts and the legislature, as well as being endorsed routinely by all spheres of government in environmental policy commitments and by the majority of the professional literature. The increasingly high profile of the principle in these fora indicate that the necessary ingredients exist for it to evolve into a common law doctrine (Barton 1998 and Stein 2000) and possibly a ground of judicial review (Fisher 2001). It is now unlikely that, in the environmental arena, it could be held to be an irrelevant consideration. The scope of the precautionary principle depends significantly on trends in case law which can be influenced by prevailing social and political values (Commission of the European Communities 2000: 10). In common law, judges in some countries have reinterpreted traditional legal doctrines in quest for sustainable development (VanderZwaag 1993: 55). Indeed, *Leatch* established that the principle may need to be considered even if it is not included in the specific legislation upon which a matter is being litigated. Reinforcing this view are the statements of the High Court of Australia that there is a 'legitimate expectation' that Commonwealth discretion will be exercised in conformity with the terms of international conventions to which Australia is a party,⁸⁰ and there are numerous such conventions which embody the principle. Yet more guidance is needed as to the circumstances in which the principle is, or should be, a relevant consideration. Given the vague language used in legislation enshrining the

decision in the case did not conflict with the principle. Thus the opportunity to quash the decision on precautionary grounds did not present itself. See also the decision of Wright J of the same court in *R v Land Use Planning Review Panel; ex parte M F Cas Pty Ltd* [1998]TASSC 131 (23 October 1998).

⁷⁹ See, for e.g., the decision of Gallen J in *Greenpeace New Zealand Inc. v Minister of Fisheries*, Unreported, High Court of New Zealand, CP 492/93, 27 November 1995. His Honour held that the Minister's decision setting a higher limit for fish catch could not be seen as unreasonable because there was material (an equivocal scientific report) which justified the Minister coming to the conclusion he did. The case is discussed by Gullett (1997) and Mascher (1997).

⁸⁰ *Minister for Immigration and Ethnic Affairs v Teoh* (1995) 183 CLR 273 at 287-88 per Mason CJ and Deane J; at 298-303 per Toohey J; at 303-5 per Gaudron J.

principle, the courts have been given an insubstantial mandate to enforce it. The formulation of the principle in the pieces of legislation which adopt it indicate that it is most likely to be applied as a general principle of statutory interpretation and not as a legally enforceable rule (Bates 1994: 253). Thus the need for more specific operating instructions for applying precaution in environmental decision-making is clear. In a recent *ex-curia* statement, Justice Stein of the NSW Court of Appeal noted the poor guidance that exists in statutes to apply the principle and suggests that there is a need to apply the common law as well (Stein 2000: 3):

[T]here is the opportunity, if not the obligation, in the absence of clear legislative guidance, to apply the common law and assist in the development and fleshing out of the principles [of ESD]. Our task is to turn soft law into hard law. This is an opportunity to be bold spirits rather than timorous souls and provide a lead for the common law world. It will make a contribution to the ongoing development of environmental law.

5.2.1.d. *Other examples of precaution in Australia*

The Australian experience with the precautionary principle has been characterised by considerable conflict, particularly concerning environmental lobbyists and industries associated with resource extraction. This is because Australia has a resource based economy and application of the principle is seen by many to be a threat to resource security (Harding and Fisher 1994: 253). Industry groups continue to pressure governments to consider economic implications of environmental objectives.⁸¹ Concerns expressed by these industries tend to mirror concerns expressed in other countries: that the principle requires the prohibition of activities where there is uncertainty. Thus, if precaution were to be adopted as a governing principle, development would be characterised by a 'do nothing' approach (see Brunton 1995; Hickey and Walker 1995: 425 and Wills 1997). However, this view is inconsistent with all formulations of the principle. The principle requires some indication that harm may result before the burden shifts to the proponent of an activity to negate the possibility of unacceptable harm. There is, or should be, a quasi-scientific threshold (differing according to the level of anticipated harm) which must be met in order for it to be necessary to consider the principle. However, even where there are grounds to implement precautionary measures, these still should be weighed against expected benefits (including economic) which may be foregone if a proposed activity is

⁸¹ E.g., Drake (1993) notes that the Australian Mining Industry Council's position is that risk-taking should not be eliminated. It has argued that this is essential in human progress.

prohibited. Importantly, some benefits of implementing precaution are non-quantifiable (e.g. improvement in air quality), and likewise it can be difficult to measure economic benefits of developments. Even though complete information is unobtainable, what information there is can be weighed in order to achieve a well-considered decision appropriate for the context. Where the magnitude of uncertainty is large, more reliance on precaution is warranted. The fundamental misunderstanding about the principle – that it simply, and irrationally, stops development – and the rhetoric associated with it, indicates the need for more discussion and education about what the principle does, and does not, entail.⁸²

Arguably the most important non-judicial decision made on precautionary grounds in Australia is that concerning the NSW government's rejection in 1996 of a proposal to construct an open-cut gold mine in the Lake Cowal area in the central west region of the state. The area is a listed wetland under the National Estate and is considered by Commonwealth and state government agencies to meet criteria for listing under the Ramsar Convention⁸³ and there is much uncertainty about the effects a mine would have on the environment. Notwithstanding this, a Commission of Inquiry found that likely environmental impacts were consistent with planning and environmental guidelines, thus presenting the government with no legal hurdles with respect to the issuance of a development consent order. The decision of the government to act as it did in the face of pressure from the proponent, North Limited, as well as the Australian Workers' Union, is remarkable given that the proposal had met all necessary requirements and had satisfied a Commission of Inquiry. The government based its decision, in large part, on the grounds that only by refusing the proposal could unknown risks to a significant environment be avoided. Undoubtedly other political factors influenced the decision to some degree, thus calling into question the strength of commitment to the principle espoused by the government. Notwithstanding this, the government's use of the precautionary language in a context in which consideration of precaution was appropriate due to the level of uncertainty involved, provides evidence that precautionary thinking has achieved legitimacy as a reasonable basis for public decision-making.

⁸² Events such as the Precautionary Principle conference held at the Institute of Environmental Studies at the University of New South Wales in 1993 and the Wingspread conference, *Strategies for Implementing the Precautionary Principle*, held in Racine, Wisconsin in 1998 are important in this regard because they bring together a range of people from many disciplines, all of which are touched by the principle.

⁸³ Ramsar Convention on Wetlands of International Importance Especially as Waterfowl Habitat (1972).

More indirect versions of precaution are evident in other areas. For example, there has been considerable development in cleaner production and environmental management systems in the 1990s. Many corporations are seeking accreditation for the ISO 14000 series of standards which cover issues such as life-cycle assessment and environmental auditing (Deville and Harding 1997: 21). Also, the inclusion of the principle in most state and federal environmental policy documents not only has influenced decisions by governments and ministerial authorities, but it also has influenced the recognition of it by professional organisations and corporations which, although not necessarily committing themselves to the application of the principle, do adopt environmental policies which include ESD (Deville and Harding 1997: 15-6). However, more work needs to be done on determining other ways to implement precaution, such as subsidies or research grants for clean technology, waste minimisation plans, safe minimum standards, prohibition or limited sale of certain products, injunctive remedies and adaptive management.⁸⁴ The task is to recognise *when* and *how* to use different techniques appropriately to support decision-making in the face of scientific uncertainty. Decision-makers need clear guidance as to the circumstances in which they need to adopt precautionary responses and they also need to know which methods to use. In this respect, after a development approval decision has been made, there is a need for courts to be empowered to ascertain what precautionary methods were used, and the reason for selecting them, as part of the process of assessing whether the principle was taken into account appropriately.⁸⁵

This section has shown how Australian environmental strategies tend to be cautiously preventative, rather than anticipatory and precautionary. Efforts to give the principle more effect need to focus on how it could be established as a mandatory consideration in environmental matters. This was, in late-1999, achieved to a degree for certain decisions made under the *EPBC Act 1999*. However, in many other contexts decision-makers can ignore the principle in circumstances in which its consideration or application is appropriate. A compounding factor is that existing law in property and torts in this regard is far from precautionary because it is heavily influenced by the assimilative capacity approach. For example, for a concerned resident to succeed in prohibiting a development application where planning guidelines have been met, he or she typically is required to adduce evidence to show that the activity would result in impermissible

⁸⁴ For more detail on the techniques available to support decision-making in the face of scientific uncertainty, including the 1995 Risk Management Standard (AS/NZS 4360), see Dovers et al. (1996).

⁸⁵ For a discussion of how courts should substantively review expert decisions made under scientific uncertainty, see Fisher 1998.

environmental harm, rather than the developer being required to establish that the activity is unlikely to result in such harm. The principle is a stated aim of virtually all environmental policy documents and its expression in environmental legislation is commonplace, yet attention now needs to shift to the task of assisting decision-makers to implement precaution.

5.3. Challenges and opportunities to take the principle forward

As explained in Chapter Four, the principle is a broad principle of action espousing commonsense philosophies regarding potential harm, yet it also contains specific instructions for action which may differ in different contexts. The principle is general but it can devolve to the particular (Cameron 1999: 47). It is entrenched as a central component of environmental policy and will continue to inform environmental protection strategies (Cameron 1999: 30). However, it still faces considerable hurdles to successful implementation. Application remains problematic due to imprecise expressions of it in policy and law, the fundamental challenge it presents for environmental management, and the difficulty of making decisions in the face of scientific uncertainty. By definition, its application takes place in a context where there is a shortfall of information or conflicting interpretations of available information. The hurdles are most apparent in the crucial area of judicial application. Although judicial consideration of the principle arguably has been most advanced in Australia with it being accepted as a ground of review, its use in courts does not suggest that there has been a change in decision-making practices with a more critical stance toward science. Courts and tribunals have focused attention on correct interpretation of the principle as expressed in official statements rather than detailed implementation and seeking a broader understanding of the principle (Fisher 2001). There is a need for further refinement of the principle in legislation and official statements of policy to remove confusion about its suitability to particular problems and how to achieve effective implementation. The common practice of incorporating the principle as a statutory objective is insufficient. Specific regulatory strategies are needed. Scientists and decision-makers need guidance for deciding if precaution is warranted as well as guidance as to what might constitute an appropriate level of precaution (see Moffet 1997: 163). The principle needs greater articulation as an environmental policy as well as more concrete guidance in law.

Existing legal processes which incorporate the principle sanction the status quo by considering people to have acted sufficiently cautiously in the absence of examination of shortcomings of scientific method and knowledge. This situation militates against necessary institutional change (Fisher 2001). Consequently, decisions which purportedly are made based on the principle can undermine the spirit and ethic it aims to instill. The spirit of precaution can be lost in a sea of 'feel-good' improved design and better management decisions in the absence of genuine searches for alternatives and uncertainty. Refined formulations of the principle in legislation presents the challenge of formulating appropriate and accurate expressions of it. The rationalistic basis to decision-making presents a paradox when formulating the principle as a legal requirement (Fisher 1999: 184, 189). Science is still required to be the basis for decision-making, yet the principle prompts a broader understanding of the limitations of science and suggests a more collective and inclusive basis to decision-making. As currently practiced, the principle both accepts and negates science. Thus revised formulations of the principle need to be rigorous enough to be a sound basis for decision-making, although not precluding the adoption of decisions based on appropriate precautionary, and seemingly less rationalist, grounds. Decision-making typically involves a political system of competitive priorities. As the need for precaution arises in circumstances where not all the facts are available, the principle's application will always take place to some degree in a political context. Although it is argued that precaution is a legitimate basis for decision-making, existing structures of administration are not well-suited to allowing decisions to be based on precaution because evidence of its justification cannot necessarily be produced instantly. The need is for better definition of the principle to overcome international resistance to more exacting standards of precaution and allow for incremental reform by 'preventative design' (M'Gonigle et al. 1994: 101, 138). Concrete tools are needed to move from precautionary theory to precautionary practice. The Commission of the European Communities (2000: 3, 9) indicated that it is beneficial to develop international guidelines and stated that 'finding the correct balance so that the proportionate, non-discriminatory, transparent and coherent actions can be taken, requires a structured decision-making process with detailed scientific and other objective information.' According to Hickey and Walker (1995: 425-38), states need to agree on criteria in statements on precaution which would include a precise statement of goal and threshold; jurisdictional scope; substantive obligation to exercise precaution and measures for implementation. Thus the principle must evolve into a

refined rule that would adjust to new and evolving factual situations, to more sophisticated norms of international law and to advances in scientific knowledge.

The global community needs a more specific rule of restraint adaptable to a wide range of new environmental circumstances.

The principle faces the prospect of being misinterpreted and misapplied. Developers are still largely wary of the principle, typically fearing that it unnecessarily halts developments and increases costs and thus decreases certainty in decision-making. The confusion that exists between precaution and prevention is not a simple matter of semantics but goes to the heart of the philosophies underlying the different principles. Rather than operating simply where there are data gaps, the precautionary principle also challenges the overall basis to decision-making and seeks innovative and serious searches for optimal environmental results. The principle has been seen as most suitable to discrete pollution licence issues rather than for approval for large-scale developments. This is because it is perceived as applicable merely to the yes/no decision for approval rather than the overall way in which decision-making is conducted. But the principle also suggests consideration of the basis for project approval, purpose and design. Sustainable development needs to be understood as a multifaceted process rather than a 'knowledgable end point' (Dovers 1999: 375). Much of this fear is misplaced and is largely due to the polarisation of views about the principle and it being misunderstood as a 'no development principle' when no formulations of it come close to this proposition. It will be shown in Chapter Six that application of precaution need not result in decision-making uncertainty: options are available to clarify the application of precaution in specific contexts based on predetermined criteria which would increase certainty for all actors. In this case, precautionary values are added to EIA decision-making.

The problems presented by environmental protection need to be reframed to include adaptive and learning processes. For example, not taking an action should be viewed as a decision just like a decision to act, and not be treated negatively. Admitting that uncertainty cannot readily be reduced is anathema to rationalistic decision-making. But the principle should be understood as allowing activities to proceed more slowly rather than stopping them. Changing the focus to avoiding risks rather than accepting certain levels of harm is preferable. Less focus can be placed on precautionary action and more on what is necessary for precautionary administration (Fisher 2001). But also the principle can be tailored to the problem at hand although it is necessary to ensure that the original spirit of the principle encapsulated in the *vorsorge* concept is retained. The principle cannot be allowed to be 'subsumed into rationalism' by being assessed on a 'risk

weighted' rather than flexible approach (see Fisher 2001). The challenge is to work out appropriate tools to use to implement the principle. It is argued in Chapter Six that what is needed is clear decision-making structures supported by adequate legal measures. In the context of transboundary EIA, bilateral or multilateral treaties can provide this legal framework.

5.4. Conclusion

Precautionary public decision-making requires the identification of appropriate tools to implement the principle. To date, application of the principle has focused on science and technical implementation but has largely ignored overarching, yet equally important, decision-making structures for development projects. In particular, debate on the principle has largely ignored the institutional dimension (von Moltke 2000). Precautionary decision-making, based on detailed legally based measures, is particularly necessary in relation to transboundary environmental problems which are subject to increased decision-making complexity. The precautionary principle emerged in environmental discourse in recognition of the need for a framework for decision-making, which would be adequate to respond to the increasingly complicated nature of environmental problems. It is the foremost example of legal recognition of the aggregate nature of environmental harm and the potential for harm to be irreparable. It is not a lofty ideal, but an approach, which is necessary. That the precautionary principle/approach is commonplace internationally (and in fact is considered by many to have crystallised into a norm of customary international law) and in domestic jurisdictions is testament to the soundness of the concept and the usefulness of considering precaution when devising environmental management and protection strategies. It has achieved a degree of conceptual clarity and its continued acceptance in international and domestic environmental fora indicates that its future as a leading environmental principle is secure. Some foresee it as developing into 'the fundamental principle of environmental protection policy at the international, regional, and local levels' (Cameron and Abouchar 1991: 27). It also provides philosophical support for the emergence of a 'third generation' human right, namely, the 'right' to a clean and healthy environment. The principle is not simply a 'slippery' principle of environmental policy, but rather is fundamentally concerned with 'the role and nature of public administration' (Fisher 2001). Although the principle has definitional and implementational shortcomings, it has the capacity to inform environmental practices systematically as the basis of a regulatory regime – not merely at the policy level.

To date, in Australia, the principle's most important test – implementation – has been bedevilled by problems. This is due, in large part, to concerns by industry groups that there should be certainty concerning the principle's implementation. Governments, being concerned about reducing investment opportunities, have been cautious about adopting strict versions of precaution and thus we see the prevalence of 'let-out' phrases in virtually all legislative examples of the principle (including the words 'wherever practicable' in the IGAE formulation *supra*). The principle typically is either contained in non-operative provisions of legislation or it is relaxed and expressed in permissive terms. As such, existing legislative and policy enunciations of the principle are too vague or ambiguous to enable it to be implemented systematically. Its practical use is currently limited because decision-makers are not bound to apply it and are in doubt as to how to do so. Although the principle has been embraced internationally and domestically, the current practice in many countries and international agreements of repeatedly espousing the principle as a guide to environmental decision-making is not sufficient to discharge the obligation to ensure the principle is 'widely applied'.⁸⁶ It must be given *effect*.

The principle is in a crucial transitional phase. While its merits as an environmental *philosophy* are virtually unquestioned, the debate has shifted to the more difficult aspect of its *potential* to amount to more than a nebulous 'guiding principle' for environmental protection. The argument that the principle is incapable of being given clear definition is waning. Thresholds for its application can be determined and appropriate precautionary responses can be adopted. Although the principle's success at the international level has led to the perception that it is relevant only to 'macro' level policy as a response to transboundary harm and threats to the global commons, it is apposite for the entire spectrum of environmental decision-making, including individual development decisions. To give effect to international obligations to implement the principle and to be seen as taking the sustainable development concept seriously, states must apply the principle so that it influences *decisions* and environmental management *practices*. Operative standards need to be adopted which, at minimum, are in conformity with international obligations and, ideally, would implement the innovative qualities of the principle. This would require greater treaty and legislative commitment and the creation of enforcement mechanisms. In the absence of clearly defined regulations, courts are likely to be deferential to departmental interpretations of the principle and not go beyond determining it to be a non-binding 'relevant consideration'.

⁸⁶ Rio Declaration, Principle 15.

For the principle to be implemented effectively, it must be integrated into the most sophisticated existing environmental protection framework that we have – environmental impact assessment. The principle's progressive quality lies in the opportunity it creates to mandate a commonsense approach to environmental decision-making and to form the basis for an effective regulatory regime. Reform to decision-making processes is necessary because the principle has yet to result in a principled and coherent approach to decision-making under scientific uncertainty. Decision-makers need more guidance to make more cautious decisions. This is challenging because simple, widely applicable and universally agreed-upon rules for implementing precaution are illusory because the principle is inescapably political and profound in its implications. The principle can be further refined in guiding or instructive ways in certain contexts rather than remaining an overall amorphous policy approach. There is a need to reshape institutional arrangements and policy processes 'to ensure that effective decisions can be made in the face of pervasive uncertainty' (Dovers et al. 1996: 1144). States should no longer be able to appear to invoke the principle simply by referring to it in treaties in absence of substantive obligations (Hickey and Walker 1995: 453). Merely taking uncertainty into consideration is not sufficient (Gullett 1997: 67 and Cameron 1999: 50). Rather than continuing merely to repeat the principle in hortatory terms, states must shift attention to developing specific operating criteria or 'rules' which must ensure the application of some minimum content and not allow precaution to be diminished. Specifically, these must address the two central issues of when, and how, to act in a precautionary way. Otherwise the principle faces the prospect of being reduced merely to an unachievable aspiration for environmental management. The next chapter responds to this challenge by proposing specific measures to implement the precautionary principle in the EIA context.

Chapter Six

Transboundary EIA and the precautionary principle

6.1. Introduction

This chapter overviews the purpose of EIA and existing transboundary EIA processes to determine what opportunities exist for EIA to improve environmental practice for projects with transboundary implications. The complementary nature of EIA and the precautionary principle is then explained. We then determine whether, and how, the precautionary principle could be integrated into EIA procedures.

6.2. EIA

On 1 January 1970 the *National Environmental Policy Act 1969*⁸⁷ (NEPA) became law in the United States. NEPA has often been referred to as the Magna Carta of environmental law (Manheim 1994: 43). It embodied the first legislative environmental impact assessment (EIA)⁸⁸ procedure in the world. Numerous countries observed its implementation in the 1970s before adopting their own EIA systems. Australia, for example, drew heavily on the NEPA model when it formulated its EIA procedures in 1974. This section outlines the history, purpose and experience of EIA in countries with advanced environmental assessment practices.

⁸⁷ 42 USC §§4321-4375.

⁸⁸ Where 'EIA' is used, this refers to the generic title of environmental impact assessment. Not all jurisdictions term their assessments EIAs. 'EIA' refers to the environmental assessment process, whereas 'EIS' refers to environment impact statement (the produced document).

6.2.1. The United States benchmark

NEPA promulgated a number of ambitious and potentially far-reaching national policies aimed at promoting 'efforts which will prevent or eliminate damage to the environment.'⁸⁹ At the time of its enactment, there was optimism that it had the potential to become an 'Environmental Bill of Rights' (Hanks and Hanks 1970: 269). NEPA was the first major response by Congress to increasing concerns about the capacity of the environment to cope with the impacts of human activities. It sought to promote long term planning and to change the attitude of federal agencies toward sound environmental management by declaring policy goals and providing a statutory plan for implementation. NEPA amended the mandate of all federal agencies by declaring that 'it is the continuing responsibility of the Federal Government to use all practicable means, consistent with other essential considerations of national policy, to improve and coordinate Federal plans, functions, programs, and resources' to achieve six enumerated goals. These are: to fulfil the responsibilities of each generation as trustee of the environment for future generations; to assure safe, healthful, productive, and aesthetically and culturally pleasing surroundings; to attain the widest range of beneficial uses of the environment without undesirable consequences; to preserve important natural aspects of national heritage and maintain, wherever possible, an environment which supports diversity and variety of individual choice; to achieve a balance between population and resource use; and to enhance recycling and the quality of renewable resources.⁹⁰ The Act also established the Council on Environmental Quality (CEQ)⁹¹ to oversee implementation and to offer advice and assistance to the President on environmental matters.

To ensure that the federal government considered the environmental consequences of its actions adequately, an 'action-forcing' section was included. Thus the cornerstone of NEPA is its requirement that all federal agencies *shall* – 'to the fullest extent possible' – accompany 'major Federal actions significantly affecting the quality of the human environment' with a detailed environmental impact statement (EIS).⁹² The CEQ explained the purpose of the EIA by stating that it:

⁸⁹ 42 USC §4321. See Cardone (1991: 159).

⁹⁰ 42 USC §4331, see Holland (1985: 756-7), Freedman (1987: 71) and McGregor (1994: 7).

⁹¹ The CEQ was replaced by the Office of Environmental Quality within the Executive Office of the President, which was itself replaced by the President's Council on Sustainable Development in November 1995. See 42 USC §§4321, 4372(a).

⁹² 42 USC §4332(2)(c). NEPA does not actually use the phrase 'Environmental Impact Statement'; rather, it requires a 'detailed statement'.

shall provide full and fair discussion of significant environmental impacts and shall inform decisionmakers and the public of the reasonable alternatives which would avoid or minimize adverse impacts or enhance the quality of the human environment.⁹³

NEPA set a benchmark standard for EIA which has since been implemented in more than 60 countries as well as being adopted by many international agencies⁹⁴ (see Robinson 1992: 597). For example, in Australia, the Commonwealth and Victorian procedures were closely modeled on NEPA. The method of establishing legislative requirements augmented by implementational guidelines contained in subordinate instruments is identical to NEPA. Most significantly, they reflect the same rationale of providing a mechanism by which it is ensured that decision-makers act on the best available information and are fully cognisant of the environmental effects of their decisions.

6.2.2. Purpose of EIA

The *raison d'être* for EIA is that socially optimal development decisions will result if the short- and long-term environmental effects of a project or activity are assessed in conjunction with a study of and comparison with feasible alternatives. The early concept of EIA was based on the assumption that the increasing desire for rationality in public administration – to 'look before you leap' – would encourage decision-makers to adopt recommendations made in EIA processes (Bartlett 1990: 88; Cheung 1997: 3.1 and Weston 2000: 185). The object of EIA is to ensure that matters affecting the environment are fully examined and taken into account so that development activities avoid or minimise anticipated adverse environmental effects. The hallmark of the process is its institutionalisation of foresight. It introduces consideration of environmental factors as a condition precedent to planning decisions. When developed to its full potential, EIA enables an interdisciplinary and cross-sectoral approach to decision-making which incorporates the consideration of social and economic issues of the activity being studied together with environmental issues (Kjellerup 1997: 158). Brown and McDonald (1995) argue that not only do EIAs have a 'passive' role in so far as they produce advice, but they

⁹³ CEQ, Regulations for implementing the procedural provisions of the National Environmental Policy Act, 1978. §1502.1 (same in 1992).

⁹⁴ E.g., the World Bank and the Goals and Principles of EIA issued by the UN Environment Program in 1987. See generally Klein-Chesivoir (1990: 531). It is now common for bilateral aid agencies to require EIA in the recipient country as a prerequisite to receiving funds (Preiss 1999: 322).

also have an 'active' role in so far as they provide a mechanism to incorporate remedial and mitigation measures into project design.

Environmental impact assessment has become an established component in the planning process for most major developments in many countries. It is the only legislative process by which environmental considerations are studied in a systematic and detailed manner and then expressly taken into account in developmental decision-making. EIAs have both an 'active' and 'passive' role in environmental protection: they are active in the sense that they provide a mechanism by which remedial and mitigation measures can be incorporated into project design, but passive in so far as they are only designed to educate and to advise (Brown and McDonald 1995: 65). The passive role is also illustrated by the typically limited mandate of EIA. Often when legislative EIA measures are introduced, their importance is qualified by statements that they are not panaceas for environmental ills and that their objective is not to prevent works being undertaken which are harmful to the environment, but to ensure decisions about such works are taken in the knowledge of their environmental consequences. For example, during the Second Reading speech of the Australian *Environmental Protection (Impact of Proposals) Act 1974* (since repealed), the Minister for Environment and Conservation, Dr Moss Cass, cautioned that the legislation:

[W]ill not grant me the exclusive power of veto over proposals or policies. It will not force developers to abandon environmentally unsound objectives. It will not ensure that the government makes environmentally sensible decisions. It will not give individual citizens the power to stop bad projects or to set conditions for moderate ones. The legislation will, instead, enable me to gather extensive information on specific proposals. It will force developers to include environmental impact in their planning. It will present the government with comprehensive information about environmental impact as an aid to decision making (House of Representatives 1974: 4082).

The focus of EIA processes is thus to provide a procedure to *consider* possible adverse environmental consequences of certain activities, but not necessarily to *avoid* them.

6.2.3. EIA process

There is no uniform EIA process. They vary from one country to another and also across sub-national jurisdictions. This is due to differences in public administration, cultural values, legislative procedures, institutional capacity and ecosystems across jurisdictions (Timoshenko 1988: 481-2). Nevertheless, a general EIA framework can be identified which most jurisdictions adopt notwithstanding variations in detail, commitment and

capacity to undertake certain elements. The following sections outline the main steps of EIA and the sections in boxes outline the elements as included in the benchmark NEPA provisions. The main steps of EIA are:

- Screening
- Scoping
- Content (prediction, assessment of significance, mitigation)
- Decision-making (review of adequacy of EIA and decision whether to authorise project)
- Post-decision monitoring and auditing

6.2.3.a. Screening

The first step in the EIA process is to determine when an EIA is required; that is, to determine the threshold that an activity must meet for the process to be triggered. This is known as screening. To assist screening, some procedures include a list of activities for which the conduct of an EIA is mandatory. Where an activity is not included on such a list, or otherwise where a process does not have such a list, a decision needs to be made concerning whether the proposed activity warrants the undertaking of an EIA. Internal guidelines are often prepared to assist this determination. Typically the threshold set for this question is whether the activity is 'likely' to cause 'significant' environmental impacts. Other preliminary activities required include a determination of an appropriate decision-maker where this may be absent in the EIA procedures, and also a description of the proposed activity. Note that some jurisdictions have tiered assessments which incorporates flexibility into the process by allowing different levels of assessment depending on the environmental significance of the proposal.⁹⁵

NEPA screening requirements

NEPA requires a high level of compliance with its provisions by federal government agencies. The CEQ regulations state that the EIS process should commence as soon as a proposal is presented. A 'lead agency' is assigned to coordinate the planning process. The agency determines whether an EIS is required, or, alternatively, whether a more concise Environmental Assessment (EA) will suffice. Proposals contemplated are those involving any major federal action significantly affecting the quality of the human environment.⁹⁶ In fact, there is a presumption that NEPA applies to all

⁹⁵ E.g. the new federal provisions in Australia under the *Environment Protection Biodiversity Conservation Act 1999* (Cth) provide for six levels of assessment.

⁹⁶ 42 USC §4332(2)(c).

federal actions that have not been categorically excluded.⁹⁷ The threshold has been the subject of a great deal of litigation and controversy, particularly in the first decade of NEPA's operation (and prior to the issuance of the CEQ regulations which essentially codified court decisions) (Holland 1985). Where no EIS is required, a Finding of No Significant Impact (FONSI) is made, which is subject to public review. This report must detail the evidence relied upon for the decision. The public is afforded thirty days to review this finding which ensures that agencies properly fulfil their obligations. Additionally, courts may review any negative decision, although there are no real guidelines for review so that the courts generally defer to agency determinations of significance of impact. This means that agencies are afforded a considerable degree of latitude in determining when EISs are required. Review is most frequently successful where the decision is 'arbitrary and capricious' (although some courts have applied a more stringent 'reasonableness' test and reviewed decisions in order to determine whether there was any rational basis for it) (Holland 1985). Where an EIS is required, a Notice of Intent is issued and the scoping processes commences.

Major federal actions

The requirement that EIAs be conducted for 'major federal actions' has caused considerable confusion. 'Major' is generally accepted as requiring a substantial commitment of financial or human resources (Kubasek and Silverman 1994: 105). However, confusion has arisen over the exact parameters of the expression 'federal action'. Although this has been defined broadly to include policies, plans, programs and projects, it is accepted that NEPA obligations do not attach to activities in the absence of federal agency jurisdiction – there must be some federal connection. Thus, the activity must be undertaken directly by an agency or involve a private proposal the subject of federal financial support, assistance or approval. In reality, it seems that the most tenuous federal involvement is sufficient (Holland 1985). Although NEPA is limited to federal activities, the Act has spawned numerous 'little NEPAs'. That is, NEPA has been replicated in a number of states, and still others have adopted legislative or other EIA procedures which are viewed as more progressive than the federal Act. Due to duplication in administrative procedure in the states, common case law has developed (Robinson 1992).

Significant impact

The most contested threshold requirement is the determination of at what point a proposal is deemed to affect 'significantly' the human environment. Although 'human environment' has been defined broadly, no universal definition of the word 'significantly' has been arrived at.⁹⁸ The CEQ regulations attempted to resolve some of the uncertainty by defining what is meant by 'significant impact'. This expression is to be understood both in terms of *context* and *intensity* (or severity) of

⁹⁷ *Anacostia Watershed Society v. Babbitt* 871 F.Supp. 475 (1995).

⁹⁸ It has been held that NEPA only applies to activities which alter the natural physical environment: *Douglas County v. Babbitt* 48 F.3d 1495 (1995).

impact. This includes consideration of cumulative short and long-term effects and the broader region in which the activity is located (Kubasek and Silverman 1994).

Exemptions

There are a number of situations in which NEPA obligations are able to be avoided. These are:

- where the activity is mandated, directed, or provided by Congress directly by statute (statutory conflict);
- where the CEQ determines that an 'emergency situation' exists;⁹⁹
- where the national security exemption arises;
- where the proposed activity is not discretionary in nature;
- where a 'functionally equivalent' process has occurred (limited to Environmental Protection Agency); and
- where the action would produce international effects exclusively within the jurisdiction of another nation (Freedman 1987; Blumm 1988).

These exceptions are rather narrow and require positive determinations for applicability. The most likely exception is direct statutory conflict, although there have not been many incidences of this (Orsi 1987). This exemption requires a clear expression by Congress that it does not intend NEPA to apply to a particular activity.¹⁰⁰

6.2.3.b. Scoping

The second step in an EIA process is to determine what issues need to be addressed in the environmental assessment. The magnitude, extent and significance of impacts need to be identified with focus being on the most potentially significant impacts. Public consultation and participation is ideal at this stage. Three broad types of impacts need to be considered: *direct* (caused by activity in proximate location and time); *cumulative* (caused by incremental impact of activity when added to other activities or reasonably foreseeable activities); and *indirect* (caused by the activity but distant in space or in time). It is common for social and economic impacts to be addressed in addition to environmental impacts.¹⁰¹ It is essential that the scoping phase is conducted early so that alternative activities (including the 'no action' option) can be considered and projects can incorporate mitigation measures identified (see European Commission 1999: 63). Scoping also

⁹⁹ This exception was included in the 1978 CEQ regulations and is criticised for not being defined and for undermining the purpose of NEPA (Orsi 1987).

¹⁰⁰ One prominent example is the express Congressional intention that space launch activities are exempt from NEPA. See Pub.L. 104-88, Title IV, §401 (1995).

¹⁰¹ Note that the field of social impact assessment (SIA) is developing. Some commentators argue that social impacts are best addressed in separate processes (see Seebohm 2000).

requires determining appropriate methods for assessment (these may include checklists, matrices, overlays, environmental indices, cost-benefit analysis and computer modelling). Most EIA processes include scoping requirements, although the level of detail varies. For example, the EU EIA Directive merely states that, at the request of the developer, the authorities 'shall give an opinion on the information to be supplied' by the developer in the EIA.¹⁰²

6.2.3.c. *Content of EIA*

It is common for jurisdictions to have different standards concerning the level of detail required in EIAs. However, the normal requirements for EIAs is that they contain a description of the project in question as well as reasonable alternatives; a baseline study of the area prior to development so that impacts can be evaluated; an evaluation and quantification (where possible) of impacts identified in the scoping phase; a consideration of alternatives including comparison of predicted impacts; and a consideration of mitigation measures. As EIA studies are normally comprehensive studies of numerous different issues, it is common for all the various impact studies to be summarised in an easily readable report. This report is commonly called the environmental impact statement (EIS).

NEPA content requirements

NEPA provides that an EIS must include a detailed discussion of:

- the environmental impact of the proposed action;
- any unavoidable adverse environmental effects of implementation;
- alternatives to the proposed action;¹⁰³
- the relationship between local short term use and long term productivity; and
- any irreversible and irretrievable commitment of resources necessary for the action's implementation.¹⁰⁴

These procedural requirements, stated rather briefly in the Act, have been amplified by regulations developed and promulgated by the CEQ since 1978. Although their interpretation of the Act is not binding on the courts, the Supreme Court has ruled that they should be given 'substantial

¹⁰² Article 5(2).

¹⁰³ Alternatives must include those which lead to different results. It is not sufficient to study merely substantially similar proposals. Discussions need not be exhaustive, but they must be sufficient to demonstrate reasoned decision making: *Ayers v. Espy* 873 F.Supp. 455 (1995).

¹⁰⁴ *Ibid.*

deference'.¹⁰⁵ The regulations provide uniform standards applicable throughout federal government agencies to facilitate the production of comprehensible documents in minimum time. For example, any excessive length in EISs is avoided by limiting statements to 150 pages (or 300 pages for proposals of unusual scope or complexity).¹⁰⁶ The document must be non-conclusory and contain a detailed description of the proposal and its purpose, as well as a discussion of the cumulative direct and indirect consequences (both positive and negative). Alternatives to be considered include the 'no proposal' or postponement options, and may include alternatives rejected by the proponent.

6.2.3.d. *Decision-making*

Once the EIS has been prepared, it is normally reviewed by the government agency responsible for approving the development as well as the public. Advanced processes also require that the EIS be reviewed by an independent body to determine whether it is adequate in terms of the issues addressed and the depth of analysis. Finally, a decision is made as to whether, and on what grounds, the project should proceed. EIA theory assumes that the most suitable project option will be chosen, although in practice the proposed project is normally selected rather than other options. The EIA may also set conditions for project approval aimed at minimising predicted environmental impacts.

NEPA decision-making

The EIS must be made available to the public prior to the making of any final decisions so that it is not merely a justification for decisions already made. Public participation is assisted by the requirement of at least 45 days for comments (which must be discussed in the final document) and no administrative action may be undertaken within 90 days after the release of a draft EIS or within 30 days after a final EIS (McGregor 1994). The last stage is the making of a decision to refuse, permit or modify the proposal. There is no formal administrative review of EISs. Following the preparation of an EIS, and subsequent decision, a concise record of decision must be prepared.

6.2.3.e. *Post-decision monitoring and auditing*

Modern EIA procedures also normally include a requirement that monitoring systems are established after the project is completed to determine whether the actual impacts of the projects correspond with those that were predicted during the EIA process. This also enables verification of the effectiveness of mitigation measures and the ability to determine whether further mitigation measures are necessary.

¹⁰⁵ *Andrus v. Sierra Club* 442 US 347 (1979), Blumm (1988).

¹⁰⁶ 40 CFR 1502.7, Freedman (1987).

Implementation of NEPA

The legislature in the US opted for self-regulation by agencies charged with NEPA obligations – no regulatory body with enforcement powers was created. However, the numerous procedural requirements of NEPA – all mandatory – have resulted in a significant role for the courts enforcing the Act. Yet it is unlikely that the drafters of NEPA envisaged the extent of judicial intervention and the consistency with which courts have insisted on strict procedural compliance. The wide grounds for standing have also enabled the institution of a plethora of suits by citizen and environmental groups.¹⁰⁷ In fact, an average of more than 100 NEPA lawsuits were instituted annually between 1970 and 1985 (McGregor 1994).

Although there is a clear intent in NEPA to achieve substantive goals, these have been only partially attained (Caldwell 1993a). The courts have consistently required strict compliance with procedural requirements in the preparation of EISs (enforced by the issue of injunctions), yet they have refrained from inferring that Congress mandated particular results or set performance standards. Yet this reflects the nature of judicial review to ensure sound decision-making rather than to implement policy. Courts have taken a proactive role in determining *when* an EIS is required and what amounts to an *adequate* EIS, but have not required agencies to *act* upon EIS recommendations. As US courts do not provide merits review, they do not reverse decisions to proceed with activities found to have significant effects on the environment. However, courts have held that *pro forma* compliance with NEPA procedure is not sufficient to discharge an agency's obligations under the Act. An agency must consider in 'good faith' the environmental consequences of its activities and must not make arbitrary decisions. This involves taking a 'hard look'¹⁰⁸ at the adverse environmental impacts of a proposal before deciding how best to accomplish the desired result (Holland 1985). Although an agency is not compelled to adopt the most environmentally desirable option, it cannot dismiss environmental considerations in a perfunctory manner because this would undermine the purpose of the Act. However, concern remains that EIA results are not effectively considered by decision-makers (Bartlett 1997: 160). Cheung (1997: 3.1.1) also notes that despite far-reaching provisions and more than 25 years practice of EIA in the North America (with Canada's comparable provincial EIA provisions), little 'major benign effects on the environment' have occurred. She cites the sustained input of containments into the Great Lakes as an example.

¹⁰⁷ NEPA does not provide private rights of action for violations of its provisions *per se*. However, citizens can force governmental compliance with NEPA by bringing suit against delinquent agencies under citizen provisions of the *Administrative Procedure Act*: *Muhly v. Espy* 877 F.Supp. 294 (1995). An environmental activist with a 'geographical nexus' to land affected by a proposal has standing to challenge decisions because the person is within the 'zone of interest' intended to be protected by NEPA: *Florida Audubon Society v. Benton* 54 F.3d. 873 (1995).

¹⁰⁸ 'Hard look' is a doctrine of administrative compliance with legislative intent developed in the United States.

The impact of NEPA has been characterised by the judicial insistence on procedural compliance.¹⁰⁹ This has led to criticism that the EIS process has overshadowed its purpose (Caldwell 1993a). Nevertheless, NEPA has had a sweeping impact by mandating that all federal agencies undertake a systematic examination of the environmental consequences of threshold actions *before* acting. It has facilitated radical administrative reform (see Rodgers 1990: 487 and Espeland 1994: 1156). Further, many projects have been halted where there has been a failure to prepare a sufficiently comprehensive EIA and projects have been modified due to increased knowledge of potential impacts identified in the EIA process (Preiss 1999: 314). In the first decade of NEPA around 1,000 EISs were prepared each year (Glasson et al., 1994). Although this number has been reduced to around 500, it is argued that this reflects the success of NEPA. Proposals are generally more environmentally sound and only require an EA, not a full EIS. This saves time and money by avoiding poorly planned projects. Glasson et al. (1994: 32) point out that although this reduces the cost of preparing EISs, it also reduces public participation in project decision-making. There has also been a reduction in the number of lawsuits filed against agencies. Most cases are complaints of erroneous decisions not to order EISs or the preparation of inadequate EISs. The long judicial history of EIS in the United States has made it the most extensively documented EIA practice in the world. Its success lies in the strong judicial enforcement of NEPA's procedures mandate. The accessibility of recourse to the courts (providing judicial determinations of obligations and enforcing public participation requirements), and the wealth of information released by the CEQ, have resulted in a widely understood and implemented EIA process.

6.3. Transboundary EIA

6.3.1. EIA and transboundary environmental problems

EIA is one of the most useful tools available to assess and address environmental effects of discrete development projects before they occur, thus enabling optimal first-order solutions to environmental problems. At the international level, early espousal of EIA objectives can be found in the Stockholm Declaration which recognised the need for environmental 'planning' in seven of its twenty-six principles.¹¹⁰ However, devising effective EIA processes is most challenging when it is environmental effects that cross international borders that are attempted to be avoided or mitigated. The environmental impacts of large development projects do not respect jurisdictional borders, yet these impacts need to be

¹⁰⁹ Weir (1994: 56) argued that one reason that the US has experienced more EIA cases is due to the absence of formal administrative review. The final EIS is only sent to the CEQ for comment, not for an adjudication on its quality. Further, the strict separation of powers in the US makes it necessary for the judiciary to review actions of the executive.

¹¹⁰ Principles 2, 4, 12-14, 17. Preiss (1999: 317).

addressed in the same manner as impacts of projects which are confined neatly within one jurisdiction. As outlined in Chapter Two, the problematic nature of large-scale transboundary environmental problems can be exacerbated by jurisdictional conflict between countries due to differences in administrative processes as well as differences in environmental and economic policy commitments. Where the 'ecological footprint' of an activity exceeds the jurisdiction in which it is located, difficulties in establishing appropriate environmental assessment procedures arise. This situation is compounded by the operation of different legal standards at the international level than what are typically found within national jurisdictions. These challenges for environmental protection require transboundary EIA to be innovative and responsive not only to the environmental consequences of development projects and activities, but also to the political and administrative environment in the region in which they are located.

The attention that has been given to transboundary environmental problems to date has tended to be largely reactive, such as determining bases for liability for transboundary harm (e.g. development of the *Trail Smelter* doctrine) and targeting pollution emission (e.g. standards setting such as in the Montreal Protocol). These advances relate to environmental matters where the causation of harm has been relatively straightforward to determine rather than where environmental understanding is inadequate, such as is typically the case with large-scale environmental problems. We now turn to the legal issues relevant to cases where one country may cause environmental harm to another through development activity. Current practice in EIA at the international level is then examined. The need for more sophisticated procedures for transboundary EIA is then articulated together with methods to achieve this.

6.3.2. The development of the international legal context for transboundary EIA

In Chapter Two it was explained that states have a range of environmental protection responsibilities at international law derived from the common law principle of 'good neighbourliness'. This was first articulated in 1941 in the *Trail Smelter*¹¹¹ decision which established that states are liable to compensate for causing serious harm to other countries. The *Corfu Channel*¹¹² decision of 1949 extended this obligation by establishing that a state shall not 'knowingly' allow its territory 'to be used for acts contrary to the rights of other states'. A further obligation on states to cooperate with other states to mitigate any

¹¹¹ *Trail Smelter Arbitral Tribunal Decision (United States v Canada)* (1941) 35 AJIL 684.

¹¹² *Corfu Channel case (United Kingdom v Albania)* [1949] ICJ Reports 4.

transboundary harm that has been caused was established in the 1957 *Lac Lanoux Arbitration*,¹¹³ is the obligation to cooperate with other states to mitigate any transboundary harm that has been caused. The usefulness of these rules for preventing environmental harm is limited because of the onerous legal hurdles that must be overcome to establish liability. The most significant shortcoming of the liability rules for transboundary harm is that serious environmental harm must have occurred or be likely before the process for liability can be initiated. However, we now turn to more recent developments which indicate that the legal obligations on states has extended in the absence of further judicial determinations.

6.3.2.a. *Development of international environmental law principles: the obligation to conduct EIA*

Notwithstanding the difficulty of establishing liability for transboundary harm, new norms of environmental behaviour have emerged that focus on avoiding harm by requiring states to act prior to harm occurring. These norms can in time harden into enforceable rules of international law, such as is arguably the case in relation to EIA. An obligation to conduct EIA can be derived from the jurisprudence which followed the *Trail Smelter* decision. A corollary of the duty a state has not to knowingly cause harm to other countries is the duty it has to monitor the environmental impacts of activities as facts and knowledge progress. Monitoring contributes to baseline knowledge of ecosystems and is also necessary to determine if a state is complying with specific emission standards contained in conventions. Robinson (1992: 602) considered that 'it is becoming a norm of customary international law that nations should engage in effective EIA before taking action that could adversely affect either shared natural resources, another country's environment, or the Earth's commons.' A state likely to be affected by a harmful activity should be consulted and furnished with sufficient information to enable it to make an assessment of the probable effects of the proposed activities.¹¹⁴ This necessitates some form of environmental assessment and notification to potentially affected states of proposed activities which foreseeably involve risk of harm (Cooper 1986; Timoshenko 1988; Stec and Eckstein 1998; Robinson 1992; Popiel 1995: 474-5; Boyle 1999 and Preiss 1999). Support for this proposition can be found in the 1997 decision of the International Court of Justice in the *Gabcikovo-Nagymaros* case in which it was noted that environmental risks

¹¹³ *Lac Lanoux Arbitration (France v Spain)* 1957 ILR 101ff.

¹¹⁴ See Montreal Rules of International Law Applicable to Transfrontier Pollution (1982), Art. 7. Reproduced in Iwama (1992: 119).

need to be evaluated and 'assessed on a continuous basis'.¹¹⁵ This suggests that it is appropriate – if not obligatory – for a state to conduct some form of EIA (that meets minimum standards) for a project or activity which is likely to cause significant transboundary harm.¹¹⁶ More support for this proposition can be found in the development of 'soft law' documents which indicates that EIA is a proactive method for implementing the 'good neighbourliness' obligations. An example is the non-binding UN Environment Programme guidelines on EIA, which demonstrate that EIA is becoming prominent at the international level. The extension of the *Trail Smelter* preventative principle at international law creates an obligation to conduct EIA. Further, the obligation to conduct EIAs can be seen as a technical implementation of the duty to implement the precautionary principle. However, the international legal requirements to conduct EIA exist separate to precautionary obligations (McIntyre and Mosedale 1997: 238). Many scholars argue that the duty to conduct transboundary EIAs where appropriate is now a general custom of international environmental law (Ebbesson 1996a: 47 and Preiss 1999: 308).¹¹⁷ This nascent responsibility also offers increased opportunity to consider cumulative, distant or uncertain transboundary environmental effects of activities for which compensation at international law would be unlikely to flow.

6.3.2.b. *Current status and future development of transboundary EIA*

EIA practice has developed concurrently with the above-mentioned advances in jurisprudence in recognition of the fact that transboundary environmental problems are best addressed by cross-jurisdiction management processes which integrate the interests of all actors with decision-making authority. Numerous international conventions dealing

¹¹⁵ ICJ, Judgment in the *Case Concerning the Gabcikovo-Nagymaros Project*, 25 September 1997, para 112, 37 ILM 162 (1998). See, however, Preiss (1999) for argument that the ICJ's opinion was misguided in terms of it failing to establish that EIA is a customary principle of international law. See also Hey (2000).

¹¹⁶ For a concurring opinion in relation to the Slovakia's unilateral decision to divert the Danube in 1992 in the *Gabcikovo-Nagymaros* dispute, see Preiss (1999) at 309. See Weeramantry J's separate concurring opinion that the current state of development would read into treaties which may reasonably be considered to have a significant impact on the environment, (such as bilateral construction treaties in the case), a duty to control and monitor the environmental impacts of projects (see Preiss 1999: 348). See also Weeramantry J's dissenting opinion in *Request for an Examination of the Situation in Accordance with Paragraph 63 of the Court's judgement of 20 December 1974 in Nuclear Tests [New Zealand v France]*, Order 22 IX 95, ICJ Rep. [1995] 288 at 342-4. See McIntyre and Mosedale (1997: 233).

¹¹⁷ The International Law Commission (1998: ch 4, para 47) considered international EIA as part of the procedural obligations contained within the general duty to prevent injurious consequences, together with the precautionary principle as a substantive obligation under this head. See Principle 3 of the ILC draft principles of international law: 'States shall take all appropriate measures to prevent, or to minimize the risk of, significant transboundary harm.'

with specific subject matters or the general transboundary context require some form of EIA.¹¹⁸ EIA is used to investigate and communicate to other countries potential transboundary and global impacts in numerous contexts. The UNEP Governing Council, for example, recommends that all States undertake

environmental assessment before engaging in any activity with respect to a shared natural resource which may create a risk of significantly affecting the environment of another State or States sharing that resource.¹¹⁹

Transboundary EIA agreements have also appeared, the most notable examples being the EU EIA Directive¹²⁰ and the UN Espoo Convention¹²¹ (discussed below). There is also movement toward establishing bilateral or trilateral EIA agreements, such as between Norway and Sweden,¹²² and between Canada, the United States and Mexico.¹²³ The benefits of regional approaches are that it is normally easier to establish rules providing for appropriate constraints on state behaviour where the number of actors is small and there is greater consistency in management and policy approaches among participants.

Transboundary EIA not only has the potential to reduce environmental impacts, it also can reduce the grounds for interstate conflict. It is quite common to find interstate disputes arising from development projects, particularly concerning exploitation of shared natural resources, such as the Danube dam and Timor Gap disputes discussed in Chapter 2. By helping to establish clear parameters for project approval at the inception stage, EIA can minimise conflict over, among other things, differences between countries in scientific opinion about – and acceptability of – predicted environmental impacts. The challenge is

¹¹⁸ See, e.g., Climate Change Convention Article 4(1)(f), Biodiversity Convention Article 14(1)(a), and treaties dealing with the global commons such as the Convention on the Conservation of Antarctic Marine Living Resources Article XV(2)(d). See McIntyre and Mosedale (1997: 238). For e.g., the U.N. Convention on the Law of the Sea states this obligation as follows 'When states have reasonable grounds for believing that planned activities under their jurisdiction or control may cause substantial pollution of or significant harmful changes to the marine environment, they shall, as far as practicable, assess the potential effects of such activities on the marine environment and shall communicate reports of the results of such assessments.' These international forms of EIA tend to be weak.

¹¹⁹ See www.unep.ch/eta/archive/txt.mono2-6.txt (visited 12 December 2000).

¹²⁰ Council Directive 85/337/EEC of 27 June 1985 on the assessment of the effects of certain public and private projects on the environment, OJ 1985, L75, p. 40. See also Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, OJ 1997, L73, p. 5.

¹²¹ United Nations Convention on Environmental Impact Assessment in a Transboundary Context, (conducted at Espoo, Finland, 25 February 1991).

¹²² Negotiations for cooperation on EIA are also currently being conducted for example between Norway and Russia (Lind 1999; see World Bank 1998).

¹²³ Commission for Environmental Cooperation project on Transboundary Environmental Impact Assessment (see Paquin 1999a).

to determine the most suitable operating basis for EIA where the area potentially affected by the development under scrutiny exceeds the jurisdiction in which the project is located. Much can be achieved by linking EIA with the concept of precaution. Opportunities to make current transboundary environmental decision-making more precautionary are discussed in 6.6.

6.3.3. EU EIA Directive

The EU EIA Directive, adopted by the European Commission Council in 1985, represents the first attempt to generate a regional EIA framework. It supports the harmonisation of the main principles of EIA among member countries although its provisions lack detail and it places relatively few procedural demands on states, thus limiting its effectiveness as a preventative approach to environmental harm (Brown 1997). The Directive was substantially amended in 1997 and applies to both public and private projects which are 'likely to have significant effects on the environment by virtue, *inter alia*, of their nature, size or location'.¹²⁴ These are defined in two categories. First, Annex I provides that the provisions of the Directive shall apply to the type of projects listed therein.¹²⁵ Second, states shall determine by case by case examination or according to thresholds or criteria set by them, whether projects listed in Annex II¹²⁶ shall be made subject to EIA.¹²⁷

A specific, although not rigorous, EIA procedure is provided which must be completed prior to the granting of project consent,¹²⁸ and must be taken into consideration in final decision-making.¹²⁹ This covers standard EIA elements including the identification, description and assessment of 'the main effects which the project is likely to

¹²⁴ Article 2(1).

¹²⁵ These are: crude oil refineries, thermal power stations, nuclear fuel installations, cast-iron and steel smelters, asbestos extraction installations, integrated chemical installations, large rail, road and airport constructions, inland ports, hazardous waste disposal installations, artificial groundwater recharge schemes, works for the transfer of water resources between river basins, waste water treatment plants, petroleum and natural gas extraction works, dams, large gas, oil and chemical pipelines, large poultry or pig rearing installations, pulp timber plants, quarries, construction of overhead electrical power lines, and petroleum, petrochemical and chemical storage facilities. See Council Directive 97/11/EC of 3 March 1997 amending Directive 85/337/EEC on the assessment of the effects of certain public and private projects on the environment, OJ 1997, L73, p. 5, Article 4(1).

¹²⁶ These are: various agriculture, silviculture or aquaculture projects, quarries not covered by Annex I, underground mining, deep drillings, surface installations for extractive industries, projects relating to the energy industry (including surface storage of natural gas and underground storage of combustible gases), installations for the processing of metals, various projects within the mineral, chemical, textile, leather, wood, paper and rubber industries, various infrastructure and other projects not covered by Annex I, tourism and leisure developments, as well as changes or extensions to projects listed in both annexes.

¹²⁷ Article 4(2).

¹²⁸ Article 2(1).

¹²⁹ Article 8.

have on the environment'.¹³⁰ There needs to be consultation with other member states in addition to the public and authorities.¹³¹ The Directive requires developers to provide information on alternatives to the intended project that they choose to study,¹³² although it does not require that project approval be balanced against the relative merits of each project option.

The Directive is not intended to displace domestic EIA processes, but rather harmonise member states' EIA procedures to reduce competition and misallocation of resources (Preiss 1999: 316). In some cases, the EIA procedures in the Directive diverge from domestic procedures.¹³³ The absence of exacting standards in the Directive has led to criticism that it merely formalises procedures already in existence in member countries and does little to advance standards and practice in EIA (see McHugh 1994: 605, Dresner and Gilbert 1999: 106 and Preiss 1999: 316). This is understandable considering that it is a consensus document. However, the Directive offers guidance to ensure transboundary EIA is conducted effectively across jurisdictions. It reiterates that European Commission environmental policy is based on the precautionary principle¹³⁴ and aims to promote the consideration of environmental issues in planning and design.

6.3.4. Espoo Convention on EIA in a Transboundary Context

The most significant advance in transboundary environmental impact assessment is the 1991 UN Convention on Environmental Impact Assessment in a Transboundary Context (adopted at Espoo, Finland under the auspices of the United Nations Economic Commission for Europe (ECE), and hereafter referred to as the Espoo Convention). The Convention entered force on 10 September 1997 upon the ratification of 16 countries. As at mid-2000, 31 countries have ratified the Convention. It provides that EIA procedures must be undertaken for certain activities which are likely to have significant transboundary impacts within an area under the jurisdiction of another party.

A key point to make is that the Convention defines EIA as 'a national procedure for evaluating the likely impact of a proposed activity on the environment'.¹³⁵ Thus, it is

¹³⁰ Article 5(3); Articles 3 and 5.

¹³¹ Articles 6 and 7. See also the current proposal to expand the public participation requirements of the Directive (Commission of the European Communities 2001).

¹³² Preamble & Article 5(3).

¹³³ An example here is the discrepancy in public participation requirements in the Directive and those contained in Denmark's EIA procedures (see Kjellerup 1999a: 144).

¹³⁴ Preamble.

¹³⁵ Article 1(vi).

envisaged that all states will adopt minimum EIA procedures but it does not provide for the conduct of EIAs separate to domestic procedures. Rather, it seeks the harmonisation of them. Similar to the EU Directive, the Convention provides that EIA shall be undertaken prior to a decision to authorise or undertake proposed activities listed in Appendix I that are likely to cause significant adverse transboundary impacts.¹³⁶ Many of the activities listed are well defined. However, qualifying words such as 'major', 'integrated' and 'large' appear to alter the threshold, thus meaning that the provisions of the Convention only apply to a subset of all possible activities under consideration. The significance of the likely transboundary impacts can only be considered once a determination is made that the activity in question falls within the projects listed in Appendix I. The determination of the 'significance' of a transboundary environmental impact is to a certain degree a value judgment. This is to be determined by comprehensive consideration of the characteristics of the activity and its possible impact. In addition, EIAs may be conducted for activities that are not listed in Appendix I by agreement of the parties, and depending upon the size, location, and potential effects of the project.¹³⁷ Relatively brief content requirements are provided in Appendix II which state that EIAs must include, at a minimum:

- a description of the proposed activity and its purpose;
- a description, where appropriate, of reasonable alternatives to the proposed activity including the no-action alternative;¹³⁸
- a description of the environment likely to be significantly affected by the proposed activity and its alternatives;
- a description of the potential environmental impact of the proposed activity and its alternatives and an estimation of significance;
- a description of mitigation measures;
- where appropriate, an outline for monitoring and management systems and any plans for post-project analysis; and

¹³⁶ The activities listed in Appendix I are: crude oil refineries; thermal power stations; nuclear fuel production or enrichment facilities; steel and cast-iron smelting installations; asbestos processing or extraction facilities; integrated chemical installations; motorways; large diameter oil and gas pipelines; trading ports and inland waterways; waste disposal installations for the incineration, chemical treatment, or landfill of toxic and dangerous wastes; large dams and reservoirs; groundwater abstraction activities; pulp and paper manufacturing; major mining; on-site extraction and processing of metal ores or coal; offshore hydrocarbon production; major petroleum, petrochemical, or chemical storage facilities; and deforestation of large areas.

¹³⁷ Article 2(5).

¹³⁸ Appendix II, para (b) and (d).

- a non-technical summary.

Significantly for the purposes here, the Convention also requires an 'explicit indication of predictive methods and underlying assumptions', as well as an 'identification of gaps in knowledge, and uncertainties encountered in compiling the required information'. Other states are required to be notified of potential environmental effects, and there is a requirement of participation from the public that may be affected.¹³⁹ Similar to other processes and the NEPA benchmark procedure, the Espoo Convention does not require proponents of projects to choose the least environmentally harmful alternative. It is simply necessary that the environmental assessment be completed.¹⁴⁰

In accordance with EIA theory, the Convention emphasises the importance of considering alternatives to the proposed project. It requires a description of the potential impacts of 'reasonable alternatives', including the no-action alternative. The main concern parties have so far with the Convention is its lack of clarity in relation to its procedural requirements. To some degree, this is understandable considering that it is a consensus document in which it is difficult to seek agreement on detailed contents requirements among a large number of parties with differing EIA procedures. The Convention is intended to be applied by many countries with differing domestic EIA regimes. Its main requirements relate to notifying potentially affected states about a proposed activity likely to cause a significant adverse transboundary impact and inviting their participation in the EIA procedure. Involving the public in the potentially affected states about the process is a key component of the Espoo notification provisions (Tesli and Husby 1999). Since the Convention entered into force, a number of countries have strengthened their experience in transboundary EIA by applying the provisions of the Convention to an increasing number of cases. However, at the time of writing, no Espoo EIA procedure had been completed.

6.3.5. North American transboundary EIA agreement

The North American Free Trade Agreement (NAFTA) concluded between Canada, the United States and Mexico generated considerable criticism concerning predicted negative environmental impacts arising as a consequence of its implementation. These objections to NAFTA led to a series of separate negotiations which resulted in a 'side-agreement' to NAFTA entitled The North American Agreement on Environmental Cooperation (NAAEC) (DiMento and Doughman 1998). The Commission of Environmental Cooperation (CEC) was created by the Agreement. At the time of writing, further work is

¹³⁹ Article 2(6).

¹⁴⁰ Article 6.

being undertaken by the CEC with the aim of concluding another agreement between the three countries on transboundary EIA (Paquin 1999a: 3). This stems from Article 10(7) of the NAAEC which states:

Recognizing the significant bilateral nature of many transboundary environmental issues, the Council [of the CEC] shall...consider and develop recommendations with respect to:

- (a) assessing the environmental impact of proposed projects subject to decisions by a competent government authority and likely to cause significant adverse transboundary effects, including a full evaluation of comments provided by other Parties and persons of other Parties;
- (b) notification, provision of information and consultation between Parties with respect to such projects; and
- (c) mitigation of the potential adverse effects of such projects.

Most attention is being focused on the identification of uniform standards among the three countries and provincial jurisdictions. Other agreements have been reached, separate to this process, on the conduct of EIAs at a lower administrative level, such as between British Columbia in Canada and Washington state in the United States. Both Canada and the United States (although not Mexico) have signed the Espoo Convention by virtue of them being member countries within the EC (although the United States is yet to ratify Espoo). Once the CEC agreement is concluded, there will be a degree of overlap between it and the transboundary EIA provisions in Espoo. However, it is envisaged that the forthcoming North American agreement will include more exacting standards regarding the conduct of EIA and thus any EIAs concluded under it would also fulfil the requirements of Espoo (Paquin 1999b). At the time of writing, negotiations for the transboundary EIA agreement between Canada, the US and Mexico being pursued by the Commission for Environmental Cooperation have stalled. Negotiators face difficulties in concluding an agreement because of differences in environmental management systems in the three countries. In light of these difficulties, the Council members of the CEC agreed in June 1999 to work with their respective negotiators and individual border states and provinces to build 'good neighbor' agreements based on reciprocity. The Parties have since pursued bilateral discussions on this matter (Bellefleur 2000).

6.3.6. Congruence of national and international EIA

The development of EIA practice and theory has occurred at the national level. Numerous studies have been conducted comparing EIA procedures and implementation in countries

and domestic states and provinces which reveal the nuances of particular procedures and administrative practice. Some jurisdictions are noteworthy for having advanced procedures in certain aspects of the EIA process. The focus here is on world's best practice in terms of the explicit or indirect incorporation of the elements of the precautionary principle. In following sections, key provisions of a number of jurisdictions' EIA procedures are examined. Attention is later focused on how different levels of jurisdictions interact where there is overlap concerning the predicted environmental impacts of a project. The existence of international borders presents challenges for the practice of EIA which traditionally has been conducted internally in a country's domestic EIA procedures. This is likely to remain the case in the foreseeable future. Only the United States has taken tentative steps towards empowering NEPA to have ex-territorial application to the global commons, although this remains a highly contentious and problematic legal issue and the EIA process itself remains domestic. The preceding sections outline the agreements and mechanisms currently available in Europe and North America for the conduct of transboundary EIAs which centre on notifying potentially affected states of the procedure and tentative steps towards harmonisation of procedures. EIA also offers opportunities to complement, and in time, advance international law concerning the responsibilities on states to ensure that activities within their jurisdiction do not result in environmental harm to other states. International law must, of course, be implemented by states domestically, but fuzzy areas remain concerning the development of the responsibilities emanating from the *Trail Smelter* decision and subsequent jurisprudence. It is argued here that transboundary EIA can be developed to be consistent with the international responsibility to implement the precautionary principle and by doing so advance the standards in international law and avoid potential problems caused by the onerous rules to establish liability for transboundary harm. The context for discussion is large-scale development projects with transboundary implications.

6.4. Future development of EIA practice and theory

EIA has become arguably the foremost environmental protection regime that exists in most jurisdictions. It would be unlikely not to find a functioning EIA system in a Western democratic country. EIA has also been adopted by many developing countries. The aim of EIA is well understood, but there is considerable room for improvement in terms of implementation and further refinement of some aspects of EIA. Transboundary EIA is necessary for projects with potential environmental impact in other countries due to the limitations of international law for liability. However, reform is needed due to

shortcomings in EIA as practised in many countries. In many cases, EIA practice falls far short of EIA theory. A weakness of some processes is that there is no clearly defined policy context in which EIA is conducted. Numerous options for improvement of transboundary EIA are being canvassed at the time of writing in relation to the Espoo Convention. For example, it has been argued that for large-scale development projects it is not satisfactory to involve only states and their authorities. Where international bodies have part-financed projects and have been influential in the development of them, it has been suggested that they also need to be involved effectively in the EIA process (Furman and Hildén 2000: 14). Another common suggestion is to make EIA more procedural and enforceable which, like in the United States, is likely to result in less litigation once all the procedures are clear (Kjellerup 1997: 161). A structural weakness of many EIA systems is that they produce EIAs as 'stand-alone' reports; adjuncts to the planning process. More cutting edge practices are moving towards integrating EIA in the wider planning context (James 1995). We focus here on some of these suggestions in the specific context of making EIA more consistent with the precautionary principle.

6.4.1. Strategic, cumulative and integrated impact assessments

A key focus for the reform of EIA has been for it to be broadened to include assessment and consideration of the environmental impacts of the project in question together with the *cumulative impacts* of other projects (normally adjacent or concurrent projects), the purpose of the project together with long-term plans for the region in which it is located (*strategic assessment*), and also consideration of broader economic and social impacts (*integrated assessments*) (see e.g. Piper 2000). The reform suggestions that follow complement these objectives. In particular, they are consistent with the rationale for strategic assessments. However, the purpose of this thesis is to evaluate existing EIA measures and thus the focus here remains on project-specific EIAs¹⁴¹ which narrows the focus to the project in question and its reasonable alternatives.

6.4.2. EIA and sustainable development

Recent international practice in EIA has seen a shift in emphasis from its forecasting and decision-making structure to its role within the broader environmental management context (Wood 1995, 1997). The theoretical context in which EIA has been conducted in many countries since the early-1990s has been defined largely – but weakly – by the goal

¹⁴¹ These can be contrasted with site-specific EIAs which focus on projects which can only be located in a specific place. However, the type of assessment used for project-specific and site-specific EIAs tends to be the same (Carlman 1996: 16).

of sustainable development. Although George (1999: 180) argues that EIA predates the concept of sustainable development and does not necessarily include its goals, it can be seen that EIA supports sustainable development by providing information on the interrelationship between economic activities and their environmental consequences (Schrage 1997). It is, according to Cheung (1997: 1.1, 1.2), 'the strategic point of intervention in the decision-making process for sustainable development.' She identifies several features of the EIA process that make it effective for decision-making: the obtaining of scientifically-based information, the invocation of societal values through the participation of interested parties and the public; and 'an anticipatory power' by identifying future environmental problems and the measures required to address such problems. Feedback mechanisms of post-decision monitoring in effective EIA processes fulfill the learning goal of adaptive management. Further, subsequent EIAs of similar proposals enable the transfer of experience across departments, developers and practitioners.

Connections between EIA and sustainable development have been made for more than a decade. The 1987 Brundtland Report was the first significant document to identify the importance of EIA as a tool by which environment and development objectives could be integrated to achieve 'sustainable development'. The Report noted the increasing number of countries that require EIAs for major projects and recommended that:

A broader environmental assessment should be applied not only to products and projects, but also to policies and programmes, especially major macroeconomic, finance, and sectoral policies that induce significant impacts on the environment (World Commission on Environment and Development 1987: 222).

The World Commission on Environment and Development Experts Group on Environment Law considered prior environmental assessments of activities which may significantly affect the environment to be integral to the achievement of environmental protection and sustainable development (World Commission on Environment and Development 1987: 348; Harvey 1992: 266). This issue was clarified by the UN Environment Program in 1987 when it adopted 13 Principles of Environmental Impact Assessment. The need for EIA was reiterated at the Rio Conference. Principle 17 of the Rio Declaration provided, among other things, that

[E]nvironmental impact assessment, as a national instrument, shall be undertaken for proposed activities that are likely to have a significant adverse impact on the environment and are subject to a decision of a competent national authority.¹⁴²

In Australia, some of the connections between EIA and the 'ecologically' sustainable development [ESD] concept were identified in the 1991 Australian and New Zealand Environment and Conservation Council (ANZECC) report *A National Approach to Environmental Impact Assessment in Australia*. In particular, the report noted that EIA can assist in achieving ESD by promoting 'caution in dealing with environmental risk and irreversibility' (ANZECC 1991: 4). The 1992 Intergovernmental Agreement on the Environment (IGAE) was the first national policy formally to detail and adopt the concept of ESD. It provides some guidance for the incorporation of ESD principles in EIA and sets out nationally accepted principles of environmental policy, including the precautionary principle. Essential approaches for achieving ESD were outlined in the *National Strategy for Ecologically Sustainable Development* (Commonwealth of Australia 1992), released later in 1992. These include the consideration of national implications of local activities and taking long-term rather than short-term views in environmental decision-making. Some 70 of the recommendations contained within the nine ESD sectoral reports relate to EIA (Environment Protection Agency 1994a: 4). These demonstrate that in Australia, a country with leading EIA practices, the process of EIA is considered to be a key tool for achieving sustainable development. The precautionary principle provisions of the new federal EIA Act are discussed below in 6.5.1.b.

There is consensus among environmental planners and resource managers that EIA must reflect sustainable development principles and broader policy concerns more closely. However, little has been done in a formal capacity to effect this goal. It will be seen below in the analysis of the two case studies that in some cases EIA is used 'for the sole purpose of diminishing the most obvious and negative environmental impacts of a development/planning decision, without any regard to the concept of sustainability' (Cheung 1997: 1.1). Where this occurs, the emphasis of the EIA process is the mitigation of environmental impacts rather than avoidance of them. Novek (1995: 145) argued that EIA in practice often internalises rather than overcomes conflict between economic development and environmental protection and that EIA is often used by governments to legitimate projects. In some jurisdictions, EIAs tend only to be conducted *if* their

¹⁴²(1992) 31 ILM 874. The meaning of the phrase 'as a national instrument' has been debated. Preiss (1999: 318) argued that it would be ironic to limit the use of EIA to domestic impacts (thus precluding truly international assessments) because the Rio Declaration was intended to be an international accord.

preparation is considered to be politically expedient. In practice, few proposals which have been subjected to EIA are rejected (Gilpin 1995: 158 and Thomas 1996: 10). The numerous calls to incorporate sustainable development principles in EIA have tended to focus on reforming EIA *procedure* and have neglected *substantive* outcomes. Further, the research that exists on EIA decision-making tends to focus on the final project approval stage rather than the numerous earlier and significant decisions made in the screening and scoping phases which shape the whole EIA process (Weston 2000: 185).

It is evident that 'EIA is a major tool for promoting sustainability; however promoting the practicable steps that should be taken when applying the process to that end are not necessarily clear' (Department of the Environment, Sport and Territories 1997: 5). The question then is: how can these practical steps be taken? A method for integrating the precautionary principle, a key component of sustainable development, in EIA is now presented. Notwithstanding the difficulties of establishing uniform EIA standards across jurisdictions, the following framework is applicable to all legislative EIA processes.

6.5. EIA and precaution

The need to integrate the precautionary principle systematically in decision-making requires us to examine the potential for it to be included in existing environmental protection measures. EIA is the most sophisticated environmental protection framework that exists in many jurisdictions and it is therefore arguably the most obvious vehicle for giving effect to the principle and the logical starting point for reform options. EIA has become an established component in the planning process for most major developments and it is the only process which provides expressly for environmental considerations to be taken into account in developmental decision-making. The practice of EIA is an appropriate place to consider precaution because this concerns whether to proceed with development proposals in situations where uncertainty exists about future environmental effects. Not only are the principle and EIA complementary in so far as they are both means of informing decision-making and influencing environmental outcomes, but EIA itself is also precautionary in a minimal sense because it is predicated on addressing uncertainty about future environmental effects (Cameron 1999: 52; Cameron et al. 1999: 109; Stedman and Hill 1992 and Harding and Fisher 1999: 3). The hallmark of the EIA process is its institutionalisation of foresight. It is, as Cameron and Abouchar (1991: 3) note, 'institutionalised caution'. Thus EIA indirectly incorporates precaution. However, the two differ conceptually: EIA is a procedure prior to decision-making and the principle is a policy, or potentially a rule, to inform or govern decision-making.

The above discussion outlines the limitations of the rules for liability for causing transboundary harm and the strengthening status of the precautionary principle at international law. We have also seen the emerging obligation on states to conduct EIA. Yet, this nascent obligation falls short of fulfilling the contents requirement of the principle because at most it would prescribe a minimal content for EIA which even in its most advanced form in domestic jurisdictions falls short of effectively embodying the precautionary principle. EIA must move beyond its basic information-provision function to a process whereby it is demonstrated that the project under examination meets certain precautionary ends (Cameron 1999: 53). EIA is not as genuinely anticipatory as it could be. Future ICJ decisions on this subject matter will no doubt be illuminating. We now consider how to make existing EIA processes more consistent with the principle. This is discussed in the international and legal context.

6.5.1. Existing attempts to include precaution in EIA

A number of EIA regimes and organisations assume that EIA is precautionary (e.g. United Nations Environment Programme 1993: 8). However, few EIA regimes in the world have taken seriously the challenge to make EIA truly precautionary. Most legislative inclusions of the principle are stated in permissive terms and or are contained in general object provisions. Including the principle in preambular statements (or object provisions of legislation) is a common practice which demonstrates governmental commitment to the principle and allows for interpretations to evolve. However, such incorporations can limit the application of the principle in practice and prompt litigation over correct interpretations and to what extent official discretion is fettered by purposive provisions of legislation. Further, they can demonstrate a lack of serious thinking on the part of the legislators as to the full legal implications of imprecisely-worded objectives (VanderZwaag 1994: 12). It is necessary to reconsider the way in which the principle is incorporated into statutes and treaties so that it could be given more support.

6.5.1.a. *Espoo Convention*

The preamble to the Espoo Convention envisages that the operation of its provisions will enable precautionary approaches. It mentions the need to develop 'anticipatory policies' and Appendix II parts (f) and (g) require an 'explicit indication of predictive methods and underlying assumptions as well as the relevant environmental data' and an 'identification of gaps in knowledge and uncertainties encountered in compiling the required information'. The preamble declares that

[c]onscious of the need to give explicit consideration to environmental factors at an early stage in the decision-making process by applying environmental impact assessments, at all appropriate administrative levels, as a necessary tool to improve the quality of information presented to decision makers so that environmentally sound decisions can be made paying careful attention to minimizing significant adverse impact, particularly in a transboundary context.

However, these measures could better be described as preventative rather than precautionary due to the focus being on preventing and mitigating 'likely' risks, as well as targeting 'significant' impacts. The requirement that gaps in knowledge and uncertainty encountered be identified is not followed with guidance as to how to act mindful of such information deficiencies.

6.5.1.b. *Australian EPBC Act*

The most recent Australian inclusion of the principle is contained in the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act)*. This Act, which entered into force on 16 July 2000, replaced the previous Commonwealth EIA Act and, among other things, provides the new legislative basis for federal EIA. Section 391 is the most progressive legislative inclusion of the principle in Australia to date, and the most progressive inclusion of the principle in EIA systems. The section provides that the Minister 'must take account of the precautionary principle' in making any of the 16 specific decisions listed in s 391(3). These decisions include whether to approve projects or developments and decisions relating to conservation and management plans. However, a curious proviso is contained: the Minister need only consider the principle 'to the extent he or she can do so consistently with the other provisions of this Act'.¹⁴³ It is difficult to imagine a situation in which the mere 'consideration' of the principle could be inconsistent with other provisions in the Act. Perhaps this proviso indicates legislative contemplation that the principle would largely be applied to some degree. Consider also that Part 16, in which the section is located, is entitled 'Application of precautionary principle in decision-making'. Nevertheless, the innovative nature of the provision is that it *requires* consideration of the principle in situations where this is deemed to be appropriate. Thus the principle is now a matter that *must* be taken into account for these decisions, rather than a matter that *may* be taken into account. The provision will do much to entrench precautionary thinking at the highest level of environmental decision-making and will provide a firmer basis for litigants to argue that application of precaution is necessary in

¹⁴³ s391(1).

certain cases. The scope of application is limited to Commonwealth areas of competence, determined as areas of 'national environmental significance'. The formulation of the principle adopted is a reworded, but substantively identical, version of that contained in the IGAE. Section 391(2) states, 'The *precautionary principle* is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.' Regrettably, the opportunity was not taken to provide a stronger and more precise definition of the principle. This is unfortunate considering that the Act is the main product of a large-scale review of Commonwealth environmental law and is the pivotal piece of Commonwealth environmental legislation. Among other things, it provides the new legislative base for federal EIA.

6.5.1.c. Victoria

In Victoria, the 1995 revised Guidelines issued under the *Environment Effects Act 1978* (EEA), state that an environmental effects statement (EES) 'should' include:

predictions of significant environmental impacts of the proposal...and their consequences, direct and indirect, short and long term and cumulative, with an estimation of the amount of uncertainty involved (Department of Planning and Development 1995: 7).

However, this provision for the estimation of uncertainty – the only such provision in Australian jurisdictions – does not indicate the extent to which uncertainty must be examined. In the normal course, this would be determined by a Consultative Committee, which is established to guide the scope and preparation of assessments. Although establishing a committee is not mandatory, it is common practice. Controversy often surrounds who is appointed to the Committees (see Richardson and Boer 1995). Nonetheless, in practice, proponents are afforded much flexibility in interpreting the guidelines. Further, the unenforceable nature of the Victorian provisions mean that there is little that can be done if a proponent prepares an inadequate EES (for example, one which does not address the amount of uncertainty involved). For example, the Victorian Point Lillias EES, which examined the proposed relocation of the port and chemical storage facility at Coode Island in Melbourne to Point Lillias near Geelong, met the uncertainty requirement perfunctorily. In relation to the most controversial aspect of the proposal – the nature and understanding of its effect on the Orange-bellied Parrot (a species listed in the highest order of concern under the *Endangered Species Protection Act 1992* (Cth)) – only four concessions concerning uncertainty were made. There were short statements about unknown population trends, uncertainty concerning the area of the species's habitat

potentially affected and other factors playing a role in the response of the species, and poor understanding relating to habitat preferences. The EES noted, however, that data relied on made 'no pretence about presenting a complete picture. This would require vastly more knowledge of at least species abundance and key functional aspects of the ecosystems' (Department of Planning and Development 1996: 7B: 85). Thus, despite the requirement that uncertainty should be covered in the EES, this was done in a poor manner, and, due to the unenforceable nature of the guidelines, with no opportunity for redress. Although an Independent Panel was established to review the EES, the adequacy of review was undermined by the abbreviated period given to it to complete its report and by the fact that its primary recommendation – that the proposal should not be approved in the absence of a more detailed assessment – was not accepted by the responsible Minister (Department of Infrastructure 1996).

Although the Guidelines assist considerably in interpreting the EEA, and would be a 'relevant consideration' in a judicial determination of the adequacy of an EES, they are not delegated legislation and can be replaced or amended at any time. To date, excluding review on narrow grounds by the Planning Appeals Division of the Administrative Appeals Tribunal (AAT), the EEA has not been judicially considered. The AAT only has considered the issue of whether it would require EESs in particular situations, and only pursuant to appeals against the grant of a planning permit under the *Planning and Environment Act 1987* (Vic) (Raff 1995: 250). There has been no judicial consideration of what amounts in law to a valid EES.

6.6. Approaches for integrating precaution in EIA

It was argued in Chapter Four that the precautionary principle is more than a nebulous idea; it is conceptually clear and it has a minimum content which can be given practical application. However, to date, the most common approach for advancing precaution in environmental management merely has been repeatedly to espouse the principle as a guide for environmental decision-making. It is the writer's contention that a key way to give effect to the principle so that it influences decisions and environmental management practice is to integrate it formally in EIA regimes. This, as will be shown, would be achieved most effectively by incorporating the principle in substantive provisions of treaties or legislation rather than merely including it in preambular statements which in this

regard have limited effect.¹⁴⁴ One concern often expressed is that in practice EIA tends to be poor in identifying knowledge gaps and uncertainties (see Lawrence 1997b). However, simply to require statements on information deficiencies does not go far enough in the absence of instructions regarding how to deal with uncertainty. The approach detailed here supports the contention that precautionary environmental decision-making should be based on formal, clear and unconditional rules and measures (see Kjellerup 1997: 161 and McIntyre and Mosedale 1997: 236).

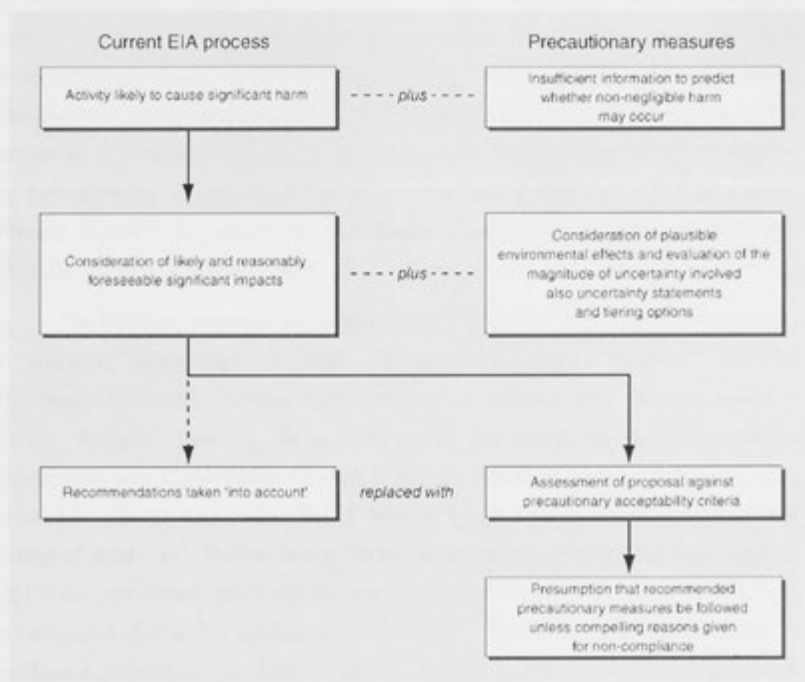
It is difficult to determine the precise minimum content of the obligation states have at international law to conduct their activities consistent with the precautionary principle. Yet attention is being devoted to developing the necessary conceptual frameworks for advancing the concept as well as identifying the practical steps that can be taken to implement precaution. The position that is taken here is that appropriate precautionary EIA conduct can be legislated. This would incorporate uncontested elements of precaution and also allow for flexibility in determining precise applications depending on the context. However, it is clear that giving full effect to the principle could not be achieved simply by appending precautionary considerations to existing EIA processes. Challenges to the more effective precautionary application of EIA are procedural, methodological and institutional. Wide-ranging reform options also need to be adopted. In particular, EIAs need to be conducted more widely to encompass strategic impact assessment and to embody cumulative impact assessments in order that they reflect two key notions inherent in the principle: awareness that the causes of environmental harm are numerous and interrelated and that these causes may be spatially and or temporally distant from their effects (see Harvey 1992, 1998; Wright 1994; Brown and McDonald 1995; Deville and Harding 1995; Court, Wright and Guthrie 1996; Marsden 1997). The landmark *New Zealand Resource Management Act* 1991 could be used as a guide. The Act provides for broad assessments integrated in the planning system with the explicit objective of sustainable management (Section 5(1); Montz and Dixon 1993; Dixon and Fookes 1995). Leaving aside the applicability of EIAs for policies (see Bailey and Renton 1997), plans and programs, effective integration of the principle in current project-specific EIA would require three principal reforms to existing processes. They would need to ensure that:

¹⁴⁴ However, see the proposed Massachusetts Precautionary Principle Act (1997) which states that state agencies 'shall' apply the principle 'when there are grounds for concern that a procedure or development may contribute to the degradation of the air, land and water of the Commonwealth' (House Bill 3140, s 1) (Tickner 1998).

1. EIAs are conducted where there is uncertainty regarding environmental impacts (*threshold*);
2. there is adequate assessment of environmental uncertainties (*content*); and
3. environmental uncertainties are given appropriate weight in final decisions (*substantive effect*).

The methodology proposed for integrating the principle in EIA is illustrated in Figure 2.

Figure 2. Proposed precautionary EIA steps



6.6.1. Step 1: Threshold for operation of EIA

The first step to integrate the principle in EIA would be to amend the project screening criteria to ensure that EIAs are not limited to activities which *will* affect the environment 'to a significant extent', as is the common practice. The EIA process must also be triggered where there is uncertainty regarding the possibility of serious environmental impact. There has been much dissatisfaction with the subjectivity and uncertainty inherent in the popular EIA threshold of 'significant' environmental impact. Although the parameters of environmental uncertainty are similarly elusive, particularly at the larger

scale, this difficulty is not insurmountable and guidelines could be prepared to render this threshold operable. This is where more work on risk assessment and uncertainty analysis needs to be undertaken.

In some jurisdictions it is implied in the EIA legislation or their parliamentary reading speeches that some projects do not warrant EIAs, thus providing a justification for discretion in deciding whether or not to require an EIA (e.g., see House of Representatives 1974: 4082). However, the argument for such discretion is misguided. By definition, EIAs are only required when the threshold is met. It cannot be maintained that an EIA is not warranted for a particular proposal when it has been determined that the proposal *is* likely to have a significant effect on the environment. The threshold proposed here is lower, and may require tiering of assessments such that an initial, less comprehensive assessment is conducted upon the threshold being met to determine whether a full EIA is warranted. It must be borne in mind that the objective of EIAs is not solely to determine the environmental acceptability of proposals, but also to generate information about proposals so that if they occur, their environmental consequences will be understood and, hopefully, reduced (see James: 1995).

The literature reveals a few instances where there have been calls for amendments to triggering requirements to better incorporate uncertainty regarding predicted environmental impacts. Current draft legislation in Massachusetts calls for action to prevent 'probable' harm.¹⁴⁵ In a 1996 report, the Australian and New Zealand Environment and Conservation Council (1996: 2) (ANZECC) stated that initiating a formal EIA process may be justified if there is 'a high level of uncertainty or a large number of unknowns'. Further, in a yet to be implemented draft discussion paper entitled *ESD in EIA*, the New South Wales Department of Urban Affairs and Planning (1995: 21) recommended that a full assessment of an activity should be undertaken if there is insufficient information available to predict whether there is likely to be significant environmental effects. It is submitted that legislative or treaty force should be given to a lower, although similar, evidentiary standard in all jurisdictions: EIAs should be required where there is insufficient information available to predict whether non-negligible environmental harm may occur. This lower evidentiary standard would reflect the principle in so far as it would shift attention from the acceptability of the 'significance' of the environmental impacts of a proposal to the acceptability of the level of scientific

¹⁴⁵ Draft legislation covered, at time of writing, by attorney-client privilege. Copy in possession of author.

uncertainty which attaches to the predictions of the impacts. It is essential that the direction is expressed in mandatory language. Case studies on transboundary environmental impacts have revealed the difficulties involved in establishing sufficient quantitative information on the characteristics of likely impacts to determine their 'significance' (Kjellerup 1999b). Cheung (1997: 3.1.1) has argued that it is difficult to establish significance unless a broader approach is taken; one that would, for example, consider cumulative effects of incremental developments (Cheung 1997: 3.1.1). The measure proposed here reshapes the question of significance such that an indication of future environmental harm is sufficient to trigger the first level of the process. Uncertainty as to whether a project warrants an EIA would be reduced if an inexhaustive list of 'designated developments' is adopted to trigger the process. This has been done, for example, in Europe via the EU Directive on EIA.

6.6.2. Step 2: Content of EIA

For the principle to be taken into account, the uncertainty associated with a proposal (concerning both what is known and not known) must explicitly be examined and evaluated in EIA. Thus, the second step to integrate the principle in EIA would be to ensure that there is assessment of the environmental uncertainties involved in a proposal. There must be a genuine attempt to anticipate and evaluate the level of scientific uncertainty. Table 3 lists examples of uncertainty in EIAs (see also De Jongh 1988; Glasson, Therival and Chadwick 1994: 122-4; Lawrence 1997a: 87-8). Lawrence (1997a: 88) notes that uncertainty in EIA also relates to value judgments in decision areas and sums-up eloquently the notion that a broader approach to scientific inquiry is required:

A scientific, positivist approach will not be generally appropriate for the trans-scientific, messy problems often encountered in EIA. A less analytical, more holistic, approach will be required. A new scientific paradigm, which incorporates concepts such as complexity, nonlinearity and emergence, is more appropriate.

Uncertainty, as discussed above, involves more than the presence or absence of 'objective' scientific knowledge; to a large degree it is socially and politically constructed. Awareness of this phenomenon in EIAs, in addition to more rigorous scientific inquiry tailored to measuring areas of uncertainty at each stage of an EIA, would enable much more comprehensive assessments of environmental impacts – in particular, cumulative impacts – than are currently undertaken. Determining *how* to assess uncertainty is the current challenge. The step focused on in this part of the chapter is the assessment of uncertainty of the proposal, and of practical alternatives.

Table 3. Examples of uncertainty in EIA

(adapted from Department of Urban Affairs and Planning 1995: 12)

Pre-development:	Impact identification and prediction:	Impact mitigation and rehabilitation:	Decision making:	Monitoring:
<p>Knowledge of pre-proposal environment, proposed technology, community values and needs may be:</p> <ul style="list-style-type: none"> • incorrect • partially correct • non-existent <p>Existing situation may therefore be misunderstood and all later stages may be jeopardised</p>	<p>Impact prediction may be:</p> <ul style="list-style-type: none"> • [undermined because] impacts may be ignored, missed, overestimated or underestimated [or] not fully understood • [inaccurate] because of incorrect or poorly designed modelling or predictive techniques • based on incorrect knowledge of pre-proposal situation • flawed because of lack of data, incorrect data or the use of poor quality data 	<p>Method may be:</p> <ul style="list-style-type: none"> • unproven • inappropriate • only partially valid (although these do not preclude the mitigation or rehabilitation from being partially successful) <p>Application of method can be unsuccessful due to:</p> <ul style="list-style-type: none"> • failure of method (unproven, inappropriate, incorrectly applied) • lack of appropriate training, maintenance or management • lack of feedback loop from monitoring • other factors eg. fire may follow revegetation 	<p>Decision made based on</p> <ul style="list-style-type: none"> • biased or partially accurate information • insufficient information to understand the full costs and benefits of the proposal 	<p>Monitoring may be unsuccessful for various reasons:</p> <ul style="list-style-type: none"> • inappropriate method • inadequate data (temporally or spatially) • lack of commitment • lack of funding <p>Lack of a feedback loop may lead to continued unsustainable practices</p>

EIA content requirements in legislation and subordinate legislation typically provide poor guidance regarding the type of impacts which need to be assessed. The level of assessment required invariably is absent or incomprehensive. In June 1996, ANZECC published a report entitled *Guidelines and Criteria for Determining the Need for and Level of Environment Impact Assessment in Australia*. The document provides a framework to guide decisions regarding whether a potentially significant proposal requires an EIA and the level of assessment necessary. It calls for statements in EIAs on the level of confidence with which predictions of impacts are made envisaging explanations as to the adequacy of base line data, the level of certainty which attached to management programs

and consideration of whether the project design and technology is sufficiently detailed and understood to enable impacts to be established (see Table 4). A key recommendation was that criteria be developed to guide the level of information sought from a proponent. It also recommended that reasons for a decision on the level of assessment required should be made publicly available. It noted that assessors need to be critical of scientific evidence and be mindful of assumptions which inhere in them. The report reflected one of the key concerns identified by the Bureau of Industry Economics (BIE) in its 1990 report on the impact of environmental assessments on major projects. The BIE Report identified lack of clarity in respect of what EIAs require as a major source of uncertainty faced by proponents (Bureau of Industry Economics 1990: vi; Leeson 1994: 75). The document is a crucial – although partial – step forward for ensuring that EIA practitioners are more critical of scientific evidence and are mindful of the assumptions which inhere in scientific methods and interpretations. These two concepts go to the core of the precautionary principle.

Table 4. Checklist for EIAs: confidence of prediction of impacts

(Australian and New Zealand Environment and Conservation Council 1996: 9)

- | | |
|-----|--|
| (1) | <p>What level of knowledge do we have on the resilience of a given significant ecosystem? Cover —</p> <ul style="list-style-type: none"> — adequacy of baseline data; — level of certainty attached to any management or rehabilitation program; and — relevance of comparable situations. |
| (2) | <p>Is the proposal design and technology sufficiently detailed and understood to enable impacts to be established? Cover —</p> <ul style="list-style-type: none"> — previous experience with design; — relevant models; — degree of accuracy desired; and — degree of accuracy achievable. |
| (3) | <p>Is the level and nature of change on the natural and human environment sufficiently understood to allow the impacts of the proposal to be predicted and managed. Cover —</p> <ul style="list-style-type: none"> — adequacy of baseline data. |
| (4) | <p>Is it practicable to monitor predicted effects? Cover —</p> <ul style="list-style-type: none"> — frequency and duration of monitoring; — feedback loops; environmental management plans; and — community involvement. |
| (5) | <p>Are present community values on land use and resource use likely to change? Cover —</p> <ul style="list-style-type: none"> — sources of values; and — degree of stress and change likely in the community. |

The federal EPA review of the EIA process, completed in 1994, recommended that the federal government adopt the process the US *National Environmental Policy Act* 1969 (NEPA) utilises for dealing with incomplete information and scientific uncertainty (Environment Protection Agency 1994b: 109). Requirements for the content of EISs are stated rather briefly in NEPA but are amplified by regulations issued by the Council on Environmental Quality (CEQ), established by NEPA to oversee the implementation of the Act. The CEQ regulations provide, among other things, that where there is incomplete or unavailable scientific evidence, this should be disclosed. Where the cost of obtaining such information is exorbitant, the relevance of the information must be stated. Added to this should be consideration of cumulative and synergistic effects. In particular, there is a requirement that impacts which have been ascribed a low probability of occurrence but which entail possible catastrophic consequences must be considered if they are 'within the rule of reason' (that is, they have some scientific support and are not based on pure conjecture) (Code of Federal Regulations 40: §§1502.22, 1508.27). The CEQ has stated that agencies cannot ignore 'uncertain, but probable' effects of their decisions (Fitzgerald 1996: 464). Further, the United States Court of Appeals ruled in the *Sierra Club*¹⁴⁶ case that indirect effects of a project that are reasonably foreseeable must be assessed comprehensively. However, Breyer J held (at 878) that in preparing an EIS, an agency need not consider impacts which are 'highly speculative or indefinite.' An important area here is for EIAs to analyze the potential for irreversible impacts from a proposed development.

To enable EIA to embody the precautionary principle it would be necessary to adopt some of the NEPA requirements. It would be imperative to require proponents to obtain all available scientific evidence of possible environmental harm of proposals. If insufficient scientific information is available (where there is reason to assume there may be non-negligible environmental harm), that would be reason alone to use the principle to refuse project approval or to require precautionary action for certain aspects of the proposal. To give effect to the essence of the principle – that there be a shift in the 'burden of proof' – proponents should be required to establish that the uncertainties which attach to the predicted environmental effects of proposals are within predetermined precautionary 'acceptability' criteria or 'margin-of-safety' standards. This burden would be more onerous to discharge where there is conflicting scientific evidence and may call for a sliding scale of required proof according to the predicted likelihood and severity of harm.

¹⁴⁶ *Sierra Club v. Marsh* 769 F.2d 868, 877-82 (1st Cir. 1985).

It may be necessary – at minimum – to require a developer or potential polluter to establish that no safer way to conduct the activity is possible (Tickner 1998). See, for example, the Ministerial Declaration of the Fourth International Conference on the Protection of the North Sea which states that a party must 'demonstrate to the satisfaction of the committees...that nutrient impacts do not cause eutrophication effect'.¹⁴⁷ This could coincide with measures to ensure that EIAs place greater attention on the existence of alternatives. The focus of scientific analysis in EIAs would change from the significance of harm to the limits of scientific knowledge (Bates 1994: 252). This change would act as an incentive for proponents to submit sound proposals in the first place. Articulation of acceptability criteria could draw from Table 5 which is based on a discussion paper prepared by the NSW Department of Urban Affairs and Planning. This is a useful early espousal of such criteria. Guidance is also offered in Table 6, prepared by Tickner to guide weight of evidence analysis and the amount of proof needed for precautionary action (see also Deville and Harding 1997).

Table 5. Factors to consider in deciding the acceptability of a proposal based on the precautionary principle

(adapted from Department of Urban Affairs and Planning 1995: 24)

In making decisions about the proposal —

- Have worst cases outcomes been considered in the estimates of environmental benefits and costs? Err on the side of caution when predicting outcomes.
- Have risks to social or ecological integrity been identified? Have the scope and scale of risks been assessed? Are all risks considered acceptable?
- Has a risk averse approach been adopted? Has a safety margin been applied and best available technology used? Can performance bonds or other incentive mechanisms be applied?
- Are there scientific uncertainty about the outcomes? Peer review of scientific data should be undertaken. If certainty is low, are the potential impacts likely to be serious or irreversible? If so, strong consideration should be given to other options.
- Are there information uncertainties about outcomes? Where do gaps appear? Determine their legitimacy. (Does information exist and has the applicant ignored it or not known about it, or is it really a gap in human knowledge?) Where knowledge does not exist has the worst-case scenario been considered?
- Is there certainty that a representative range of community values have been considered? Is there certainty that sectors of the community will not be adversely affected at the advantage of others? Has a cautious approach been taken when considering the needs of future generations?
- Have valuation methods been appropriately used in weighing up the costs and benefits? Has scarcity been appropriately factored into valuation and assessment of resources proposals? Have appropriate factors been considered when considering compensation for non-sustainable use of renewable or resource rents and royalties for the use of non-renewable resources?
- Can consent conditions provide for early-warning of environmental degradation?

¹⁴⁷ Part IV 31(I), p. 21. Progress Report, Fourth International Conference on the Protection of the North Sea, Esbjerg, Denmark, 8-9 June 1995, Danish EPA.

Table 6. Proposed criteria for precautionary decision-making

(Tickner 1998)

Causal inference criteria

- Strength of evidence (experimental and observational)
- Amount and consistency of evidence across a wide range of circumstances
- Temporality of effect
- Coherence with existing knowledge
- Plausibility of effect
- Have all evidence and all plausible hypotheses been considered?
- Power of study(ies) to detect an effect
- Is the evidence statistically significant or of public health significance?
- Is there some presumption of causal relatedness based on previous experience which would lower the evidentiary standard? (i.e., is there evidence from any other similar case that would lead one to believe that a similar impact could be considered in the present case?)
- What is the adverse effect being studied and is it the correct one?

Decision-stakes criteria

- Spatial scale of cause and effect: local-national-regional-international-global
- Magnitude of possible impacts (on both humans and natural systems)
- Temporal scale of potential impacts
timing (near, medium, long-term)
longevity (short, medium, long)
- Reversibility (easily quickly reversed or expensive/irreversible)
- Mensurability of factors and processes (well-known/ignorant)
- Degree of complexity and connectivity
- Is the action robust to uncertainties (error friendly)?
- Do alternatives or measures exist to reduce or eliminate potential harm (ease of prevention)?
- What is the trade-off between further study and potential impacts?

Where EIAs are prepared, invariably they are confined to environmental impacts which would occur in proximity to the proposed development. Rarely is there consideration of such factors as a particular proposal's possible implications for less tangible impacts such as global warming or ozone depletion (Harvey 1992: 271). A constant source of criticism of EIAs is that the quality of scientific analysis they contain is often poor. Although the NSW Department of Urban Affairs and Planning (1995: 11) has expressed the concern that the level of uncertainty associated with the predictive process in some NSW EISs has been disregarded or concealed, few commentators would argue that proponents consciously suppress damaging scientific evidence when preparing EIAs. It has been suggested that what is more likely is that proponents fail to seek out information. Walker (1994: 291) has lamented that an EIA cannot offer a 'dispassionate assessment' of a proposal (see also Fairweather 1989). A difficulty arises here in ensuring that EIAs adequately cover uncertainty at each relevant stage of the process. To give effect to the principle, EIAs need to be more attentive to far-reaching and cumulative effects of discrete

development activities. Time limits for preparing assessments may need to be relaxed to ensure that adequate information is obtained. This would be politically unpalatable due to persistent industry pressure for speedier project approval processes. Yet, depending on the jurisdiction, this may be a necessary trade-off to ensure that rigorous EIAs are prepared. Also, an opening-up of review processes would be required. Wood (1995) has noted that independent EIA review, although contributing to increased cost and delay, has produced good results in Canada and the Netherlands. A sound approach would be to have expert independent panels – perhaps modelled on those in Victoria – to review EIAs and summarise the magnitude of uncertainty involved and provide recommendations with respect to whether projects should proceed, or under what circumstances they would be acceptable. This conclusion would then be forwarded to the responsible minister for the final decision following the procedure outlined below.

6.6.2.a. *Assessment of project alternatives*

The heart of the precautionary principle, as it relates to proposed activities, is the consideration of alternatives so that there is opportunity to implement less harmful options. Rather than seeking to determine what risk or harm is acceptable, the principle fundamentally changes the questions posed. It seeks to determine how much harm can be avoided while maintaining objectives (Tickner 1999). It thus seeks to apply the 'substitution principle': substitute safer alternatives where possible. Without consideration of alternatives, EIA is merely a risk assessment procedure which avoids considering whether the activity is necessary and whether less-risky options are available (O'Brien 1999).¹⁴⁸ An essential prior ingredient for achieving precautionary EIAs is to ensure that feasible alternatives to the proposed activity are assessed and considered. It is necessary from a precautionary standpoint to consider alternatives, including the 'no proposal' alternative, as a way to *reduce* environmental impacts by logical choice of best design options rather than merely to *assess* actual predicted impacts of the sole option being considered. This consideration and balancing of outcomes would avoid a criticism of some commentators that the implementation of project alternatives presents new risks which might outweigh the preferred project (see Cross 1996: 861 and Harding and Fisher 1999: 18). In this sense, any risks which follow a decision to implement a project alternative must be balanced against other options.

¹⁴⁸ On this point, see Stein J in Leach (at 286) where he indicates that the precautionary principle required further consideration of alternatives than was undertaken. See Fisher (2001).

Most jurisdictions require or allow consideration of alternatives as part of their EIA process.¹⁴⁹ However, in practice, particularly where EIA processes are largely discretionary, such as in Australia, the consideration of alternatives is a poorly performed step of EIA. Invariably few alternatives are considered, and those that are considered often are done so inadequately. This is because a developer will typically focus on its primary proposal, and momentum for the proposal is generated by the process itself. This occurs, for example, by financial commitments to the project already made by this early stage of the process and the often predetermined outcome of large scale projects which take on a political import. Consideration of alternatives should not merely be a pro forma procedural requirement. The focus should be to consider reasonable alternatives to the proposed action to enable identification and selection of less potentially harmful activities as a way of minimising or reducing harm during the early design stage of the project. Precautionary decision-making would be facilitated by rigorous qualitative analysis of alternatives. It would encourage evaluation of the purpose of the proposed activity in the first instance rather than assuming that the activity will be approved and focusing on the best way to proceed (see O'Brien 1999). A transboundary EIA which required full assessment of reasonable project alternatives, prior to project consent, would embody the fundamental components of precaution. It would enable identification and selection of potentially less harmful activities during the early design stage. The purpose of the proposed activity could be evaluated, much like in strategic environmental assessment processes. Further, there would be no assumption that the activity would be approved.

6.6.2.b. *Assessment of uncertainty*

It is essential that there is a serious attempt to reduce the parameters of uncertainty that exist in relation to a project's environmental impacts. Thus, a rigorous environmental assessment is necessary which may reveal unknown properties and even greater complexity, potentially further 'compounding prediction and management' (Dovers et al. 1996: 1152). Some uncertainty will be irreducible but Type II errors must be omitted where possible, as well as the problem of decision-making being based on asymmetric information (see part 4.2.1.a). For example, risks of projects are typically stated to be uncertain, yet the benefit of projects are typically stated to be certain. Also, there is a

¹⁴⁹ See, e.g., s102(2)(c)(ii) NEPA. For a review of consideration of alternatives in a number of national EIA processes, see Wood (1995). See e.g. NSW *Threatened Species Conservation Act* 1995 provides s110(2)(h) that a species impact statement must include a description of 'any feasible alternatives to the action that are likely to be of lesser effect and the reasons justifying the carrying out of the action in the manner proposed, having regard to the biophysical, economic and social considerations and the principles of ESD' (see Stein 2000: 10).

tendency for results that are known to be overestimated and results that are not known to be underestimated. Because uncertainty cannot be eliminated, it is necessary to make decisions in situations where it exists. Fisk (1998: 6) suggested that a way to flush out missing data is to circulate interim findings of assessment panel for public comment and peer review to detect bias and subjectivity. There are a number of approaches to informing policy and decisions in the face of uncertainty, including modified forms of risk assessment (see Walker 1991; Dovers and Handmer 1995; Dovers et al. 1996). Giving responsible authorities power to request more information from proponents about the project where necessary during the review process would assist in ensuring that all available information is produced. It is important that flexibility is maintained to ensure the incorporation of new information (Dovers et al. 1996: 1157). This is particularly important in relation to the post-decision monitoring phase of EIA, not only for the project in question, but also for the broader learning goal of adapting to uncertainty. On this point, Freestone and Hey (1996: 266) suggested that further precautionary measures could include establishing bodies to deal with unforeseen environmental harm to cover costs of rehabilitation (see also Preston 1985).

Determining suitable ways to justify making decisions where uncertainty exists – typically anathema to decision-makers who invariably seek uncontested and ‘objective’ information – is an area where more attention is needed in order to give the precautionary principle more cogency in decision-making generally, and in EIA in particular. Critical issues here are how to determine and express thresholds for appropriate precautionary responses and how best to communicate evidence of uncertainty to decision-makers who may not be well-informed about the nature of risk. Reason to believe that a causal link exists between an activity or pollutant and a negative environmental or health consequence can be expressed in different ways, depending on the strength of the evidence (see Butler 1999). This can range from statements such as ‘the evidence *indicates/is consistent with* a causal relation’ through to areas of greater uncertainty about a connection expressed in statements like ‘there is *no evidence* bearing on a causal relation’ or ‘the evidence *does not indicate* a causal relation’. However, more appropriate ways to express the same degree of confidence about causal relations can facilitate the making of decisions based on them. For example, rather than stating that the evidence ‘is consistent with’ a causal relation, this could be expressed as the evidence ‘favors acceptance of’ a causal relation. Similarly, where the evidence is ‘insufficient to indicate’ a causal relation, this could be expressed as the evidence ‘is inadequate to accept or reject’ a causal relation. One area where risk assessment can improve is to provide for uncertainty in degrees of confidence to be

expressed in statement form. This is to be preferred to assigning numbers to predictions of harm where uncertainty exists because numerical values create a false impression of precision where often none exists. This in turn can contribute to decisions being made more on political grounds where numbers and not meaning tend to be focused upon. Discrepancies can exist between experts and the public in risk perception (Bostrom 1997). Statements about uncertainty have the benefit of compelling consideration being given to the nature of the evidence relied upon, for example by specifically addressing issues such as the adequacy of the data and the level of scientific consensus about data analysis. As such, it is argued that the final document produced in the EIA process should express the degree of confidence of predictions and severity of harm in statement form so that rigorous uncertainty analysis and consideration is more amenable to the environmental approvals process. Although it is argued here that it is necessary for more attention to be devoted to assessing the uncertainties which attach to project options, it is important to recognize that uncertainty itself cannot be overcome because of its pervasive and cumulative nature in the environmental arena (M'Gonigle 1999). Therefore, the crucial task that follows that of assessing and conveying uncertainty in EIA is that of how to ensure that decisions are influenced appropriately by the uncertainty that exists.

6.6.3. Step 3: Substantive influence on decision-making

To achieve the stated aim of implementing precaution, it is imperative that a procedure is adopted whereby precaution actually influences (or perhaps governs) decisions. This task strikes at the core of the precautionary principle. In an era in which decision-making is aimed to be rational – particularly in the fields of law and public administration – any attempt to base decision-making in part on the *absence* of information is bound to cause concern. Yet this is exactly what the principle instructs us to do. It is unsatisfactory to have a process whereby uncertainty is assessed, but not considered adequately in final determinations.

It is essential that sustainable development principles govern, or at least heavily influence, decision-making related to the approvals process for major developments. In relation to the matter at hand, once uncertainty explicitly is taken into account in environmental assessments, the next step would be to ensure that proper consideration is given to it in final decision-making. Simply addressing uncertainty in an EIA will not necessarily lead to it determining the final decision. A legal rule needs to be formulated requiring the prohibition of an activity or the implementation of other appropriate precautionary measures where the threshold for application of the principle is met. This would be the case unless there is sufficient evidence that the level of uncertainty (not

merely risk) is acceptable. To improve environmental management, EIA recommendations should be highly persuasive. This would alter their character from being merely a procedural step more to an approvals process – although this approach is not without its critics (Buckingham 1996). A potential problem is that, if the EIA process were to become an approvals process, there would be more attempts by proponents and governments to avoid the process. This would mean that the initial discretion relating to whether a proposal requires an EIA would need to be narrowed and coupled with a stricter interpretation of triggering elements (see Buckley 1991 and Whitehouse 1999).

Confining final decision-making discretion would improve the integrity of the process by ensuring that decisions which conflict with precautionary recommendations are based on pre-determined relevant considerations. This should take the form of a legislative presumption that the responsible Minister adopts the expert recommendations contained in independent reviews of EIAs. To ensure that ministerial discretion would not be usurped, this presumption would be displaced if compelling reasons are given as to why, in the instant case, precautionary recommendations should not be followed. This could be achieved in a manner similar to the 'bounded' decision-making established in Canada under the innovative *Canadian Environmental Assessment Act* 1995 (CEAA). The Act fetters the discretion of the responsible authority (section 37(1)(b)) thus:

[W]here, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is likely to cause significant adverse environmental effects that cannot be justified in the circumstances, the responsible authority *shall not* exercise any power or perform any duty or function conferred on it or under any Act of Parliament that would permit the project to be carried out in whole or in part (emphasis added).

The important aspect of this provision is that the project cannot proceed once it is established that the project is 'likely' to cause significant adverse environmental effects, unless the effects can be justified in the circumstances. Such a conclusion can be overturned only by Cabinet Order-in-Council. However, the proposal submitted here goes further than the CEAA in so far as a similar provision in EIA Acts or treaties could read:

Where, taking into account the implementation of any mitigation [e.g. precautionary] measures that the Minister considers appropriate, the project is likely to cause significant [or non-negligible] adverse environmental effects or there is a non-negligible level of uncertainty as to whether such effects may result, the Minister shall not exercise any power or perform any duty or function conferred on the Minister or under any Act of Parliament that would permit the

project to be carried out in whole or in part, unless the Minister provides compelling reasons why this is inappropriate in the circumstances.

A separate provision would be needed to elucidate the 'compelling reasons' exception. It would list other exigencies which, in particular circumstances, could outweigh the uncertainty which attaches to a proposal. This could include significant economic effects and any adverse environmental effects that may occur if the project does not proceed. However, the Minister must demonstrate that he or she has taken into consideration overarching sustainable development principles. Judicial review must be made available to ensure the adequacy of reasons and to ensure that there is not merely *pro forma* compliance with other procedural requirements. Judicial review would not usurp ministerial discretion because the nature of judicial review is to ensure sound decision-making – not to implement policy. The ability of the public to challenge a decision is essential because the appropriate precautionary approach may conflict with vested interests of the proponent or the government of the day. The important point is that once the threshold for project denial is reached the onus is placed on the proponent, and in turn, the Minister, to justify the project against precautionary criteria.

Although by allowing argument against the application of the principle this procedure would in some cases enable precautionary recommendations to be avoided, the principle has never been considered to have mandatory application in all situations. A threshold for application does need to be determined below which non-precautionary decisions can be taken (Cameron et al. 1999: 100). However, even where the threshold is met, it would be too arbitrary to allow precaution to be the sole criterion for decision-making. Rather, it should be a significant criterion with presumptive application in appropriate circumstances with the level of precaution required being appropriate to the level of uncertainty involved. The approach outlined here would ensure that uncertainty is expressly taken into account and that the necessary balancing act of environmental, economic and social issues is undertaken not simply by considering available scientific evidence but also by being critical of such evidence and taking into account the absence of scientific data uncertainty and indeterminacy – amounting to a fundamental re-evaluation of how costs and benefits are estimated. It would require (where appropriate) precautionary measures to be taken unless there is sufficient evidence to conclude that the benefits of proceeding with a development proposal outweigh the uncertainty involved. This would be a utilitarian incorporation of the principle allowing environmental trade-offs for other expected benefits in appropriate situations. The method articulated here would avoid the Commission of the European Communities' (2000: 13) caveat that the principle cannot be

used 'to justify the adoption of arbitrary decisions' because the precautionary measures adopted would have been identified through a rigorous, independent and transparent process which allows for cases to be made against the implementation of particular precautionary measures. This process would be a combination of indirect and direct precautionary measures. Steps one and two would assist in creating a climate fostering precautionary thinking while step three would be more direct by presumptively requiring application of precaution in appropriate circumstances. This approach would make EIA more ethical and far-sighted and would facilitate the substantive behavioural change necessary for the achievement of sustainability. This would create more coherence where decision-making is, and will remain, subjective, and EIA would become a truly precautionary process.

6.6.4. A legal approach

The reform steps advocated here are conditional on EIA processes which are implemented effectively and routinely. This is best achieved where procedures can be enforced legally. Many EIA processes can be circumvented because they, unlike NEPA, are permissive and unregulated. This is demonstrated in the case studies that follow. As a result, the impact of such discretionary procedures tends to be remarkably different from that of NEPA. According to Kjellerup (1997: 176), 'the thinking behind the EIA system demands transparency and openness with regard to information and assessments'. Formal, explicit and mandatory EIA procedures improve process transparency and ensure that decision-makers are accountable if the process is not used (see Preiss 1999: 312). EIA is a useful analytical tool because of the opportunity it provides for public participation as an integral part of an informed decision-making process. This should be ongoing and responsive with respect to the feedback mechanisms of post-decision monitoring. Ideally, EIA procedures should facilitate public involvement in all stages in the process, and allow adequate opportunity for public review. Legislation and treaties provide a firmer base for public participation than informal systems (Fowler 1985). The EU EIA Directive envisaged in its preamble that stricter rules will evolve over time. The NEPA process ensures full public disclosure and agencies are obligated to seek comments from the public and to take these into account in the final document. This is to ensure that potential impacts and alternatives are explored fully. Non-binding processes, and the absence of adequate formal avenues for the public to demand that its concerns are addressed, can result in public disquiet being expressed through a number of informal means, including lobbying, protests and direct action (Buckley 1991). Such disquiet can be minimised where the public has faith in the rigour and fairness of EIA systems. A necessary element is the availability of judicial

review to ensure the enforceability of EIA requirements. The effectiveness of EIA is dependent on it being fully integrated into decision-making and appreciated by decision-makers – something which is absent in many jurisdictions (Cheung 1997: 3.1.2). It is also advantageous for authorities charged with the responsibility of ensuring the adequacy of the EIA to be truly independent of the decision-making body. The precautionary provisions outlined here would most likely result in litigation in domestic jurisdictions (or at the international level if incorporated into treaties) concerning their content. This could be reduced, however, by the inclusion of detailed contents provisions to reduce the grounds for judicial interpretation of parliamentary intent. It would also minimise the potential for discretionary interpretation of precautionary rules in treaties by developers (see Bellini 1998: 56). The benefits of regional approaches are that it is normally easier to establish rules providing for appropriate constraints on state behaviour where the number of actors is small and there is greater consistency in management and policy approaches among participants.

There has been criticism that EIAs, being advisory documents, are 'paper tigers' because they only give the impression that something is being done about the environmental impacts of proposals, when in many cases they have already received political approval. This stems from the perception that, in many cases, proposals have received political approval prior to the preparation of assessments. Further, they are perceived to be devoid of substantive content because they do not mandate that environmentally harmful activities should not be undertaken. Although, in practice, few proposals which have been subjected to EIAs have been rejected, their effectiveness should not be judged solely by this criterion. Also, EIAs are useful for generating information which informs final decision-making in more subtle ways, notwithstanding the potential for recommendations to be ignored. They are necessary to support notions of participatory democracy and provide accountability in bureaucratic decision-making. The NEPA model is one of the most effective national processes because its enforceability has meant that *all* proposals which meet the objective threshold are assessed; rather than only being considered *if* it is politically expedient to do so.

Far from being something to avoid, judicial insistence on procedural compliance has been the strength of NEPA. Blumm (1988: 190) argued that 'the threat of NEPA litigation is absolutely essential to the effective functioning of the NEPA process.' This has fostered confidence in the US environmental management process because one knows

that *all* activities which meet the threshold test (absent direct statutory conflict)¹⁵⁰ will be subjected to environmental assessments. This results in fewer arbitrary decisions. Not only has the threat of litigation and risk of injunctive orders meant that agencies are sure to implement NEPA's requirements, but it has also encouraged agencies to embrace the spirit of the Act. Although judicial activism has resulted in increased cost and delays in development decision-making – and has stopped some projects for which there existed broad political support¹⁵¹ – it has ensured a more effective environmental planning scheme and uniformity in EISs.¹⁵² Fowler (1985) argued that bureaucrats tend to favour administrative procedures because they are afforded flexibility, whereas proponents and the public prefer legislative models. The former category because environmental responsibilities are more certain; the latter because participation is more thorough. Mandatory procedures enhance participatory democracy which outweigh their negative effects. NEPA's greatest success is that its EIA process is implemented routinely. It is incorporated into a broad policy framework, and its objectives have permeated agency decision-making. Political and discretionary EIA processes do not necessarily mean that EIAs will be inadequate, but there is far more potential for abuse than under a mandatory procedure. Although no model compels good decision-making, I submit that the mandatory procedures in the US are the most suited to encourage sound environmental management. First, *more* proposals are required to have environmental assessments. Second, although at the end of the day proposal approval is a political decision, as the US approach *ensures* identification and public awareness of environmental effects, there is a greater likelihood that proposals with significant environmental impacts will be rejected or modified, than under less rigorous procedures where the environmental effects may not be understood fully if the proposal bypasses the EIA process or an inadequate EIA is prepared. Further, the potential cost to developers in the US of judicial scrutiny of their proposals acts as an incentive to submit environmentally sound proposals in the first instance.

6.7. Conclusion

As we embrace sustainable development principles we need to take a more holistic perspective and recognise the interlinked nature of environmental processes and human

¹⁵⁰ Provided, also, that the other (rare) exemption categories are not relevant.

¹⁵¹ See Battle (1985: 306).

¹⁵² It is to be noted, however, that as the standard of EISs in the US has improved, there has been a decline in litigation (Glasson et al. 1994). See also Mott (1986: 497).

activities. EIA is a tool which assists us in determining the future implications of our activities and the precautionary principle enables us to consider carefully whether we proceed with potentially risky endeavours in the face of uncertainty. EIA processes need to be more rigorous to ensure that environmental practice is informed by precaution and to ensure that the precautionary principle amounts to more than a 'guiding' principle. Existing environmental protection measures do not as yet evince any remarkable degree of innovation in attempting to move away from conventional regulatory approaches – targeting actors, establishing causes of action, and apportioning liability in a procedural manner – to embracing novel methods of dealing with fundamental causes of environmental harm (which involve profound uncertainty and complex, poorly understood structural issues). The principle needs to be expressed in such a way that it can be applied in specific environmental management and resource decisions. Formulations such as those contained in the Rio Declaration and the IGAE, although useful for advancing precautionary thinking, will not enable us to meet the principle's most important test – implementation. Formulations which are imprecise – although popularizing precaution – inhibit the development of operational strategies. The reform option suggested would implement precaution within existing decision-making structures – a task which is not procedurally difficult. Although the measures suggested here do not purport to solve the complex problems created by uncertainty, it is submitted that they are a necessary practical step towards more precautionary and adaptive environmental decision-making. We now examine a recent development project and a likely future development issue to consider the efficacy of the proposed reform steps for actual development issues and whether further project-specific precautionary measures may be necessary. The focus for analysis is the applicability of the precautionary principle to the developments and the complementary issue of how transboundary effects are incorporated into environmental approval processes.

Chapter Seven

Principles and challenges for the Denmark-Sweden Øresund fixed link

7.1. Introduction

This chapter analyses the approvals process used for the Øresund Fixed Link. The Link is a recently completed mega-project between two countries with advanced environmental practices. It thus enables a study of what is arguably current best practice in transboundary environmental decision-making. The focus for analysis is how the Link's potential transboundary effects were considered and incorporated into the decision-making process, in light of the precautionary principle. Innovative aspects of the environmental approvals process used for the project are identified, together with other measures to improve the precautionary base for decision-making.

7.2. Structures and actors – the decision-making context of the Øresund Fixed Link

7.2.1. History of the project

The Fixed Link is a 16 km four-lane road and double-track rail link across the Øresund (sound) between Copenhagen, Denmark and Malmö, Sweden which officially opened on 1 July 2000 (see Figures 3 and 4, overleaf). The first stage of the Link is an artificial peninsula which extends for 430 metres from Kastrup, adjacent to Copenhagen airport. This connects to a 3.5 km immersed tunnel which then connects to an artificial island, 4.1 km long. The next stage is an 8.1 km low-level bridge including a 1.1 km high-level bridge across the Flinterenden navigational channel. This connects to Sweden at Lernacken, 5 km south of Malmö. The international border lies midway along the link between the high bridge and the artificial island. A limited company (owned jointly and

equally by Denmark and Sweden) called Øresundskonsortiet was established to construct the Link.

Figure 3. Location of Øresund fixed link



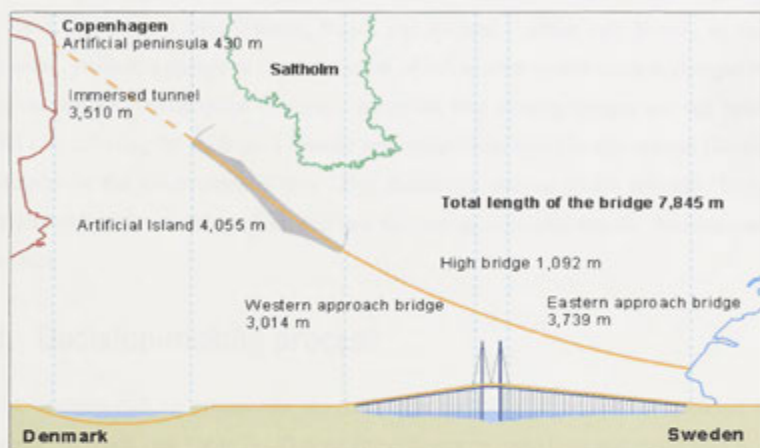
There have been plans to construct a bridge across the Øresund since the early part of last century, although it was not until the late-1960s and 1970s that the Danish and Swedish governments began to consider proposals seriously. Several fairly brief feasibility reports were produced during this period, but agreement to construct a Fixed Link was only achieved in 1991 owing to public opposition in both countries and disagreement within both governments, particularly in Sweden. For most of the post-war period the Social Democrat party held office in Sweden. The party had historically favoured large-scale development projects and it acted quickly to secure an agreement with Denmark to construct the Link prior to its losing office in 1991. Most of the detailed planning phase of the project took place during the non-socialist coalition government consisting of the Moderate, Centre, Liberal and Christian Democrat parties. The coalition was largely in favour of the construction, although there were periods of great division, most notably when the minister responsible for the project, Centre Party leader Olaf Johansson, resigned over the decision to build the Link.¹⁵³

In Denmark, the project was finalised while the conservative government held office in the early-1990s, but was implemented by the newly elected Social Democratic party. The construction prompted enormous public interest and debate. Political opposition centred on the quality of public participation, the loss of parkland and concern that the project's potential environmental effects were not accorded sufficient weight in the decision-making process. The numerous and well-organised mass public protests reached

¹⁵³ In 1994, the Social Democrats returned to power and have remained in office until present.

their climax in 1993, during the early stages of construction. The final significant – and short-lived – public act of opposition was when an alliance of youth and environmental groups sailed to the artificial island and declared it an independent state named ‘Republic of Ecotopia’.

Figure 4. Schematic diagram of the Øresund Fixed Link



7.2.2. Environmental issues

A number of environmental issues presented challenges in the construction of the Link. It is located in sensitive eelgrass habitat, and is close to the European Community protected wetland area covering the nearby island of Saltholm, as well as important habitat for waterfowl on the Swedish coast. However, most attention focused on the ‘blocking effect’ the Link’s concrete pylons and artificial island and peninsula would have on the water exchange between the North Sea and the Baltic Sea. It was estimated that the cross-sectional area on the Link’s alignment would be reduced by around 25 per cent (International Expert Panel 1993). This impediment to water flow not only had the potential to affect water dynamics in the Øresund itself, but it also had the potential to contribute to a further decline in the environmental quality of the Baltic Sea, and thus affect the interests of other Baltic countries. The Øresund is the second largest of the three connections the Baltic has to the North Sea,¹⁵⁴ and represents approximately one third of the water exchange between the two seas. In the higher reaches of the Baltic the water has a low saline content. The level of salt generally decreases proportionately to the distance

¹⁵⁴ The other two are the Store-bælt (Great Belt) and the Lille Bælt (Little Belt), both within Danish territory.

from the open water of the North Sea. Several fish species in the Baltic are dependent on particular levels of salinity, and the most significant concern expressed in relation to the project is that the Link could impede the exchange of saline water and oxygen to the Baltic, which would in turn affect the habitat and thus distribution of fish species, especially cod, which are susceptible to small variations in salinity. This was of concern to the fishing industries in the countries that border the Baltic – Sweden, Denmark, Germany, Poland, Lithuania, Latvia, Estonia, Russia and Finland – which rely heavily on certain species. Further, a change in the distribution of fish species would result in changes in the production and consumption of organic materials, thus altering oxygen and salt balances and also affecting the ecological balance and competition between fish species (Denmark, Ministry of the Environment 1991). This discussion focuses on the scientific basis for understanding the blocking effect, and how this was incorporated into the decision-making process.

7.3. Decision-making process

The decision-making process for the Link was complicated because it occurred on a number of levels (see Table 7). Various and different national laws and regulations in both countries were triggered, in addition to sub-national approvals processes. Also, several regional treaties contain environmental protection obligations on the two countries of relevance to the project, although these did not influence the project in any substantive way.¹⁵⁵ Despite the complex jurisdictional context, the two principal decisions relating to the project – whether to construct it, and if so, where – were made swiftly by the two countries.

In 1990, a task force and steering committee were set up within the Danish Transport and Environment ministries which oversaw the release of a joint Denmark-Sweden strategic feasibility report on the government proposal for the establishment of a fixed link. This report formed the basis for the signing of the *Treaty between the Government of Denmark and the Government of Sweden concerning a Fixed Link across the Sound* on 23 March 1991. This agreement specified various technical details of the project, most notably that it would consist of a four-lane motorway and a two-track

¹⁵⁵ See 1974 Nordic Environment Protection Convention (Nordic Convention), 1992 Convention on the Protection of the Marine Environment of the Baltic Sea Area (Baltic Convention), and 1992 Convention on the Protection and Use of Transboundary Watercourses and International Lakes (Helsinki Convention). Although these treaties focus on the prevention of marine pollution rather than more indirect sources of possible harm, it is arguable that they could have some application to problems created by the Fixed Link (see Ebbesson 1996b).

railway. It further stated that the Link 'shall in the main' be located on the alignment indicated on the map provided. Thus, the decision to construct the Link – of a specific design and in a specific location – was entrenched in international law by way of a bilateral treaty. Environmental safeguards on the project were expressed thus:

Denmark and Sweden are agreed that the final characteristics of the Fixed Link...shall be executed with due consideration of what is ecologically motivated, technically feasible and financially reasonable in order to prevent any detrimental effects on the environment. (Article 5)

Table 7. Chronology of key events

1960s-1990	Preparation of several project feasibility reports
1991	
March	Bilateral Treaty establishing Fixed Link signed
August	Danish project legislation adopting project enacted Bilateral treaty ratified by both parliaments
1992	
January	Øresundskonsortiet established
October	International Expert Panel established
November	Swedish EIA submitted for hearing at EPA authority (Miljöskydds nämnden) and regional Water Court Full progress on Danish landworks
1993	
April	Greenpeace initiated legal challenge in Denmark regarding exemption from EU EIA Directive First Danish EIA procedure on design of the Link
October	Second Danish EIA procedure on design of the Link
1994	
May	Third Danish EIA procedure on design of the Link
June	Swedish Government formally adopted project after the project was rejected by the EPA-authority but approved by the Water Court (with regard to overall permissibility of project) Danish High Court granted Greenpeace standing
July	Danish Government formally adopted project
1995	
March	Danish quality objective and monitoring and control program approved
April	Fourth Danish EIA procedure on design of the Link
May	Danish Supreme Court denied Greenpeace injunctory relief
June	Final location and design of artificial island approved Swedish Concession Board for Environmental Protection granted

		project approval
	July	Swedish Water Court granted final approval
	October	Renewed development consent issued in Denmark (relevant to excavation of seabed)
1996	November	Mandate of International Expert Panel restricted
1998	December	Danish Supreme Court ruled against Greenpeace
2000	July	Fixed Link officially opened

7.3.1. EU EIA Directive and Espoo Convention

Neither the EU EIA Directive nor the Espoo Convention were applied to the project. In the first case, the Directive was specifically exempted from the Danish process and Sweden was not a member of the EU at the time of project adoption. In the second case, the Espoo Convention was not applied because the project had commenced prior to the convention entering into force in September 1997. Although both Denmark and Sweden agreed to implement the Convention in the interim,¹⁵⁶ this was not done in relation to the Link despite some of the notification provisions being followed. As a result, there is no opportunity to evaluate the effectiveness of both these instruments for this project.

Although the decision to construct the Link was reached by agreement between the two countries, both countries by and large conformed with their own domestic regulations in a disparate fashion in relation to the numerous decisions that needed to be made during the seven-year construction period. Notwithstanding that it was a joint project, the international border bisecting the Link had a profound impact on the decision-making process. For this reason, the approvals process for both countries is overviewed separately.

7.3.2. Danish approvals process

The Danish Parliament passed the *Fixed Link Across The Øresund Act* on 19 August 1991¹⁵⁷ to facilitate implementation of the bilateral treaty. A report presenting the main results of preliminary environmental investigations and the previous feasibility reports accompanied the Act. The legislation provided that there shall be various supplementary technical and environmental investigations and monitoring programs aimed at optimising the design of the Link (Øresundskonsortiet 1993; Denmark, Ministry of the Environment

¹⁵⁶ UN ECE Resolution on Environmental Impact Assessment in a Transboundary Context, 25 February 1991, ECE/ENVWA/19.

¹⁵⁷ Act no. 590.

and Energy et al. 1996). Construction commenced on the artificial peninsula in late-1992 prior to the approval of the Link under the Act and in the absence of final approval in Sweden. This prompted concerns that Sweden might be liable to Denmark under international law for breach of the treaty if it failed to approve the project. On 8 July 1994, the Minister for Transport,¹⁵⁸ after consultation with the Minister for the Environment, granted final approval of the overall design and alignment of the Link pursuant to s 15 of the Act. The Minister stated that the approval was 'conditional upon the achievement of an unchanged water flow in Øresund and oxygen and salt supply to the Baltic Sea after completion of the fixed link' (Denmark, Ministry of Transport 1994). The problematic nature of this wording is that it provides that approval is conditional on results which cannot be determined until after the project is completed. Further, considering the Government's ratification of the binding bilateral treaty in August 1991, it would seem unlikely that in mid-1994, after considerable work had been undertaken on the artificial peninsula in Danish waters, the project would be halted if there were concerns that 'unchanged water flow' could not be achieved. On 28 March 1995, the Danish Government, pursuant to s 4(2) of the Act, approved a quality objective as well as a monitoring and control program. In mid-1995, Øresundskonsortiet applied for dredging consent orders which gave rise to project alterations and a renewed development consent being issued by the Minister for Transport in October 1995.

7.3.3. Swedish approvals process

The Swedish consent procedures for the project commenced after the formal decision to proceed with the project, according to Sweden's unique legislative system (Kjellerup 1995). In 1991, the Government decided that the project should be administered under the *Natural Resources Act* (since amended) and the EIA regulations provided in it. An EIA was completed which included three alternatives: continued ferry traffic, a tunnel alternative (treated rather superficially), and a combined bridge and tunnel option (Nordisk Ministerråd 1999). The regional Water Court was empowered to set environmental requirements for the project, and the Environment Protection Agency and the Malmöhus County Administrative Board were authorised to establish the control and monitoring program (Denmark, Ministry of Transport 1995). The project was formally adopted on 16 June 1994 under the *Natural Resources Act* and the *Water Act*, but with an altered design that was not identical to the one adopted by legislation in Denmark (Kjellerup 1999a). However, the project was initially rejected by the Concession Board for Environmental

¹⁵⁸ The project fell within the responsibilities of the Transport Ministry.

Protection under the authority of the *Environmental Protection Act*, and did not receive final approval from the Board until 30 June 1995. Also, the Water Court twice rejected the proposed project, stating that the material presented to the Court had not demonstrated compliance with its definition of a 'zero solution' in relation to water exchange between the Baltic and North Seas. Further, the Court was not satisfied that the project 'would not have a severe impact on the sensitive balances of the Baltic Sea' (Kjellerup 1995 and Gray 1995). Øresundskonsortiet was able to establish to the court's satisfaction that the proposal would have 'zero effect' on the Baltic when it presented its sixth design proposal in July 1995. Thus, despite the existence of the legally binding treaty and the commencement of construction activities in Denmark, nearly four years elapsed from the time Denmark formally adopted the project in legislation to the time when all approvals were obtained in Sweden.

7.3.4. International expert panel

A noteworthy part of the overall decision-making process for the project was the establishment in 1992 of an International Expert Panel (IEP). Although under no legal obligation to do so, the governments of Denmark and Sweden decided to establish the Panel to facilitate the provision of expert environmental advice on the design of the Link. This also had the benefit of increasing the perception that environmental issues were being treated seriously. The 11-member Panel comprised hydrographers, modellers and biologists from Estonia, Finland, Germany, Norway, Poland and the UK, although none from Denmark or Sweden.

The IEP did not operate as a rigorous independent body empowered to review the adequacy of the overarching EIA framework. Rather, its mandate was smaller and involved analysing optimum environmental designs of the Link and ongoing environmental reports. It was empowered to 'evaluate the environmental consequences and to give opinions' on the project as adopted in the bilateral treaty (International Expert Panel 1993). This related primarily to the issue of the Link's blocking effect and effects on the marine environment. The mandate of the Panel was restricted in 1996 as the project moved from the planning to the full-scale construction phase. From this point it was authorised only to comment on the short- and long-term effects on the marine environment of the Øresund caused by dredging and related work, and to check and give advice on the calculations and the amount of compensation dredging required to ensure the 'zero solution'. The less ambitious nature of the Panel was reflected in its name change to the 'International Advisory Expert Panel' (International Expert Advisory Panel 1996; see Larsen 1999).

The Panel played a significant role in the construction, despite its recommendations not having legal status. It operated separately to formal decision-making by enabling additional scientific opinions to be obtained without requiring that they be acted upon. Its greatest impact related to the Link's impact on the water exchange. Some of its recommendations – although unacknowledged – were later adopted by the Water Court when it prescribed the Swedish environmental standards. Even more significantly, the Panel was largely responsible for the most dramatic change in the design of the Link – the decision to move the artificial island 1 km closer to Sweden (see Figure 5, overleaf). It argued that locating the island in the lee of Saltholm would reduce the blocking effect with the added benefit of reducing the amount of compensatory dredging (which causes severe localised effects) necessary to achieve the zero-solution. The Panel's recommendation to move the island was accepted quickly by both governments despite it increasing the cost of the project by approximately \$140 million US (Gray 1999: 38). Further, the Panel made some important observations about the quality of the hydrographic reports and went on to document in subsequent reports its concerns with the methods used to determine the blocking effect. Øresundskonsortiet's scientific experts had chosen to rely on two-dimensional models rather than more sophisticated three-dimensional models which would be able to take into account the stratification of the currents. As a result, the Panel doubted that the calculations used could provide a sufficiently reliable picture of the salt flow upon which critical design decisions of the link would be made. The Panel was dismayed by the 'serious weaknesses in the scientific reasoning' for establishing the zero solution, and also cautioned that calculations upon which Øresundskonsortiet relied were not validated. It recommended the use of two independent three-dimensional models which might take up to two years to complete (International Expert Panel 1993).

Figure 5. Aerial view (looking southeast) of the Øresund Fixed Link.



As late as September 1995, one of the Panel's hydrographic experts expressed his concern that environmental reports released by Øresundskonsortiet gave the impression that the results obtained by its calculations were accurate when in fact they might not be reliable, particularly considering that the zero-solution is a theoretical solution which could not be properly tested until after project completion. He cautioned that although

Øresundskonsortiet stated that the zero-solution was obtainable, this had not been established according to scientific standards of proof (Radach 1995).

A sticking point between the Panel and the Danish Hydraulic Institute, one of Øresundskonsortiet's consultants, was the decision to calculate models according to the zero crossing concept (ZCC). The Panel considered this concept to be inappropriate when the more precautionary minimum deviation concept (MDC) was available. The concern with the ZCC was that it, unlike the MDC, is unable to take into account the direction of water flow and ignores the time dimension, with the result that the results it produces underestimate the blocking effect. The models were also considered unsatisfactory because they used short study periods and did not incorporate the uncertainty of the results into the final estimates. As a result, according to one Panel member, the construction proceeded without the necessary scientific basis for estimating the effects on the Baltic (Radach 1995).

7.4. Environmental assessment of Øresund

7.4.1. Danish EIA and litigation

Major infrastructure developments in Denmark have typically been subject to specific parliamentary legislation streamlining the funding and adoption of projects by locating all decisions neatly within one ministry. Yet the practice of 'fast tracking' approvals processes by bypassing normal EIA procedures has come under scrutiny with the rise in concern for better public involvement and accountability (Leeson 1994 and Kjellerup 1997). The obvious problem with adopting projects by legislation is that existing standards can be avoided so that environmental considerations play a lesser role in the process. This occurred in the Øresund case with the failure to consider reasonable alternatives to the project. This would not have been possible if the assessments had been conducted under normal Danish EIA procedures which contain requirements for assessment of alternatives more onerous than those in the EU EIA Directive (Dresner and Gilbert 1999).

Attention only seriously turned to determining the likely environmental effects of the project after the signing of the bilateral treaty. Until then there had been only brief feasibility reports and an insubstantial environmental assessment which assessed one option of building a combined road and railway link at the specified location (Denmark, Ministry of the Environment 1991). A concern raised at the time of project adoption was whether the approvals process and the environmental assessment procedures were

consistent with the EU EIA Directive. The Act specifically exempted the project from the Directive requirements, as provided for in Article 1(5). Unfortunately, this derogation clause does not specify that such legislation must fulfil the basic requirements of the Directive, thus potentially allowing states to bypass the substance of the Directive. The only procedural demand in the Directive is that legislation must adopt the 'details' of the project. Although the Directive is silent regarding the content of 'details', it is logical that this should be interpreted as requiring a certain level of engineering standards, particularly, as Kjellerup (1999a: 140) argued, when it should be borne in mind that the reason for granting the exemption is that it is assumed in Article 1(5) that the legislation will meet the objectives of the Directive. The objectives include, among other things, the provision of fairly detailed project information (Article 5). However, the Act's description of the project is brief and is based on a more detailed description contained in the bilateral treaty which itself described the project in less than half a page (Article 2).

There were proceedings in Danish courts concerning the Link for almost the entire construction phase. The first serious legal challenge to the project began in April 1993. Greenpeace Denmark filed a suit in the High Court against the Danish Transport Minister alleging impermissible non-compliance with the EU EIA Directive on the basis that the legislation did not meet the test for exemption.¹⁵⁹ The Minister denied the claim and argued, in the alternative, that if the legislation was held not to be sufficiently detailed to meet the requirements for exemption, then the subsequent approvals process met the EIA requirements of the Directive (Kjellerup 1999a). Much of the early legal argument concerned Greenpeace's legal standing, which was eventually decided upon in its favour. Nevertheless, in February 1995, the High Court delivered its opinion that Greenpeace's suit would not be successful. This was appealed to the Supreme Court from which Greenpeace sought injunctive relief to protect its newly found legal interest in the matter. The Supreme Court denied the appeal in May 1995. The legal proceedings were finally brought to an end in December 1998 when the Supreme Court ruled against Greenpeace and declared that the project was exempted from the Directive because it was described 'in such a concrete manner' that the parliamentary procedures 'actually succeeded in

¹⁵⁹ Previously, the European Commission had considered that the Danish legislation fulfilled the derogation requirements, taking into account 'the fact that the Danish government provided the folketing [Parliament] with detailed information and abundant documentation': EU Commission Press Release (1992).

performing an environmental assessment in accordance with the purposes of the EIA Directive' (Kjellerup 1999a).¹⁶⁰

The major shortcoming of the EIA that was conducted was that the process proceeded in reverse of accepted EIA practice. The Link was approved in the bilateral treaty prior to an adequate assessment of its likely environmental effects and in the absence of assessment of project alternatives. As a result, the impacts that were subsequently identified were used to optimise the Link's design and were never able to influence the decision to approve the project (Kjellerup 1999a). Another shortcoming which received considerable criticism was the quality of public participation. Two public hearings were held on variants of the project in 1993 and 1994 but these were different from the variant adopted two years later. Further, the public was not involved in 1990-1991 when the decision was made as to whether or not to proceed with the Link (Kjellerup 1999a).

7.4.2. Swedish EIA and Water Court standards

The most comprehensive EIA ever undertaken in Sweden was prepared for the Link. It was restricted to assessing effects within Swedish territory and did not consider indirect construction effects (Ebbesson 1995). The Swedish EIA system in existence prior to its total overhaul at the start of 1999 was quite different from that in Denmark. As a result, the assessment processes proceeded differently in the two countries, causing 'severe administrative problems' for Øresundskonsortiet according to its Project Director for Environment and Authorities (Dyngesen 1999). One reason for the confusion is that the rules, principles and procedures of public administration differ greatly between the two countries. In Sweden, for example, many high-level decisions are taken by the authorities rather than by ministers, a practice described as 'unthinkable' in Denmark (Larsen 1999). Also, there were multiple bodies in Sweden with approval authority for the Link. This led to different, and at times contradictory, environmental requirements from authorities in the two countries (Dyngesen 1999).

Øresundskonsortiet prepared eight versions of the project to satisfy concerns of the various Swedish authorities despite the Government uniting the numerous supervisory authorities in the Control and Steering Group for the Øresund Fixed Link. The Water Court set conditions for the zero-solution and strict limits on sediment spill from

¹⁶⁰ In its decision, the Court interpreted the requirements of the derogation clause as requiring that the project adoption legislation fulfil the objectives of the Directive. Kjellerup (1999a) argues that although this is welcomed, the court's reasoning is problematic but can be explained by the complex litigation experiences surrounding the development.

excavation, but did not formalise the majority of objectives agreed to by Denmark. It adopted the most important recommendation of the IEP that the artificial island be moved 'as far as possible to the south of Saltholmen so that the least possible reduction in the current occurs' (Gray 1995). It is unclear why the standards were different from those in Denmark, but the result was that the environmental objectives of both countries were not co-coordinated (Larsen 1999).

7.4.3. Environmental focus: the 'zero solution', uncertainty and precaution

Although coordination of approvals processes in the two countries was rarely achieved, resulting in Øresundskonsortiet being unable to implement common environmental criteria, both the Danish and Swedish Governments were able to agree on one important matter: that the complex water exchange through the Øresund should be unaltered. A difficulty was that both countries defined the zero-solution differently. Denmark called for 'no change in the through-flow of water' and stipulated that the Link 'must not affect the Baltic Sea in such a way that chemical/physical and hence biological changes arise' (Denmark, Ministry of Transport et al. 1995). This was interpreted as requiring that any reduction of water and salt supply of the Baltic must be less than one per cent (Øresundskonsortiet 1993). However, Sweden's zero solution was defined so that 'the quantity of water flowing...through Øresund...is not impeded so that the salt and oxygen supply to the Baltic Sea is diminished' (Øresundskonsortiet 1998b). This definition was problematic because it was unclear what to use as a baseline (e.g. salinity or flow of water). This definitional problem was compounded by the absence of adequate baseline data of, for example, salinity levels in the Baltic which fluctuate by natural variation, and knowledge regarding how the different layers of water mix and affect the salt and oxygen content. The type of uncertainty involved included parameter uncertainty (where data are absent but could be rectified in part by more studies); model uncertainty (imprecise data due to inadequate two-dimensional models and three-dimensional models used over an insufficiently long period and inherent uncertainty regarding evidence based on theoretical modelling) and politically induced uncertainty (failure in decision-making to require adequate assessments prior to project approval) (see Walker 1991: 572 and Tickner et al. 1999: 12).

According to Øresundskonsortiet, the improved design of the Link which incorporated the new location of the artificial island in lee of Saltholm reduced the blocking effect from 2.3 per cent to less than 0.5 per cent. As a result, less compensatory dredging was required. This was a significant achievement because dredging has its own environmental impacts and these needed to conform, in Denmark, with the requirement

that the Link must only 'transiently' cause conditions in the Øresund to conflict with national coastal protection plans (Denmark, Ministry of Transport et al. 1995). In March 1998, Øresundskonsortiet was able to report that the dredging regime adopted would 'assure a zero solution and thereby prevent an impact on the Baltic Sea', notwithstanding the difficulty of proving such a result (Øresundskonsortiet 1998a). However, due to the definitional problems and the inadequate hydrographic reports, the blocking effect could not be determined with any degree of precision prior to the decision to construct the Link. The zero-solution environmental criterion could not be established with certainty because of definitional discrepancies, an absence of adequate baseline data, and the theoretical issue of not being able to prove it until project completion.

The environmental studies that were conducted did have an impact on the design of the Link, and resulted in a less harmful project than the one submitted in 1991. To date, no environmental effects have been detected that were not predicted and accepted. But this does not mean that the approvals process could not be improved as to make it more consistent with environmental policy objectives, minimise sources of interstate conflict and improve the democratic nature of the decision-making. The following sections comment on how the approvals process for the Link would have been different had the EU EIA Directive or Espoo Convention been applied. Options are then considered for better incorporating precaution to improve the basis for decision-making.

7.4.4. EU EIA Directive

The 1985 EU EIA Directive represents the first attempt to build a regional EIA framework. It supports the harmonisation of the main principles of EIA among member countries although it places relatively few procedural demands on them, thus limiting its effectiveness as an approach to prevent environmental harm (Brown 1997). As a result, had Greenpeace been successful in its claim in Danish Courts that the project was not lawfully exempted from the Directive, it is unlikely that the way in which key decisions were made would have been different.¹⁶¹ The Directive was substantially amended in 1997 after all Fixed Link approvals had been granted. It now requires developers to provide information on alternatives to the intended project that they choose to study,¹⁶² although it does not require that project approval be balanced against the relative merits of each project option. As a result, this new provision also would not have changed

¹⁶¹ The subsequently amended Directive also includes under Article 2(3) another avenue by which states can, in exceptional cases, exempt a project from the Directive.

¹⁶² Preamble and Article 5(3).

substantively the way in which the decisions were made because it does not require that all reasonable alternatives be assessed and incorporated in the project consent decision.

7.4.5. Espoo Convention

It would have been necessary for Denmark and Sweden to have conducted the decision-making process for the Fixed Link differently if they had decided to apply the procedures contained in the Espoo Convention. Although the Convention lacks clarity in relation to its procedural requirements, due largely to its being a consensus document designed to be applied by many countries with differing domestic EIA regimes, it does contain some important elements of EIA which were contravened in the Fixed Link process. Its main requirements relate to notifying potentially affected states about a proposed activity that will likely have a significant adverse transboundary impact and inviting their participation in the EIA procedure. Denmark and Sweden informed the other Baltic States about the proposed Fixed Link and invited them to recommend people to be appointed to the IEP. However, little was achieved – particularly in Sweden – in relation to involving the public in the potentially affected states about the process, a key component of the Espoo notification provisions (Tesli and Husby 1999).

The Espoo Convention, in accordance with EIA theory, emphasises the importance of considering alternatives to the proposed project. It requires a description of the potential impacts of 'reasonable alternatives', including the no-action alternative.¹⁶³ This central element of EIA practice was effectively bypassed in this case by the signing of the bilateral treaty which foreclosed different project options (such as the no-proposal alternative, expanded ferry service, bored tunnel alternative and the possibility of locating the Link elsewhere).¹⁶⁴ As a result, the Espoo Convention – if applied in the case – would have necessitated much more serious contemplation of project alternatives.

7.5. A more precautionary approach

Both Denmark and Sweden are obliged to implement the precautionary principle by virtue of its inclusion in, among other things, the Rio Declaration, the Baltic Sea Convention and

¹⁶³ Appendix II, para (b) and (d). This requirement contains a 'where appropriate' proviso. See UN/ECE (1991).

¹⁶⁴ E.g., consideration could have been given to constructing a link of less than one third the length 50km north between Helsingør and Helsingborg. This option was most likely rejected on political grounds due to the desire to locate the Link at the present location so that it would, among other things, revitalise the Malmö area and assist the development of Copenhagen airport. A bored tunnel would have no blocking effect although it would have cost substantially more.

the Maastricht Treaty of European Union. For example, the Baltic Convention adopts the principle in relation to 'substances or energy' which may harm marine ecosystems. This arguably extends to activities which are potentially harmful, including the Fixed Link (Ebbesson 1996b). Further, it is envisaged that the operation of the Espoo Convention will enable precautionary approaches. The preamble mentions the need to develop 'anticipatory policies' and there is also a requirement for a statement indicating predictive methods and assumptions used, as well as data gaps and 'uncertainties encountered'.¹⁶⁵ However, this approach is better described as preventative, rather than precautionary, because the focus remains on preventing and mitigating 'likely' risks, as well as targeting 'significant' impacts. As explained in Chapter Four, a precautionary approach would consider effects which meet a lower threshold, typically where there is reason to assume non-negligible effects may occur.

The precautionary principle is relevant to the Fixed Link, particularly in relation to the most contentious issue of the project: the modelling and predictions made on how the Link would affect the water exchange. The next section discusses how the decision-making process could have benefited from being conducted in a more precautionary way (see Table 8, overleaf).

7.5.1. Precautionary steps

In the early stages of the project, a number of scientific and administrative agencies expressed concern that it was not known to what extent the Link would affect the salt and oxygen supplies in the Baltic. The Danish and Swedish Governments, according to Ebbesson (1996b: 45) 'reduced the question' to whether it was possible to achieve the apparently strict standard of a 'zero solution'. It was manifestly politically prudent to require a 'zero' solution because it indicates that negative environmental impacts will be absent. According to the authorities, it was possible to achieve the solution despite the fact that it could not be verified until after project completion. However, the principal shortcomings of the solution are its definitional problems and the limited role it played in the decision-making process. The various uncertainties involved are sufficient to trigger consideration of a more precautionary approach. This would have reversed the situation

¹⁶⁵ Appendix II parts (f) and (g).

Table 8. Precautionary EIA approaches for the Øresund Fixed Link's potential transboundary effects

Precautionary objectives	Environmental assessment and decision-making process used	Suggested precautionary methods	Project phase
Consideration of the purpose of project, the need for it, and project alternatives prior to decision-making	Alternatives to Link location and design precluded	<ul style="list-style-type: none"> Detailed and transparent evaluation of the purpose of the Link and the need for it Detailed consideration of reasonable alternatives to location and design of project (such as locating the Link between Helsingør and Helsingborg and designs such as a bored tunnel) Attach weight to least harmful options 	Pre-project
Harmonised and transparent decision-making process to reduce potential for conflict among authorities and affected parties and increase awareness of project issues	<p>Separate and different approvals processes used in Denmark and Sweden</p> <p>Differences in standards set and timing of approvals</p> <p>Minimal involvement of other countries and public</p> <p>IEP provided helpful analysis of scientific reports</p>	<ul style="list-style-type: none"> Adopt uniform high EIA standards across affected jurisdictions (in bilateral or regional agreements) incorporating public participation components Establish independent IEP with mandate to review adequacy of EIA 	
Reducing parameter uncertainty (including indirect effects and avoiding Type II errors and basing decision-making on asymmetric information)	Limited baseline data concerning oxygen and salt levels of the Baltic Sea and current dynamics of the Øresund	<ul style="list-style-type: none"> Comprehensive environmental assessments that obtain all practicably available data (including more baseline data of salinity levels and natural variation in the Baltic) Establish stringent post-project monitoring programs Communication of uncertainty and the nature of risk to interested parties (including the degree of confidence with which predictions are made) 	Project assessment
Reducing model uncertainty	Initial use of 2D models, then use of 3D models over short study period	<ul style="list-style-type: none"> Use best available techniques for modeling blocking effect (e.g. early use of 3D models over appropriate study period) and explanation of results 	
Ensuring precautionary approaches have substantive influence on decision-making	<p>Process inconsistent with precautionary objectives (substantive decisions made prior to environmental assessment)</p> <p>'Zero solution' approach misleading in terms of confidence of results, and unable to be validated until project completion</p>	<ul style="list-style-type: none"> Mandate that precautionary approaches are adequately considered and presumption that decision-making be consistent with them Justify acceptance of risk and uncertainty involved Precautionary recommendations may have included delayed commencement of project until adequate environmental assessments completed and determination of most appropriate location and design 	Decision-making

by placing a high value on maintaining environmental quality in the Øresund and the Baltic and requiring justification of environmental risks and other interests in light of the uncertainties involved (see Ebbesson 1996b).

A number of adjustments could have been made to the Fixed Link decision-making process. The following suggestions are based on concepts implicit in the precautionary principle and would be achieved most effectively in an updated transboundary EIA process. The focus of precaution in this case is to improve awareness of distant and uncertain environmental effects at times when this knowledge could most effectively assist the decision-making process.

7.5.1.a. *Time of decision-making and more consideration of uncertainty*

The major criticism of the decision-making process for the Fixed Link is that it is an example of premature decision-making which conflicts with the basic tenets of EIA theory (Kjellerup 1999a). The project was effectively a *fait accompli* with the signing of the bilateral treaty prior to the preparation of an EIA and the gathering of information about the potential affects on the Baltic. This defeated the main purpose of EIA which is to collect all available data prior to final approval so that an informed decision can be made. The process used was also inconsistent with the central instruction of the precautionary principle, which is to 'wait and see' and gather more information before acting when it is plausible that irreversible or non-negligible effects may occur. Both the Espoo Convention¹⁶⁶ and the EU EIA Directive¹⁶⁷ require EIAs to be conducted prior to project authorisation. It is necessary for countries to take this requirement seriously and not preclude other project options prior to consideration of adequate information on the environmental effects of activities. A precautionary approach would also have addressed the parameters of uncertainty before making the irreversible decision to construct the Link. Although the uncertainty attached to the Link's effect on the Baltic would not necessarily have been grounds to stop the project, the adoption of a precautionary approach would have meant that the project could not have proceeded until all adequate information was obtained. This would have required, for example, adequate funding for baseline and monitoring programs and the early use of advanced three-dimensional modelling techniques. If adequate pre- and post- decision data gathering is not conducted, there may be a failure to detect an otherwise detectable effect¹⁶⁸ (Gray 1996: 139). A more thorough

¹⁶⁶ Article 2(3).

¹⁶⁷ Article 2(1).

¹⁶⁸ Known as a 'Type II' error.

early environmental assessment would also minimise decision-making being based on 'asymmetric information': the disparity that often exists between the amount of information available on the benefits and the negative consequences of activities (Cranor 1999). The preparation of uncertainty statements detailing the degree of confidence with which environmental predictions and causal relations are made is a necessary step (see 6.6.2.b.).

7.5.1.b. *Consideration of alternatives*

The heart of the precautionary principle, as it relates to proposed activities, is the consideration of alternatives so that there is opportunity to implement less harmful options. Rather than seeking to determine what risk or harm is acceptable, the principle fundamentally changes the questions posed. It seeks to determine how much harm can be avoided while maintaining objectives (Tickner 1999). Without consideration of alternatives, EIA is merely a risk assessment procedure which avoids considering whether the activity is necessary and whether less-risky options are available (O'Brien 1999). A transboundary EIA which requires full assessment of reasonable project alternatives prior to project authorisation, will embody the fundamental components of precaution. It will enable identification and selection of potentially less harmful activities during the early design stage. The purpose of the proposed activity can be evaluated, much like in strategic environmental assessment processes. Further, there will be no assumption – as in the Fixed Link case – that the activity will be approved. Once the bilateral agreement was signed, the only option for flexibility was design modification. Transboundary EIA needs to ensure that adverse impacts can be reduced by logical choice of project alternatives. This is preferable to merely assessing the predicted impacts of a sole option.

7.5.1.c. *Harmonised procedures*

Øresundskonsortiet was required to obtain double approvals in Denmark and Sweden for many construction-related issues. This contributed to confusion because of differing environmental standards and the schedule of approvals. This confusion was most apparent when construction work was undertaken in Denmark before all approvals were obtained in Sweden. Both the EU EIA Directive and the Espoo Convention encourage bilateral cooperation in EIA and envisage greater harmonisation of procedures.¹⁶⁹ The benefits of

¹⁶⁹ Stronger bilateral arrangements, in addition to clearer procedural rules, were also recommended by the Oslo Ministerial statement concluded at the meeting of the parties to the Convention in May 1998, and by the most recent Convention working group (UN/ECE 1998 and Furman and Hildén 2000). This is consistent with other examples of regional cooperation on environmental protection such as marine pollution in the Baltic (Helsinki Convention; see Haas 1994). See also Jaap de Boer (1999).

harmonised procedures include reduced opportunity for interstate dispute and a more efficient approvals process for developers. Bilateral agreements can clarify the administrative processes for joint projects such as the Fixed Link, as well as activities located solely within one country but having transboundary implications. Although there was continual bilateral consultation between authorities in both countries in the Fixed Link case, this did not result in unified procedures because an overarching framework on the agreed basis of development approval was absent.

The adoption of rigorous bilateral agreements could ensure that approvals processes in both countries do not get out of sync and that decisions are made at appropriate times to optimise the environmental basis for project consent. Bilateral agreements could be binding, or they could be adopted in the form of non-binding guidelines (Popiel 1995). In both cases they would require harmonisation of EIA processes and could also be done in a regional context. To date, most progress in improving EIA coordination arguably has occurred in the Nordic countries, although this is a fairly recent endeavour (Tesli and Husby 1999). Harmonising procedures involves identifying core elements of EIA practice that can be agreed upon between two or more countries, and then, where necessary, requiring changes to domestic processes. Reaching agreement on bilateral EIA matters is a time-consuming process because of the need to take into account different legal systems as well as differing philosophies of EIA, such as traditions in public administration (UN/ECE 1996: 50). States have demonstrated reluctance to enter into binding bilateral or trilateral EIA arrangements which impose strict standards and tend to prefer a degree of flexibility in how they implement provisions. However, binding agreements are to be preferred to non-binding arrangements because of the clarity they can offer to developers and other affected parties. It would be necessary to conclude them after a process of consultations so that there is understanding of differing administrative practices to facilitate agreement of high mandatory standards. Joint decisions on project approvals would be made in a less politically charged atmosphere because the bilateral understanding would reduce opportunities for political differences to emerge. Harmonisation of processes would also enable approvals to take place concurrently. The prospect for a bilateral agreement to be concluded between Denmark and Sweden is now more likely since the new Swedish EIA regulations are more consistent with those in Denmark.

7.5.1.d. Expanded role of the international expert panel

Independent review of the adequacy of EIAs is the hallmark of a rigorous EIA process. The IEP partly fulfilled this role by commenting on the design of the Link and various

environmental reports. Although the Panel's role was significant because a number of its recommendations were acted upon, it could have offered more input if it were established earlier and authorised to comment on reasonable alternatives to the project. There was no initial consensus between the two countries on the exact role the Panel should perform and the extent to which each country would endeavour to fulfil its recommendations. This could have been remedied by providing clearer guidance on how the authorities should respond to and incorporate the Panel's advice, such as including it formally in the decision-making process. Such an enhanced role for the Panel would have reduced the opportunity for undermining its work. This occurred most notably when its work had to be postponed at times due to submission to it of late and inadequate environmental reports. It is feasible to stipulate in an EIA agreement that a project will not proceed in the absence of adequate assessment by the Panel at appropriate stages.

An issue for consideration is whether the Panel's recommendations should be binding or remain recommendatory. As the Panel operated separate from the formal decision-making processes in both countries, it was less restricted in making recommendations than if it had known that its recommendations would be acted upon. An approach here is to give the Panel's recommendations *presumptive* application. Thus, the approvals process could presume that authorities will implement the Panel's recommendations in the absence of cogent reasons to the contrary (see 6.6.3.). To counter the Panel potentially abusing its authority by giving unreasonable recommendations, a detailed and precise mandate for it would be necessary, which would list pre-determined relevant criteria (such as precautionary environmental objectives) on which the Panel's recommendations must be based. This would mean that decision-makers would be compelled to understand the full environmental consequences of their decisions before they act because their decisions would be based on the Panel's expert advice, or they would be made after detailed consideration and rejection of the Panel's recommendations. This process would mean that some decision-making authority is taken away from the authorities and ministers and shifted to the competent independent review and would depoliticise much of the debate about the bases for project approval.

7.5.1.e. *Improved procedures for including interests of potentially affected countries*

The precautionary principle encourages the inclusion of as many relevant interests as possible in decision-making because it operates in circumstances of uncertainty and thus justifies a policy-oriented and not fully scientific basis for decision-making (Cameron et al. 1999). The public participation that was conducted for the Fixed Link consisted of

inviting Baltic States to nominate experts for appointment to the IEP and sending them EIA documentation (UN/ECE 1996). Countries were allowed to respond to the EIA documentation within three months, although only Finland did so. The Baltic states were not effectively involved in the Danish and Swedish approvals process. This was particularly noticeable in Sweden, which, for example, did not invite citizens of other countries to participate in public hearings. An opportunity here is to include more detailed notification and public participation requirements under the Espoo Convention. This would be more inclusive of the interests of citizens in other countries in transboundary environmental issues which are evidenced in the 1974 Nordic Environmental Protection Convention and most recently in the 1998 Aarhus Convention.¹⁷⁰

7.6. Conclusions

The Fixed Link created unique challenges for environmental management due to its engineering complexity, the number of administrative regimes involved and its potential transboundary environmental effects. A number of innovative techniques were used by Öresundskonsortiet and the authorities to assess and reduce localised environmental effects, yet there was only relatively perfunctory consideration of more remote but potentially more significant effects in the Baltic Sea. Despite the project being conducted by two countries with advanced environmental laws and policies, a unified approvals process that takes account of accepted EIA elements was not adopted. As a recent example of transboundary environmental decision-making, the Fixed Link experience demonstrates that current EIA practice at the international level is not as advanced as domestic practice in many countries, and that precautionary objectives are yet to be effectively incorporated into transboundary EIA. It also demonstrates that the potential of EIA to be an effective problem-solving instrument remains undermined by methodological constraints and a reluctance to consider seriously limitations of science.

If greater attentiveness had been given to the precautionary principle during the entire planning phase of the Öresund project as suggested above, the basis for decision-making would have been fundamentally different. The revised process would not have precluded the adoption of a similar proposal, but it would have precluded project approval conditional on effects which could not be determined until after project completion. Although a 'zero solution' is politically attractive, it should not be the basis of an

¹⁷⁰ Convention on Access to Information, Public Participation in Decision-Making and Access to Justice in Environmental Matters, 25 June 1998.

irreversible decision to approve a large-scale project with potential transboundary environmental effects unless the uncertainty which attaches to the solution is made clear and is deemed acceptable through a democratic approvals process. More importantly, a precautionary approach to assessments and decision-making would have been more sound than the process actually followed in terms of effectively incorporating environmental objectives and involving parties with legitimate interests in the project. The precautionary principle does not require projects to be stopped where uncertainty exists, but it does mean that decision-making should be well informed and focused on considering all available options to avoid harm. Clearer and more detailed standards of precautionary EIAs must be pursued by continual refinement of regional EIA regimes and the development of stricter bilateral agreements. This would make transboundary EIA practice more consistent with the latest pronouncements in international law on EIA and the precautionary principle.

Figure 6. Øresund Fixed Link from Lernacken



Chapter Eight

Canadian offshore oil and gas development on Georges Bank

8.1. Introduction

The 8,000 km border between Canada and the United States, has, since the early-1900s, provided a number of environmental disputes with significant legal ramifications to the broader international community, most notably the 1941 Trail Smelter dispute. The physical characteristics of the border region – including mountains, plains, open sea and dozens of rivers and lakes – continue to provide sources of disagreement between the countries concerning, in particular, the commercial development and management of shared natural resources. This suggests the need for continuous innovation in the methods used to avoid or resolve transboundary environmental and resource disputes. Existing methods take various and simultaneous forms including notification and consultation measures at various levels of public administration, joint research programs to develop and share scientific knowledge and, most significantly for the purpose of this thesis, agreement on the legal grounds for decision-making on activities with transboundary implications. Policy and practice in Canada-United States relations has, however, tended to favour diplomatic and cooperative measures for dispute resolution rather than more restrictive and formal legal measures (Cooper 1986: 253, Phillips 1991: 432 and LeMarquand 1993: 82).

This chapter outlines the current Canadian legal and approvals regime for east coast offshore petroleum developments which have the potential to impact US territory. Key elements of the federal environmental assessment regime are reviewed. Commentary is also provided on equivalent US procedures. A review is presented of the recent debate about offshore oil and gas development on Georges Bank – adjacent to the US border off the coast of Nova Scotia – and the special challenges this type of development presents for environmental management in a border region. The potential environmental implications of offshore petroleum activities are discussed. The focus for analysis is the effectiveness

of Canadian environmental assessment procedures for incorporating precautionary objectives and transboundary concerns in decision-making in this context. Measures for a broader and more comprehensive legal framework for transboundary EIA, consistent with those presented in Chapter Six, are presented. Other issues for discussion include appropriate resource management approaches where there are conflicting interests concerning the exploitation of two resources in a shared area (in this case, location-specific hydrocarbons and migratory and sustainable fish resources). The existing and emerging rules of international law concerning liability for transboundary harm discussed in Chapter Two provide the framework within which more exacting standards and practice can be fostered by strengthening transboundary EIA requirements in treaties and domestic law.

8.2. Potential offshore oil and gas development on Georges Bank

Georges Bank is an area of shallow water in the Gulf of Maine between Nova Scotia and Massachusetts, approximately 200km southwest of Nova Scotia (see Figure 7). Depths generally range from a few metres to over 100 metres. On the Northeast Peak the average depth is 60 metres (Boudreau et al. 1999: 4). The Bank supports a rich and diverse ecosystem and is one of the most productive fishing banks in the world. This is due largely to the convergence of subtropical and subpolar waters around the Bank and the high energy current and tidal processes. Commercial species include scallops, lobster, cod, haddock, pollock, flounder, halibut, swordfish, herring, and squid. The Bank is also a feeding area and migration corridor for other species including seals, Sperm and Humpback whales and the critically endangered Right whale. Large assemblages of seabirds also frequent the area.

Prior to the delimitation of the international boundary in 1984, overfishing of the fertile fishing ground was a source of dispute between fishers from the Canadian provinces of Nova Scotia and New Brunswick and the US states of Maine and Massachusetts. However, it was the realisation in the 1960s of the potential of the region to contain hydrocarbons – with the attendant issues of revenue generation and environmental protection – that made the precise location of the border particularly significant (Backhus 1987: 516 and Russell 1992: 475). Dispute between Canada and the US about where the border lay was finally put to rest on 12 October 1984 when a special chamber of the International Court of Justice, sitting in the Netherlands, delineated the international border

precisely.¹⁷¹ It determined that Canada had jurisdiction of approximately 7,000 km² of the 42,000km² area of Georges Bank. Its decision thus split jurisdiction over Georges Bank, awarding the Northeast Peak area to Canada. The precise location of the border enables hydrocarbon exploration and production permits to be issued right to the border. It is also likely that any reserves found will straddle the border creating the potential for Canada to drain reserves in US territory. The ICJ has provided limited guidance regarding the 'unitisation' of transboundary pools to allow equitable division (Christie 1986: 513).

Figure 7. Location of Georges Bank



The issue under examination is the recent controversial debate in Canada concerning whether a statutory moratorium prohibiting any offshore petroleum activities on Georges Bank should be allowed to expire to pave the way for seismic and exploratory drilling to determine whether commercial quantities of hydrocarbons exist. The potential development issue presents a number of challenges for the management of transboundary resources and illustrates tensions concerning the exploitation of different resources in one area. It provides an opportunity to assess whether Canada's regulatory process fulfils the

¹⁷¹ Canada and the US took the unusual move of requesting the ICJ to delimit a single border for both the continental shelf and the water column above it, despite each being governed by separate legal regimes, because of the administrative problems that would result in a region with both marine and geological resources (McRae 1979: 300, Christie 1986: 492 and De Vorsev 1990: 1). See *Canada v United States of America: delimitation of the maritime boundary in the Gulf of Maine area*. 1984. International Court of Justice, www.icj-cij.org/cijwww/cij/cdecisions/csummaries/ccjgmsommaire841012.htm (visited 21 February 2001).

federal government's commitment to the precautionary principle and sustainable development, and to assess how effectively the Canadian processes meet the precautionary EIA framework advocated in this thesis. It brings into focus whether, and on what basis, Canada would allow hydrocarbon extraction on its portion of Georges Bank.

8.2.1. Georges Bank ecosystem

Georges Bank has a dynamic and complex ecosystem. The most significant dynamic of the Bank is the clockwise movement of water which intricately links physical and biological processes and environmental conditions on both sides of the border. Many biota, including commercial fish species, travel or rely on the moving water as a source of food supply. Some species spawn in Canadian waters but breed on the US side of the border. Other species are juveniles in US waters but travel to Canadian side as adults (Spiller and Roanowicz 1986: 110 and Hennessey and LeBlanc 1987: 474). The Bank is remarkably biologically productive, and the persistent gyre around it serves to retain fish larvae and other floating organisms in the area (Natural Resources Canada et al. 1999: 8). The high productivity of the Bank's fish resources and location in two countries with advanced marine research expertise has led to the region being one of the most intensively studied marine environments in the world. Nevertheless, the large scale ocean circulation around the Bank and continuous tidal currents influences biological interactions in numerous, poorly understood ways. Specifically, these complex interactions, among other things, influence the abundance and location of the biota (Spiller and Roanowicz 1986: 109-10). Accurate predictions of environmental impacts, particularly indirect impacts, of human activities are difficult in this region. A compounding factor is that oceanographic dynamics vary with seasonality.

8.2.2. Moratorium and history of offshore development

In 1964, Canada issued to Texaco Canada the first geological exploration permit for Georges Bank, although this did not permit drilling (Anon 1979: 234 and Christie 1987: 469). By the late-1960s, three petroleum companies – Chevron, Amoco and Texaco – held exploration leases over separate areas of Canadian Georges Bank. The US formally objected to Canada's assertion of jurisdiction in 1969 and proposed a moratorium on drilling in the Gulf of Maine until the international border was determined and regulations were formulated to protect the fishery. Despite advocating the establishment of a moratorium, the US sold the first lease pursuant to the *Outer Continental Shelf Lands Act*

1953¹⁷² in the Georges Bank area in December 1979 (Leschine and Lahey 1987: 552). Two test wells were drilled in 1976-77 and, after considerable litigation,¹⁷³ the drilling of eight exploratory wells on the undisputed US portion of Georges Bank commenced on 10 July 1981 and concluded on 27 September 1982. All drillings produced 'dry' results (Danenberger 1987: 566 and Neff 1987: 531; see Ball et al. 1987). However, the sedimentary rocks underlying the Canadian Northeast Peak are more similar to the geology of the productive Scotian Shelf further north in Nova Scotian waters than to the geology on the US portion of Georges Bank. This has led to speculation that the Canadian portion of Georges Bank is more likely to be productive than the apparently dry US section. Nonetheless, as wells have not been drilled on the Northeast Peak, the hydrocarbon potential in that area remains unknown.

Increasing concerns about the vulnerability of the sensitive ecosystem and valuable fishery led to calls in both countries to ban oil and gas development on Georges Bank. In 1984, the US established a moratorium by presidential decree prohibiting any further exploratory drilling on its portion of Georges Bank. In 1990, President Bush extended the moratorium by executive order until 2002. In 1998, President Clinton extended the moratorium until 2012. In 1988, by way of joint federal and Nova Scotian legislation, a Canadian moratorium was established on oil and gas exploratory activity on Georges Bank and sections of adjacent areas until 1 January 2000,¹⁷⁴ covering approximately 15,000 km². This prevented Texaco from drilling its proposed two exploratory wells within its exploration permit area. The moratorium only covered Georges Bank and did not stop oil production in other areas of offshore Nova Scotia, which commenced in 1992. The legislation also provided that an independent panel conduct a public review of the environmental and socio-economic impacts of exploration and drilling in the final period of the moratorium. It was required to make a recommendation to the provincial and federal government based on the public review.

The issue of whether to extend the moratorium became very heated during the recent review period. The Canadian fishing industry and the environmental lobby formed an unsteady alliance to stop any petroleum activity on Georges. A significant issue is the potential of Georges Bank to contain sufficient quantities of commercially exploitable

¹⁷² 43 USCA §§ 1331-1356, 1801-1866 (amended 1978).

¹⁷³ See principally US Court of Appeals, First Circuit in *Massachusetts v Andrus* 594 F.2d 872 (1st Cir. 1979) (see Fryer 1979).

¹⁷⁴ *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* S.C. 1988 c.28 and *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act* S.N.S. 1987, c.3.

petroleum resources. The most likely situation, based on present information, is that if hydrocarbons were discovered in the area, they would be a combination of natural gas and condensate – although this does not negate the possibility of oil being discovered. The estimated probability that any hydrocarbon deposits are natural gas is 85 per cent or greater, and 10-15 per cent that finds would be light oil or condensate. The Geological Survey of Canada estimated that the Canadian side of Georges Bank might contain 60 million barrels of oil and 1.3 trillion cubic feet of natural gas although speculative estimates are two billion barrels of oil and upwards of ten trillion cubic feet of natural gas (Natural Resources Canada et al. 1999: 8). However, as it remains uncertain whether there are commercial quantities of hydrocarbons, the petroleum industry has maintained that it should be permitted to conduct exploratory activities to determine the development potential of Georges Bank.

8.2.2.a. *Moratorium review process*

The three person Panel appointed in 1996 to review environmental and socio-economic implications of exploratory activity on Georges Bank was required to make a recommendation to the federal and provincial government based on the public review process on or before 1 July 1999, six months prior to the expiration of the moratorium. Its mandate was generally regarded as authorising the Panel to recommend that the moratorium should, or should not, be extended. A joint federal/provincial decision was due at the end of 1999 in favour of either extending the moratorium or allowing it to expire.¹⁷⁵ The process the Review Panel adopted had similarities to an EIA process, although it operated outside the normal environmental approvals process and had different objectives. Principally, these were to consider the merits of a moratorium on petroleum activity on Georges Bank rather than whether specific development proposals should be approved. The most significant point of departure from normal EIA processes was that because there were no specific proposals under examination, there were no proponents to prepare environmental assessments. As a result, the process the Panel adopted was more in the character of a strategic environmental assessment [SEA]. The panel considered the effects of the preparatory stages of hydrocarbon production – seismic testing and exploratory drilling – but did not consider effects of hydrocarbon production.¹⁷⁶ The panel established an extensive public review process and commissioned several scientific reports

¹⁷⁵ *Ibid.*, ss141 and 134B respectively.

¹⁷⁶ However, there was an independent study conducted in the US which examined the possible consequences of both petroleum exploration and development on the entire Georges Bank region without regard to the border (see Shaw et al. 2000: 728). The Review Panel did not refer to this study.

to address knowledge gaps. Community consultation commenced in October 1996 by way of public panel meetings. In October 1997, information sessions were presented to discuss environmental, fishery, oil and gas regulatory issues. Community workshops were then held in June 1998 and extensive public hearings in January 1999 in southwest Nova Scotia and Halifax.

A politically attractive option for the federal and provincial governments was to extend the moratorium to 2012 so that there would be parity with the US moratorium. Although the panel did not comment in its final report on the impact on Canada-US relations a decision not to extend the moratorium would have, it was made aware of concerns about US responses in oral and written presentations to it. These concerns centred on possible US boycotts of Canadian catches and disharmony on the Gulf of Maine Council which is a joint Canada-US body established to maintain environmental quality in the Gulf. Although a decision to extend the moratorium to mirror the US moratorium had appeal, the legal base for the moratoriums differed. As the US moratorium is by presidential decree, it can be rescinded quickly. However, a plan to rescind the statute-based Canadian moratorium would require lengthy public consultation and parliamentary support. At the time the extension to the Canadian moratorium was being debated, it was generally acknowledged that a decision to rescind the US moratorium was more likely if a Republican were to be elected president in late-2000. This then raised the spectre of Canada 'locking in' a moratorium for twelve years to be in parity with the US only to find that the situation could be reversed at any time. If this occurred, the US could prepare for petroleum activity on its portion of Georges Bank while Canada was precluded from doing so until 2012. With the subsequent election of Republican George W. Bush in late-2000, this situation remains a possibility considering his commitment to decrease US reliance of oil imports. Yet as of the time of writing (March 2001), President Bush has not made any statements concerning Georges Bank during his Presidency.

On 1 June 1999, the Panel recommended to the Federal and Nova Scotian governments that the moratorium be extended. It concluded that Georges Bank 'is an area of exceptional ecological value' and, significantly, it advised that '[c]aution is called for'. The Panel discussed the precautionary principle briefly although it interpreted it simply as risk avoidance. The Panel concluded that in considering risks to Georges Bank, 'the unacceptability of potential harm is the most important factor' (Natural Resources Canada et al. 1999: 57-8). Although many important issues were raised by the Panel, analysis of them was often weak and, in some cases, absent. The Panel only touched on issues such as

science, regulatory decision-making, the burden of proof, and equity and fairness. In late-December 1999, the provincial and federal government accepted the Panel's recommendation and extended the moratorium until 31 December 2012. As a result, the Canadian and US moratoriums are currently in concert. The federal/provincial joint statement establishing the Canadian moratorium also called for the development of a dialogue between Canadian Federal and provincial departments and US institutions, departments and agencies with an interest in the Georges Bank moratorium. It was proposed that by 5 January 2010, the Canadian Ministers would jointly initiate a review of the moratorium and determine the need for a full public review by 1 June 2010.

The issue of development on Canadian Georges Bank has effectively been laid to rest for a decade due to the extension of the moratorium. However, this is a large and politically charged issue that will resurface in the intervening period. It is inevitable that there will be renewed pressure to allow some form of exploratory activity when the moratorium is reviewed, particularly if the world oil market at that time is high which would bring added pressure to find and exploit new reserves of hydrocarbons. Added pressure to lift the Canadian moratorium would come if President Bush rescinds the US moratorium – potentially at any time – in line with his party's policy to increase US oil production. In this scenario, a strong political commitment in the US to exploit the region's potential hydrocarbon reserves would be in sharp contrast to Canada's statutory prohibition of any petroleum activity for at least a decade. As a result, this analysis will have relevance for future development proposals notwithstanding the existence of the Canadian moratorium. It also illustrates tensions and challenges that arise for similar issues of transboundary shared resources. The purpose of this study is to analyse the regulatory approvals process that is in place in Canada that would be used if the moratorium is lifted or expires to determine the challenges and opportunities that exist for consideration of transboundary environmental effects and greater adherence to the precautionary principle in decision-making. The challenge is to determine the most appropriate process to allow development that is consistent with precautionary objectives and sound decision-making as espoused in this study. This is: how to make the decision whether to allow production; and under what circumstances would production be acceptable. It is assumed for the purposes of this discussion that the moratorium is no longer in effect. This discussion is instructive for any development proposals which are submitted at the end of the moratorium in 2012 if the moratorium is not further extended, assuming there are no significant changes to the Canadian regulatory process during the intervening period.

8.3. Decision-making process for petroleum activity on the Canadian portion of Georges Bank

This section reviews the decision-making process that would be used by the Canadian authorities if proposals were submitted for petroleum activity on Georges Bank. The decision-making process is complicated by the different types of potential activities for which approval is necessary and the debated manner in which the objective of hydrocarbon extraction should be weighed against competing fishing and ecological objectives. The activities under consideration are those which are necessary to extract hydrocarbon resources. The principal existing activity in the region, commercial fishing, is governed by other regimes.

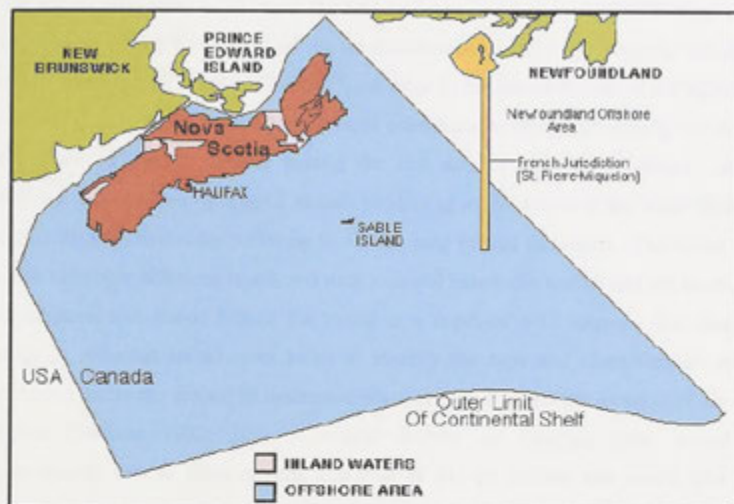
8.3.1. Initial level: Canada-Nova Scotia Offshore Petroleum Board

Offshore activities in the Nova Scotia area relating to the petroleum sector are regulated by the Canada-Nova Scotia Offshore Petroleum Board [CNSOPB], an independent authority established in 1990 by the Federal and Nova Scotian governments in the 'Accord Acts'.¹⁷⁷ The jurisdiction of the CNSOPB is illustrated in Figure 8. The mandate of the CNSOPB includes ensuring that petroleum activities are conducted in a safe manner, environmental qualities are protected, and resources are conserved. CNSOPB approval is required for all offshore petroleum operations including seismic testing, exploratory drilling and development activities. The Board requires environmental considerations to be addressed prior to the granting of authorisations. It adopted criteria used in the federal *Canadian Environmental Assessment Act*¹⁷⁸ [CEAA] for environmental assessments to provide consistency between projects which otherwise trigger federal assessment and those that only need to be assessed by the Board under the requirements of the Act (CNSOPB 1996). The discussion here is restricted to proposed activities on Georges Bank in the southwest portion of CNSOPB's jurisdiction. The Board adopted a neutral role during the moratorium review process.

¹⁷⁷ *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* S.C. 1988 c.28 and *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act* S.N.S. 1987, c.3.

¹⁷⁸ 1992, c. 37.

Figure 8. Jurisdiction of Canada-Nova Scotia Offshore Petroleum Board



The Accord Acts contain strong privative clauses generally making all decisions of the CNSOPB final without subject to review by government. However, the decision-making authority of the Board is restricted in the case of decisions deemed to be 'fundamental decisions' under ss31-38 (Harrington et al. 1997: 272). Fundamental decisions are subject to the approval of the Federal and Nova Scotian governments and can be vetoed by either government within 30 days. Such decisions include authorisations for a call for bids on new lease areas,¹⁷⁹ issuance of exploratory licences, and final approval of development plans.¹⁸⁰ Other fundamental decisions include the power of the Board to prohibit an interest holder from commencing or continuing any activity on the basis of a serious environmental problem.¹⁸¹ The Accord Acts provide, in relation to a fundamental decision by the Board, that either the federal or provincial minister may temporarily suspend it,¹⁸² or jointly set it aside entirely or by the provincial minister on his or her own.¹⁸³ Thus, if the Board decides to refuse an application for approval of petroleum activities on the basis of an environmental concern, this could be overturned in favour of the operator by either or both levels of government (Montgomery 1999: 20).

¹⁷⁹ All rights to offshore oil and gas are held by the Crown. Petroleum companies interested in extracting resources have the opportunity to establish interests through a competitive bidding process.

¹⁸⁰ Sections 60(1), 54(g).

¹⁸¹ Section 62(1).

¹⁸² Section 34(1).

¹⁸³ Section 35(1)(a).

8.3.1.a. Seismic testing

If the moratorium were to be lifted, the first action to be taken by CNSOPB would be the renegotiation of the boundaries of the exploration leases held by Chevron, Amoco and Texaco over separate areas of Georges Bank prior to the establishment of the moratorium in 1988. Then it would be open to the three companies to apply individually to CNSOPB for licences to conduct seismic testing, the first step in exploratory activity. Seismic surveying is conducted by special vessels producing sound waves in the water from high pressure air guns towed by cables up to 4-7 km long behind the vessel. The sound waves bounce off upper sediment layers and rock material below the seabed and are received by hydrophones, also towed behind the vessel at a depth of 6-12 metres. The delay and change in reflected soundwaves helps to identify the type and characteristics of rock formations under the seabed to determine whether they indicate the location of oil or gas reserves (Stalport 1992: 203). Seismic activity on Georges Bank would take approximately two to three months at a cost of \$10-20 million and would take place approximately two years after the lifting of the moratorium due to the time needed for approval and planning (Milford 1999: 2; see also Phillips and Ringrose 1995: 24-9). Both Chevron and Texaco expressed interest in conducting exploratory testing in 1999, prior to the extension of the moratorium. Companies without exploration licenses may also apply to conduct seismic surveys with the aim of selling the data to petroleum companies (CNSOPB 2000: 1.1). Two-dimensional seismic testing was conducted on the whole of Georges Bank in 1970s and early-1980s. However, current seismic technology allows for more accurate three-dimensional surveys.

Applications to conduct seismic testing are considered by CNSOPB individually and incorporate environmental standards consistent with the Board's environmental policies. However, the process has been streamlined by the recent move toward 'class assessments' for seismic activity. In 1998, a class assessment screening report was prepared by CNSOPB for the nearby Scotian Shelf petroleum activities (CNSOPB 1998). This report, based on an earlier industry-funded report, provided a more detailed environmental assessment of seismic activities than would normally be undertaken for an individual application. It is to serve as a reference document for future individual seismic proposals.¹⁸⁴ It is valid for five years, at which time it will be revised. Class assessments are useful for relatively small projects which are repetitive and are either unlikely to cause

¹⁸⁴ Class screening reports are also permitted under CEAA (s19) although they are not a substitute for environmental assessments.

serious environmental impacts or are likely to cause only predictable and mitigable effects (CNSOPB 1998). They enable applicable results of detailed environmental studies to be shared for a number of projects with similar characteristics. This streamlines the approvals process because it means that future individual seismic projects planned for the Scotian Shelf which are in accordance with the parameters considered for the class assessment, are treated as assessed. It is likely that a class assessment of seismic activities on Georges Bank would be prepared. This would require joint funding by petroleum companies with exploratory permits.

If a company's individual application to conduct seismic activity is approved by CNSOPB and is subsequently conducted, much would depend on the results. If they are poor, the company may not wish to pursue further exploratory activities. However, if the results are promising, it is likely that the company would then apply for a license to conduct exploratory activities.

Environmental effects of seismic activity

The environmental effects of seismic testing relate principally to lethal, sub-lethal and behavioural effects on adult fish, larval forms of fish and invertebrates, and marine mammals. Further, the fishing industry is concerned about displacement of fishing opportunity in survey areas.

Fish and invertebrate larvae

The Review Panel reported that there is 'some credible evidence', which may be applicable to Georges Bank, that seismic activities may cause significant adverse effect on fish behaviour (Natural Resources Canada et al. 1999: 30). Studies have shown that larval forms of fish and invertebrates are susceptible to damage from the sound waves produced in seismic surveys. The degree of damage appears to increase with proximity to the sound source. Larvae or eggs in the water column in the immediate vicinity of airgun arrays are most susceptible to damage. The CNSOPB class assessment report noted that damage to fish eggs and larvae can occur up to 5.5 metres below airguns, although it is thought that less than 1 per cent of fish larvae in the affected water would be damaged or killed. It stated that adult fish 'would not be injured by the pressure pulses from seismic arrays unless they were immediately adjacent to an airgun' (CNSOPB 1998: 2.3). The practice of 'ramping up' the noise from airguns in stages would be likely to drive fish away from the location prior to the main pulses, thus minimising damage. The report also concluded that the available information 'indicates that behavioral effects on adult fish are transitory, and thus inconsequential' which in general has not resulted in significant impacts on local

fisheries. It noted that seismic testing could be scheduled during periods when fish species are less active in the area. Nonetheless, this is potentially the most significant effect of seismic activity in Georges Bank. The concern is that the recruitment of larvae to adult populations could be affected significantly by small changes in the survival rate of larvae.

Marine mammals

Concern has also been raised that seismic testing may disturb whales which migrate through or otherwise inhabit the area. The CNSOPB (1998: 2.3) class assessment report stated that it is likely that Arctic bowhead whales may show avoidance reaction up to 24 km from seismic vessels, but the disturbance effects are likely to be transitory. There is little information about the effects seismic activity may have on toothed whales (bottlenose and sperm). It is possible that whales might actually be attracted by seismic signals (Stalport 1992: 204). The CNSOPB recommended further study on effects of seismic activity on larger toothed whales and herring. There are few studies on the effects of seismic activity on sea turtles and seabirds although the industry-sponsored report expected that these would be insignificant. However, this has not been established and it is known that seabirds may be affected by small discharges of pollutants. A report by the Federal Department of Fisheries and Oceans [DFO] stated that little information existed on the effects of petroleum activities on seabirds and recommended that these need to be addressed (Boudreau et al. 1999: 34).

Physical interference with fishing activities

The length and width – up to 7 km and 800 metres respectively – of the towing arrays on seismic vessels greatly restricts their maneuverability and prevents other vessels from entering the survey area. Seismic testing will displace fishing vessels and it also has the potential to disperse fish populations from the area being surveyed. If seismic surveys were to be allowed, an objective would be to schedule surveying in periods of least interference to fishing activities, although the seasonal nature of different fish activities makes this difficult. Some fishing activities, such as scallop and lobster fishing, take place year round whereas the ground fishery is restricted to June through to February and longline fishing occurs during summer.

Summary

Certain effects of seismic activities are known – such as damage to adult fish – but the full ramifications of such effects are not known. In particular, the degree to which seismic pulses affect larval forms of fish and, critically, what effect this has, if any, on the spawning and recruitment rate of fish species. It is also not known the length of time of

any flow-on effects on species populations. The DFO report concluded that seismic might have a significant but temporary impact on adult fish possibly affecting catch rates and spawning behaviour (Boudreau et al. 1999: iv). The Review Panel stated that there appears to be a need for more comprehensive observations of the effects of seismic surveys on particular species of larvae on Georges Bank (Natural Resources Canada et al. 1999: 30). Notwithstanding these areas of uncertainty, the environmental effects of seismic activities have not been considered serious. The main concerns relate to restrictions it will cause to fishing activities.

8.3.1.b. *Exploratory drilling*

Approval for the next stage of activity – exploratory drilling – is also required from the CNSOPB.¹⁸⁵ This is likely to involve between one and eight test sites using either floating drilling rigs or 'jack-up' rigs which are towed to the drilling site and positioned on the ocean floor. These would operate for approximately three to four months at each site over a period of three years at a cost of \$45-60 million per well (Milford 1999: 2). Supply vessels are required to accompany the rigs together with helicopter facilities to support the 60-100 workers on each rig.

A report on the environmental effects of exploratory drilling off Nova Scotia funded by eight petroleum companies argued that because

many technical aspects of offshore exploration drilling are common to all wells, it is appropriate to conduct a *generic assessment* of the common aspects of all offshore exploration wells. Thus, drilling applications for specific wells would only need to address those aspects that were unique to that well or site (LGL and Ross 2000).

A generic assessment of exploratory activities has recently been conducted by the CNSOPB similar to that prepared for seismic testing. However, it was narrower in scope than for seismic activities due to greater variance in location dynamics (CNSOPB 1999). Similar to the seismic class assessment, a generic assessment of exploratory activity does not negate the need for environmental assessments of individual wells (Wells 1999). Concern was expressed by environmentalists that exploratory wells are too large and complex for class assessments and at best can only offer an assessment template without negating the need for a full assessment of each proposed well.

¹⁸⁵ Note that the CEAA may be triggered by offshore exploratory drilling projects by virtue of Part IV, s15 of the 1999 Comprehensive Study Regulation.

If exploratory drilling is approved and conducted and the results indicate the presence of hydrocarbons, further appraisal and delineation drilling would commence to identify the nature and extent of deposits to determine whether there are sufficient quantities to justify commercial extraction (Thomson et al. 2000). If commercial quantities were identified, the next step would be for petroleum companies to apply to CNSOPB for approval to produce oil and gas.

Environmental effects of exploratory activity

The use of drilling rigs brings with it expected routine discharges of various waste materials from drilling platforms including gray and black water, ballast water, bilge water, and garbage (Thomson et al. 2000). Although these are not expected to cause significant environmental harm, drilling fluids, or mud, cause the main environmental risk associated with drilling activities. These are used to carry rock cuttings to the surface and to lubricate the drill bit and retain a sufficient level of pressure in the hole to prevent it from collapsing. Drilling muds consist of numerous, mostly non-toxic, chemicals mixed with water, oil or clay (VanderZwaag 1995: 87). In addition, drilling produces 'cuttings' of crushed rock below the seabed as the hole is bored. Exploratory drilling typically produces up to 3,200 cubic metres of muds and cuttings per well (Natural Resources Canada et al. 1999: 9). The Review Panel reported that the probability that drilling wastes discharged near Georges Bank would have significant harmful effects could not be discounted (Natural Resources Canada et al. 1999: 35).

Drilling cuttings and muds

The discharge of cuttings and drilling muds have raised concerns that they may produce lethal and sublethal responses in sensitive organisms in the vicinity of the well and may accumulate on the seabed thus altering the physical characteristics of benthic habitats. These are often released with formation water at the surface for optimal dispersion. Metal and organic compounds from discharges may also accumulate to harmful concentrations in marine organisms (Neff 1987: 531). Impacts on deep-sea corals would occur where wells are located but this is expected to be insignificant compared with the mortality caused by fishing activity (LGL and Ross 2000). There has not been extensive study of bioaccumulation of drilling muds on a number of species and the larger ecosystem (Natural Resources Canada et al. 1999: 9). Presentations to the Review Panel from the petroleum industry were based on the assumption that used muds and cuttings would be discharged into the marine environment. However, it is possible that they could be disposed of remotely, either offshore or onshore (Natural Resources Canada et al. 1999:

35). This is not a regulatory requirement, although it could become so. It is the practice in the UK offshore (Salter and Ford 2000).

Noise

Exploratory activities could also increase ambient noise significantly due to increased shipping. The industry-funded report noted that the noise effects from several concurrent exploration wells would increase the number of site-specific areas exposed to increased noise levels, but would not add significantly to the overall noise on a regional level. However, it concluded that the 'incremental sound made by supply boats and individual drilling rigs would not add significantly to existing ambient noise levels' (LGL and Ross 2000). Another concern raised is that the noise of piledriving associated with the installation of drilling platforms and light pollution may impact migratory birds.

Cumulative effects

Cumulative effects caused by exploration drilling are difficult to determine. The industry-funded report concluded that they 'may be nil, additive, or synergistic' (LGL and Ross 2000). Cumulative effects to be considered include the effects of other exploratory drill sites in addition to the one being assessed, and the effects of other existing and planned activities on and near Georges Bank including fishing, shipping, and nearby and future offshore energy projects.

Blowouts

Drill sites could experience major ruptures or 'blowouts', which are likely to affect all ecosystem components. These have been, however, very rare events in the history of offshore exploratory drilling but remain a risk associated with offshore hydrocarbon extraction.

Summary

A report by the DFO concluded that exploratory drilling is likely to have only localised impacts on the ecosystem components it reviewed. There was also a small probability that these impacts would have population and ecosystem level impacts (Boudreau et al. 1999: iv). Exploratory activities would also cause a physical interference with fishery activities. The individual nature of CNSOPB review of applications is not suited to assessing cumulative effects.

8.3.1.c. Production

Production proposals would first require design proposals of production facilities including offshore installations, transportation systems such as pipelines or tankers, and onshore

facilities. In addition, an economic benefits plan for Nova Scotia must be prepared.¹⁸⁶ These activities would be sufficient to trigger the CEAA (discussed in 8.4) meaning that authority for approval would not rest solely with CNSOPB. These pre-development activities are estimated to cost approximately CAN \$100 million. If production is approved, staff would then be hired and contractors selected. Construction of production, transportation and processing facilities would then commence at a cost of \$1.5 to 3 billion over a period of three years. The production period is estimated to be approximately 28 years at which time there would be decommissioning of facilities involving the removal of offshore rigs and the sealing of wells below the seabed. If natural gas deposits were extracted, a likely outcome would be the construction of a pipeline to land. This would most likely be across the international border to Massachusetts because it is a more profitable market for natural gas distribution. As the location of the international border has been determined precisely, drilling rigs could be approved within metres of the border.

Environmental effects of production activity

No detailed studies have been undertaken in recent years to assess the environmental effects of petroleum production on Georges Bank. Production effects were specifically excluded from the mandate of the Review Panel. The commissioned report from DFO also did not consider production effects but concluded that it expected them to be different in scale and nature from exploratory effects (Boudreau et al. 1999: iv). The main concern with petroleum production identified by environmentalists and fishing representatives is the occurrence of a large oil spill which could decimate fish populations, as well as other marine life, particularly if it occurred at a key spawning time.

The largest volume discharge from production drilling is 'produced water' which contains metal and organic matter. Discharged volumes of this effluent can exceed the volume of hydrocarbons produced by ten times (Cranford et al. 1998: 3). Studies of produced water from the Scotian Shelf showed that it caused death of 50 per cent of fish larvae as well as significant reductions in the fertilisation of scallop eggs (Natural Resources Canada et al. 1999: 9). Gradual ecological change from cumulative effects of all discharges of produced water from a producing field, and the potential for various sublethal effects could have significant effects on fish resources. However, produced water previously was not considered seriously because it was presumed that rapid dispersal

¹⁸⁶ Part 1 Accord Act. The benefits plan relates principally to the employment of Canadians, particularly Nova Scotians. Also required are a safety plan, EIS, environmental protection plan, and evidence of financial security. When a significant discovery is made under an exploration licence, a 'significant discovery licence' is issued to maintain the operator's rights between first discovery and production.

at sea rendered it environmentally insignificant (Cranford et al. 1998: 2-4). The Cranford report concluded that early life stages of haddock, sea scallops and lobster are sensitive to produced water. However, other life stages and transition periods were not examined because of the short time of the study. Results are also tentative because effects in the ocean may differ to lab results. For example, rates of predicted dispersion may be inaccurate because dispersal in the ocean may not be even. Produced water may be trapped in convergence zones at tidal fronts and the surface microlayer where fish larvae may be concentrated and thus more at risk. The report recommended a precautionary approach for the management and regulation of offshore drilling activities until further research is conducted, although it did not articulate what the precautionary approach should be (Cranford et al. 1998: 19-21).

A concern raised by the DFO is that activities within the various petroleum leases in the same area may cause cumulative effects (Boudreau et al. 1999). CNSOPB (2000: 5.0) reported that notwithstanding that an individual project 'may be of little or no significance, the cumulative impacts of several projects may result in measurable detrimental impacts to some species and ecosystems.' Other impacts are expected from daily operation of wells including concerns relating to issues such as sewage disposal and obstruction to fishing activities.

CNSOPB and production EIA

It is CNSOPB environmental policy that a company proposing to produce oil or natural gas submits with the project application an environmental assessment that satisfies the submission requirements of a screening or comprehensive study under the federal *Canadian Environmental Assessment Act* [CEAA] (CNSOPB 1996). Production proposals would be of such environmental significance that they would require the more detailed comprehensive study. As a result, approval responsibility for oil or gas production on Nova Scotia effectively falls on the federal government rather than CNSOPB on its own. The Board is empowered to publish guidelines and interpretation notes designed to support the administration of any regulations¹⁸⁷ and require operators to adhere to them. The Accord legislation provides that operators are liable for all damage caused by any 'discharge, emission or escape of petroleum' without proof of fault or negligence. It will be remembered from Chapter Four that strict liability regimes, such as this, are more consistent with the precautionary principle than where causation and foreseeability must be established.

¹⁸⁷ These are issued pursuant to s146 – S.N.S. 1987, c.3, s148.

8.3.1.d. CNSOPB strategic assessment

Notwithstanding the individual assessments that need to be conducted for approval of petroleum activities on Georges Bank, the CNSOPB has undertaken an expansion of environmental policy and approaches. This is evident in the recent strategic environmental assessment [SEA] it conducted for parcels of lease areas on the Scotian Shelf, Sable Island Bank and continental shelf slope northeast of Georges Bank. The SEA that CNSOPB conducted on various parcels on the Scotian Shelf identified valued ecosystem components (VECs) requiring special attention. These included commercial fish species and marine mammals and birds as well as habitats which are important on a seasonal basis, particularly for fish spawning periods (CNSOPB 2000: 3.0). The issues that should be considered for a Georges Bank strategic assessment include options for new or expanding fisheries, developments in marine traffic and tourist potential. CNSOPB prefers to undertake SEA as a 'cradle to grave' approach at the call for bids stage, prior to the submission of proposals for individual projects (CNSOPB 2000: 1.0). Thus, if the Georges Bank moratorium were to be lifted, the companies that hold exploration licences would apply individually for approval for activities most likely after CNSOPB conducted an SEA of all the lease areas. The aim is to identify environmental concerns or issues which must be addressed before any future activities are authorised. As such, CNSOPB may refuse to accept bids on particular parcels that would otherwise be opened up or for activities on existing leases.

8.4. Federal EIA

The *Canadian Environmental Assessment Act*¹⁸⁸ [CEAA] came into force on 19 January 1995 and thereby, for the first time, afforded federal EIA with a statutory basis. Previously, federal EIA was governed by the Environmental Assessment and Review Process [EARP] Guidelines Order issued in 1984 by Order-in-Council. CEAA prescribes one of the world's most detailed and advanced legislative EIA frameworks. It also established a new agency – the Canadian Environmental Assessment Agency – to administer the environmental assessment process.¹⁸⁹ The intention was that CEAA would present a better defined environmental assessment process than that contained in the EARP so that EIA would prompt fewer successful legal challenges (Hanebury 2000: 173).

¹⁸⁸ 1992, c. 37.

¹⁸⁹ Sections 61 and 62. The provisions of CEAA relating to the establishment of the Canadian Environmental Assessment Agency entered into force on 22 December 1994.

Nonetheless, the provisions are justiciable and have already seen a number of judicial interpretations which provide additional clarity.¹⁹⁰ Areas of note in the EIA process include the provisions for comprehensive studies, consideration of transboundary effects and the 'bounded' decision-making provisions. These are discussed in the following sections. This part outlines the relevant provisions of CEAA and how they would apply to a Georges Bank oil or gas development proposal.

8.4.1. Process

The preamble in CEAA indicates that sustainable development is a fundamental objective of the process. The concept is defined in the Brundtland Report wording as 'development that meets the needs of the present, without compromising the ability of future generations to meet their own needs', but is not further amplified.¹⁹¹ There is no mention of the precautionary principle although the preamble notes the federal government's commitment to 'exercising leadership' in 'anticipating and preventing the degradation of environmental quality.' The principle is, however, a stated objective of the federal government.¹⁹² CEAA provides four levels of environmental assessment, none of which are termed 'EIA'. Rather, an 'environmental assessment' refers to any one the following assessments conducted under the Act: screening (basic EIA), comprehensive study (a more detailed study), mediation and panel review. Screening and comprehensive studies account for approximately 99 per cent of all studies.¹⁹³ The differing levels of assessment are aimed at ensuring that projects receive an appropriate level of assessment depending on the scale and complexity of the likely effects of the projects. While the project proponent may in fact prepare the EIA report, the federal authority with approval powers for the project (the 'responsible authority') is responsible for ensuring that it is prepared in accordance with the Act.¹⁹⁴ The Minister for the purposes of the Act is the federal Minister of the Environment.

¹⁹⁰ Note that s57 provides that an application for judicial review in connection with any matter under the Act 'shall be refused where the sole ground for relief...is a defect in form or a technical irregularity'.

¹⁹¹ Sustainable development is also mentioned in the purposes section of CEAA – s4(b).

¹⁹² See preamble, *Canadian Environmental Protection Act 1999* c.74 and s30(c) *Oceans Act 1996* c.31.

¹⁹³ Canadian Environmental Assessment Agency, *Highlights of the Canadian Environmental Assessment Act*, www.ceaa.gc.ca/act/highlights_e.htm (visited 1 November 2000).

¹⁹⁴ Section 21(a). See also *Alberta Wilderness Assn. v. Cardinal River Coals Ltd.* [1999] 3 F.C. 425 (T.D.)

8.4.1.a. Trigger

A proposal for production of offshore oil or gas would trigger CEAA in a number of ways.¹⁹⁵ First, it would trigger the process under s5(1)(d) by virtue of it being a 'project' (defined in relation to a physical work as 'any proposed construction, operation, modification, decommissioning, abandonment or other undertaking') for which, under ss5(1)(d) and 59(f), a federal authority would grant an approval, permit or licence.¹⁹⁶ Second, s59(d) provides for the making of regulations listing projects for which a comprehensive study is required. The Comprehensive Study List Regulation subsequently issued in 1999 provides for comprehensive study of projects including offshore oil or gas projects. Such projects include the proposed construction, decommissioning or abandonment of 'a platform, artificial island or any other physical work for the production of oil or gas, where the platform, island or work is located offshore in salt water or fresh water'.¹⁹⁷ The list also covers the construction of offshore oil and gas pipelines¹⁹⁸ and exploratory offshore drilling projects in areas where other projects were not previously assessed under federal EIA.¹⁹⁹ As a result, a proposed petroleum production project would be of sufficient size and significance to trigger federal environmental assessment.²⁰⁰ However, a key precautionary step for EIA – requiring assessment in cases where there is uncertainty – is absent in CEAA. In this regard, the previous EARP Guidelines Order was more progressive for triggering environmental assessment where 'the potentially adverse environmental effects that may be caused by the proposal are unknown'.²⁰¹

¹⁹⁵ A production proposal may also trigger the National Energy Board's review process if the project includes an international or interprovincial pipeline. Note the Minister's discretionary powers under s43 to approve the substitution of another review process for environmental assessment by a review panel.

¹⁹⁶ Such as a habitat authorisation or ocean disposal permit by the Department of Fisheries and Oceans or Environment Canada. Another possible trigger is the spending of federal funds if this were to apply to a development on Georges Bank – s5(1)(b).

¹⁹⁷ Part IV, s11. Canadian Environmental Assessment Agency. Canadian Environmental Assessment Act Comprehensive Study List Regulations (as amended 4 November 1999 [SOR/99-439]), www.ceaa.gc.ca (visited 1 November 2000).

¹⁹⁸ Part IV, s14(b).

¹⁹⁹ Part IV, s15.

²⁰⁰ Note that on 5 August 2000, the Federal Minister of the Environment, Mr David Anderson, proposed an amendment to the Federal Authorities Regulations that would designate the CNSOPB as a federal authority under the CEAA. The purpose of the proposed amendment is to ensure that oil and gas projects would be subject to an environmental assessment under the Act. This would enable offshore petroleum projects to trigger the federal EIA legislation automatically and thus expedite the decision to conduct federal EIA. At the time of writing (December 2000), the Regulation is yet to be issued.

²⁰¹ EARP Guidelines Order, s12(d). This section also likely covered indirect effects (Spiller and Roanowicz 1986: 112).

8.4.1.b. *Timing*

An environmental assessment must be conducted prior to the exercise of any power enabling a project to be carried out in whole or in part.²⁰² This requirement is expanded to ensure that an environmental assessment is conducted 'as early as is practicable in the planning stages of the project and before irrevocable decisions are made'.²⁰³ In a 1993 decision on a similarly worded provision in the previous EARP Guidelines Order, the Federal Court ruled that an assessment of a generic project is no substitute for a specific project.²⁰⁴ Although this still does not offer guidance as to when an assessment should commence, it indicates that an assessment must include specific details of a project (Northey 1994: 657). The use of the term 'irrevocable decisions' calls into question the incremental nature of decision-making in which a series of small decisions heads inevitably toward a commitment to a project prior to its official authorisation. Northey (1994: 658) argued that if the term is to have any substantial meaning, then environmental assessments should be triggered prior to events such as feasibility studies and calls for proposals on future government projects. These activities occur in early stages of planning but have the potential to affect the range of alternatives considered for a project in later stages prior to an 'irrevocable' decision to approve a project.

8.4.1.c. *Scoping*

The scope of an environmental assessment is not defined in CEAA. This is to be determined by the responsible authority or the Minister in consultation with the responsible authority.²⁰⁵ The Act does, however, provide that environmental assessment 'shall be conducted in respect of every construction, operation, modification, decommissioning, abandonment or other undertaking' in relation to the physical work that is likely to be carried out.²⁰⁶

The Canadian Environmental Assessment Agency issued operational policy statements to provide clarification and guidance to responsible authorities conducting environmental assessments under the Act. The Agency issued these guidelines due to concerns about the inconsistent application of the Act's provisions and 'from opportunities to strengthen the application of EA [environmental assessment] under the Act to promote

²⁰² Section 5(2)(a).

²⁰³ Section 11(1).

²⁰⁴ *Friends of the Island v. Canada (Minister of Public Works)* (1993) 10 CELR (NS) 204.

²⁰⁵ Sections 15(1) and 16(3).

²⁰⁶ Section 15(3). Yet, an environmental assessment should cover every phase in the 'life-span of the works' (Hanebury 2000).

planning practices that support sustainable development' (Canadian Environmental Assessment Agency 1998b: Part 1). In 1998, it released a statement on the scope of environmental assessments to offer guidance on this matter. It stated that scoping requires a consideration of, among other things:

- the availability and use of existing policy, technical and scientific information (e.g. the assessment should make use of the best available information and undertake analyses to address gaps in information as required, to define significant environmental effects); and
- a focus on those potential environmental effects on valued ecosystem components that are likely to be adverse and significant, following the application of mitigation. Valued ecosystem components are identified through consultation with the stakeholders and government experts (Canadian Environmental Assessment Agency 1998a: Part 2).

'Need for' and 'purpose of a project'

The Agency issued further definitions on phrases in legislation including 'need for', 'purpose of', 'alternatives to' and 'alternative means'. It is intended that these issues be addressed early in the scoping phase to improve problem definition and assist in any subsequent determination of the conditions under which environmental effects may be justified in the circumstances (Canadian Environmental Assessment Agency 1998b: 1). In addition to the enumerated elements, the Act provides that an environmental assessment shall include a consideration of 'any other relevant matter' that the Minister or responsible authority 'may require to be considered'.²⁰⁷ It states that 'the need for the project and alternatives to the project' fall under this head although it fails to express it clearly in mandatory terms. The operational policy statement states that these are 'strongly encouraged in every comprehensive study and public review' and should be done at the screening stage for large, complex projects (Canadian Environmental Assessment Agency 1998b: 3.1). This is a progressive element in the Canadian process because the need for a project is an important consideration overlooked in many EIA processes. It calls into question the fundamental basis for the project and allows consideration and weighing up of competing interests. The operational policy statement defined 'need for' as the fundamental rationale for the project; 'the problem or opportunity the project is intending

²⁰⁷ Section 16(1)(e).

to solve or satisfy.' Comprehensive studies also require consideration of the purpose of the project.²⁰⁸

'Alternatives to' the project

The requirement to study 'alternatives to' the project is defined as 'functionally different ways to meet the project need and achieve the project purpose' (Canadian Environmental Assessment Agency 1998b: 3.2). For comprehensive studies, consideration of alternatives to the project is at the Minister's or responsible authority's discretion. The standard 'no option' alternative is not mentioned.

'Alternatives means' of carrying out the project

Comprehensive studies also require consideration of 'alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means'.²⁰⁹ This is defined in the operational policy statement as 'the various ways, that are technically and economically feasible, that the project can be implemented or carried out', including as examples, 'alternative locations, routes and methods of development, implementation and mitigation' (Canadian Environmental Assessment Agency 1998b: 3.3). The Agency recommended that responsible authorities should identify the preferred means of carrying out the project 'based on the relative consideration of environmental effects, and of technical and economic feasibility' and to 'determine and apply criteria that identify alternative means as unacceptable on the basis of significant adverse environmental effects' in order to identify a preferred alternative. Simply identifying potential 'alternative means' for carrying out a proposal without discussing their comparative environmental effects does not meet the requirements of s16(2)(b).²¹⁰

8.4.1.d. Content

The courts have quashed authorisations for projects granted on the basis of environmental assessments that do not meet the requirements of CEAA.²¹¹ Thus, the contents requirements of CEAA must be met to a high standard. Section 16(1) lists factors that must be considered in every environmental assessment, and s16(2) lists additional factors

²⁰⁸ Section 16(2)(a). This is defined in the operational policy statement as 'what is to be achieved by carrying out the project.'

²⁰⁹ Section 16(2)(b).

²¹⁰ *Alberta Wilderness Assn. v. Cardinal River Coals Ltd.* [1999] 3 F.C. 425 (T.D.) at para 53.

²¹¹ See, for example, the decision of the Federal Court in *Alberta Wilderness Assn. v. Cardinal River Coals Ltd.* [1999] 3 F.C. 425 (T.D.) at para 36.

to be considered in more detailed comprehensive studies. The scope of these factors is determined solely by the responsible authority or jointly with the Minister.²¹² First, 'environmental effects' – and their significance – must be considered. Environmental effects are defined as:

- (a) any change that the project may cause in the environment, including any effect of any such change on health and socio-economic conditions, on physical and cultural heritage, on the current use of lands and resources for traditional purposes by aboriginal persons, or on any structure, site or thing that is of historical, archaeological, paleontological or architectural significance, and
- (b) any change to the project that may be caused by the environment, whether any such change occurs within or outside Canada.

Section 16(1)(a) further states that there shall be consideration of 'the environmental effects of malfunctions or accidents that may occur in connection with the project and any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out'. In addition, public comments must be considered as well as mitigation measures as well as 'any other matter relevant' to the assessment such as the need for the project and alternatives to the project.

CEAA does not define 'significant' environmental effects or provide guidance as to how significant environmental effects may be justified in the circumstances. Hobby et al. (2000: II-99) argue that the wording indicates that justification of significant environmental effects would require 'demonstrable and likely compelling public benefit for permitting a project to be carried out notwithstanding significant adverse environmental effects'.

The additional elements required in comprehensive studies are a consideration of the purpose of the project,²¹³ 'alternative means of carrying out the project that are technically and economically feasible and the environmental effects of any such alternative means'²¹⁴, the need for and details of follow-up programs to verify accuracy of the environmental assessment and to determine the effectiveness of mitigation measures,²¹⁵ and 'the capacity of renewable resources that are likely to be significantly affected by the

²¹² Section 16(3).

²¹³ Section 16(2)(a).

²¹⁴ Section 16(2)(b).

²¹⁵ Sections 16(2)(c) and 38.

project to meet the needs of the present and those of the future'.²¹⁶ In the Georges Bank context, this would require consideration of the effect on commercial fisheries which are renewable and sustainable resources.

Transboundary provisions

One of the enumerated purposes of CEAA is to ensure that projects 'do not cause significant adverse environmental effects outside the jurisdictions in which the projects are carried out'.²¹⁷ This purpose is effected in s46 for environmental effects occurring in other provinces and in s47 for effects outside Canada. A project may be referred to a review panel if the Minister (or the Minister of Foreign Affairs) believes 'that the project may cause significant adverse environmental effects' outside Canada.²¹⁸ Further, s47(3) provides that the 'government of a foreign state or a subdivision thereof that claims that significant adverse environmental effects may occur in that foreign state' may also request referral to a review panel. As such, CEAA is viewed as making special provision for projects that may cause transboundary effects (both across provincial and international borders). These effects are triggers for the environmental assessment process but are located separate to the principal s5 trigger and are discretionary. A weakness of the section that undermines its effectiveness is that there is no provision that transboundary impacts must be considered (Kennett 1995: 277).

Cumulative assessment

Growing literature and practice in cumulative effects assessment (CEA) recognises that assessment of projects and activities cannot be undertaken in isolation from other human activities. Significant environmental, social and economic effects may be not be identified without consideration of the combined impact 'of a multitude of past, present and future activities' (Kennett 2000: 1). Thus, important information can be obtained from studying the cumulative effects of other projects or activities that have been or will be carried out. CEA is established as a legal requirement for environmental assessment under CEAA. The Act requires consideration of 'any cumulative environmental effects that are likely to result from the project in combination with other projects or activities that have been or will be carried out'.²¹⁹ However, because CEA operates within the existing framework of project-specific assessment contained in CEAA, project-specific EIA is the 'de facto

²¹⁶ Section 16(2)(d).

²¹⁷ Section 4(c).

²¹⁸ Section 47(1).

²¹⁹ Section 16(1)(a).

instrument of choice for addressing cumulative effects in Canada' (Kennett 2000: 1). There has been criticism of this approach because project-specific assessments cannot meet all objectives of CEAs. Project-specific EIA omit analysis of insignificant effects, yet it is the cumulative impact of a series of individually insignificant effects which becomes important. Kennett (2000: 1) argues that what is needed is a more forceful management and goal-setting role by government requiring a broader legal and policy framework. In the case of potential Georges Bank oil and gas activities, this is not likely to be significant because the projects themselves are significant enough to be addressed. The issue is whether certain less-significant consequences of an otherwise significant effect are considered. What is relevant is the compatibility of the project in question with other activities such as fishing, and other objectives such as maintenance of environmental quality. In this regard, it is important to study the cumulative effects of individual approval of a series of wells. There is a need for a policy framework with overall vision for development and thresholds against which to measure the significance of cumulative effects (Kennett 2000: 3-4). Fishing activity, marine traffic and land based pollution contribute to decreased environmental quality and add additional stresses to the ecosystem which should be considered in the context of EIA.

The Canadian Environmental Assessment Agency (1999a) issued an operational policy statement on CEA. It also commissioned reports on the subject. One report suggested that the selection of future actions to consider in the CEA should reflect 'the most likely future scenario' (Hegmann et al. 1999: 3.2.4.1). It is suggested that emphasis should be given to projects with greater certainty of occurrence although it also should allow conceptual discussion of hypothetical projects. The practitioners guide recommends that projects that are 'certain' or 'reasonably foreseeable' should be considered (Hegmann et al. 1999: 3.2.4.1). The operational policy statement encourages responsible authorities to consider hypothetical projects at their discretion, despite this not being required by CEAA (Canadian Environmental Assessment Agency 1999a: Part 3).

Strategic assessment

Notwithstanding that the area of strategic environmental assessment [SEA] is evolving rapidly, it is rare to find it expressed as a legal requirement in Canada (Hazell and Benevides 2000: 48). However, a significant advance was made in government policy in 1999 when the Federal Cabinet issued a Directive on the environmental assessment of proposals for policies, plans and programs (Canadian Environmental Assessment Agency 1999b). The Directive applies to federal policy, plan and program initiatives submitted to a minister or Cabinet for consideration or where 'implementation of the proposal may

result in important environmental effects, either positive or negative'. In addition, departments and agencies are 'encouraged' to conduct SEAs 'when circumstances warrant.' The focus of strategic assessments is also on likely environmental effects. An interesting qualifier is included: 'the level of effort in conducting the analysis of potential environmental effects should be commensurate with the level of anticipated environmental effects.' Hazell and Benevides (2000: 48) define the 'ultimate objective' of strategic environmental assessment is 'to systematically integrate environmental considerations into government planning and decision-making processes related to proposed policies, plans and programs'. For the purposes of the Directive, SEA is defined as 'the systematic and comprehensive process of evaluating the environmental effects of a policy, plan or program and its alternatives'. The aim is to consider environmental effects early in the conceptual planning stage of a proposal, before irreversible decisions are made. It aims to be consistent with sustainable development and assist analysis of project options. In the Georges Bank case, this Directive might be utilised for a plan to consider proposals for offshore development if the moratorium were lifted.

8.4.1.e. *Decision-making*

After taking into consideration a comprehensive study report, the Minister has one of two options. Where, taking into account the implementation of any appropriate mitigation measures, the project is not likely to cause significant adverse environmental effects or is likely to cause significant adverse environmental effects that cannot be justified in the circumstances, the Minister shall refer the project back to the responsible authority where it may exercise any power or perform any duty or function that would permit the project to be carried out in whole or in part and ensure the implementation of mitigation measures.²²⁰ If the Minister determines that the project is likely to cause significant adverse environmental effects or it is uncertain whether the project is likely to cause significant adverse environmental effects, the Minister shall refer the project to a mediator or review panel to allow groups and individuals to express concerns.²²¹

Where an assessment is required by a review panel, it must prepare a report after holding public hearings setting out recommendations and reasons for them relating to the environmental assessment of the project to be submitted to the Minister and responsible

²²⁰ Sections 23(a) and 37(a).

²²¹ Section 23(b)(i). Note that the Minister can also so order where public concerns warrant a reference to a mediator or review panel – s23(b)(iii). Further note that an environmental assessment or part thereof cannot be referred to a mediator unless the interested parties are willing to participate in the mediation – s29(2).

authority.²²² Review panel members can only be appointed if they are 'are unbiased and free from any conflict of interest relative to the project and who have knowledge or experience relevant to the anticipated environmental effects of the project'.²²³

As discussed in 6.6.3, the most innovative aspect of CEAA is its provision for 'bounded' decision-making. The Act fetters the discretion of the responsible authority thus:

where, taking into account the implementation of any mitigation measures that the responsible authority considers appropriate, the project is likely to cause significant adverse environmental effects that cannot be justified in the circumstances, the responsible authority shall not exercise any power or perform any duty or function conferred on it by or under any Act of Parliament that would permit the project to be carried out in whole or in part.²²⁴

It will be remembered that the important aspect of this provision is that the project cannot proceed once it is established that the project is 'likely' to cause significant adverse environmental effects, unless the effects can be justified in the circumstances. Only Cabinet Order-in-Council can overturn such a conclusion. Previously, under the EARP Guidelines Order, the responsible authority had complete discretion regarding whether to accept or implement environmental assessment recommendations (Sadler 1995: 121).

8.5. Provincial environmental assessments: Nova Scotia

Georges Bank is located in the offshore jurisdiction of Nova Scotia within Canada's exclusive economic zone. Although Nova Scotia has environmental legislation and an EIA process, its environmental approvals process is not relevant to the issue of development on Georges Bank because the magnitude of the projects would trigger higher federal law. However, CEAA envisages cooperation with provinces in the conduct of environmental assessments, consistent with the move towards cooperative federalism in Canada and increased harmonisation between levels of government (see Doyle and Sadler 1996: 16).²²⁵ Further, in 1988, a Memorandum of Understanding was entered into

²²² Section 34. Note that a public hearing by a federal authority may be substituted for a review panel – s43.

²²³ Section 33(1)(a)(i).

²²⁴ Section 37(1)(b).

²²⁵ Section 12(4). See also the November 1992 Framework for Environmental Assessment Harmonisation adopted by the Canadian Council of Minister of the Environment. One of the principles

pursuant to the Accord Acts to ensure effective coordination of work and activities by the CNSOPB and Environment Canada in relation to petroleum activities in the Nova Scotia offshore area. The memorandum noted that 'The uncertain and incomplete nature of science relating to the environment invokes the precautionary principle where it is necessary to exercise caution in adopting safe minimal standards for all development' (CNSOPB no date). This is a key issue in the regional political acceptability of petroleum production.

Concerns were raised in the 1980s by the New England states of Massachusetts and Maine in response to pressure to allow exploratory drilling on the US portion of Georges Bank. The federal government has ownership of the US seabed resources with the result that revenue goes to the federal treasury. The states argue they would receive little economic benefit while being exposed to detrimental impact on fishing activities (see Hughes and van Dusen 1987: 558). However, in Canada, agreements between Nova Scotia and federal government concerning revenue sharing of offshore oil and gas resources effectively negate potential problems over jurisdictional claims to the resources (Stalport 1992: 196).

A requirement for provincial approvals, when required, is the submission of a local economic benefit plan. The economic benefit of petroleum exploration and production was also a key factor considered by the Review Panel. It concluded that the local economic benefits from seismic and exploratory activities would be 'limited' but there would be more benefits from production. It did, however, note that it was unlikely that natural gas would be piped to Nova Scotia because market factors suggest Massachusetts is a better area to bring the gas ashore. As a result, the Panel treated with caution industry arguments that petroleum production on Georges Bank would bring substantial economic benefit to Nova Scotia (Natural Resources Canada et al. 1999: 45). It was also noted that regional economic benefit would be finite and that when the wells were decommissioned, the departure of the industry would leave a gap in the economy.

8.6. North American transboundary EIA agreement

As noted in Chapter 4, both Canada and the United States have signed the Espoo Convention. However, because the US is yet to ratify the convention, its provisions currently have no legal force with respect to projects with potential environmental effects

is that both jurisdictions will adhere to the provisions in the Espoo Convention. Council of Canadian Ministers of the Environment.

across the Canada-US border, such as petroleum development on Georges Bank.²²⁶ Nonetheless, although a draft EIA agreement between Canada and the US has been prepared, it is yet to be concluded with legal force.²²⁷ The draft agreement would be triggered by a proposal to produce petroleum on Georges Bank by virtue of it being a project located within 100km of the border within a class of projects listed in Appendix I. As the agreement is yet to be binding, this leaves customary international law as the only source of international legal obligations concerning the preparation of EIAs for transboundary matters.²²⁸ However, domestic law also partly covers this field: in Canada with the transboundary provision of CEAA, and in the US with the extraterritorial application of NEPA.

8.7. US EIA overview

NEPA provisions and practice differ from CEAA. These differences include the overarching goals of the legislation. Like the differences that exist in public administration in Denmark and Sweden, the significant difference in Canada and US EIA procedures reflect different styles of governance (Spiller and Roanowicz 1986: 110, 114). Canada's processes are characterised by generally more centralised authority and quick responses to environmental exigencies whereas US provisions are characterised more by comprehensiveness and procedural accountability (Hennessey and LeBlanc 1987: 474). Whereas NEPA has more detailed procedural measures ensuring the adequacy of scientific information, CEAA leaves most issues concerning content to the appointed panel. Thus NEPA provides greater specificity than CEAA. Yet CEAA is lauded for urging special

²²⁶ The lack of ratification, however, does not completely abrogate the treaty obligations of either nation. Under Article 18(a) of the Vienna Convention on the Law of Treaties (Vienna Convention), a nation that has signed but not yet ratified a treaty is obligated 'to refrain from acts which would defeat the object and purpose of a treaty.' Under this provision, Canada and the US are obligated at the very least to refrain from taking any action that would impede the conservation goals of the Espoo Convention (see Teece 1997: 111). Article 18 of the Vienna Convention on the Law of Treaties states: 'A State is obliged to refrain from acts which would defeat the object and purpose of a treaty when: (a) it has signed the treaty or has exchanged instruments constituting the treaty subject to ratification, acceptance or approval, until it shall have made its intention clear not to become a party to the treaty.' Vienna Convention on the Law of Treaties, May 23, 1969, S. EXEC. DOC. L., 1155 U.N.T.S. 331 (entered into force 27 January 1980). Both the US and Canada are Parties to the Convention.

²²⁷ See Draft North American Agreement on Transboundary Environmental Impact Assessment, Article 2 and Appendix I.

²²⁸ See also §206 *United Nations Convention on the Law of the Sea* which, when of legal force, would provide an obligation on member nations to assess, as far as practicable, the potential effects of planned activities within their jurisdiction or control which, on reasonable grounds, they believe may cause substantial pollution of, or significant and harmful changes to, the marine environment. It is to be noted that oil and gas activities trigger the EU EIA Directive (Salter and Ford 2000: 259).

attention for transboundary effects. An area where NEPA differs from CEAA include the CEQ requirement for the inclusion of a 'worst case' scenario for potential effects.²²⁹ Also, as discussed in Chapter Six, agencies must indicate where critical information is lacking and base analysis on 'credible science'. Yet it is only necessary to assess 'reasonably foreseeable' impacts. Impacts with low probability but catastrophic consequences are assessed but not those based on pure conjecture.

Executive Order 12,114 (1979) expanded the ambit of NEPA to require evaluation of environmental effects of agency activities outside the jurisdiction of the US. But this did not include the jurisdiction of other countries; only activities significantly affecting the global commons. As a result, the Order would not be operational for potential US petroleum activities on Georges Bank which might cause impacts in Canada (see Christie 1986: 534). Stiller and Roanowicz (1986: 114) also note that the Order provides for an environmental assessment that is less than that otherwise required by NEPA because social and economic effects are excluded; only effects on the physical environment need be considered. Neither the US nor Canada requirements provide for public input from affected parties in the other country. This would change if the US ratified the Espoo Convention.

8.8. Fishing interests

The history of dispute over the Georges Bank region has centred on the region's rich fish resources. In 1977, Canada and the US both asserted 200 nautical-mile exclusive fishing zones which covered the Gulf of Maine and Georges Bank, thus ending its characteristics of high seas open to all countries and permitting fishing only by Canada and the US (Christie 1987: 469 and Russell 1992: 475). Prior to 1977, fishers from as many as 15 countries (including the former USSR, West Germany and Poland) fished in the Gulf of Maine. Conflict among the countries active in the area had existed for two centuries (Christie 1986: 491). Between 1977 and 1984, both Canada and the US fished in the disputed zone resulting in competitive overfishing before the border was established (Christie 1987: 469). The open access nature of fish resources made this a classic 'tragedy of the commons' overexploitations phenomenon. The populations of many commercial species such as cod and haddock declined on Georges Bank during this period while populations of non-commercial species expanded rapidly (Valentine 1992, VanderZwaag 1995: 221 and Jensen 2000: 638).

²²⁹ CEQ NEPA regs, 40 CFR 1502.22(b).

Fishing has been important on Georges Bank for Canada since mid-1800s. Currently production averages \$100 million CAN per year involving 175 vessels from over 60 ports in southwest Nova Scotia (Wells 1999: 6). The fishery is the single largest source of industrial employment and income in southwest Nova Scotia (Natural Resources Canada et al. 1999: 8). Most commercial species have stabilised in the 1990s and it is argued present yields could be maintained indefinitely (Natural Resources Canada et al. 1999: 9). Production of commercial species is estimated to increase dramatically with proper management. The scallop fishery far exceeds the combined landings and value of all other fisheries and it is particularly sensitive to tainting or smothering by discharges from drilling activities because they are essentially sedentary and cannot move to avoid drilling activities and discharges (Montgomery 1999: 11). The Review Panel reported that there 'is overlapping demand for access from the fishing and petroleum industries, apparently in excess of the time and space available' (Natural Resources Canada et al. 1999: 32).

The strong historical use and reliance on Georges Bank has led the fishery industry to oppose petroleum activity on Georges Bank. An alliance between environmentalists and the fishing industry to oppose hydrocarbon activity on Georges Bank contributed to public perceptions of fishing being a sustainable and environmentally sound activity. US and Canadian fishers opposed renunciation of drilling on Georges Bank because it is a fragile spawning ground. Primarily because of the area's importance as one of the most productive fishing areas in the world, a broad-based coalition of interests (including powerful fishing interests as well as community-based organisations) came together to push for the extension of the moratorium on Georges Bank, as well as its expansion into the Bay of Fundy and other areas in southwestern Nova Scotia (Ravindra 1998: 4.5.2). Yet, a number of fishing methods used in the area, most notably trawling, are known to be detrimental to seabed life forms. Other methods include lobster traps, groundfish longline and gillnets. The main environmental group opposed to the lifting of the moratorium acknowledged the unsustainable aspects of the fishing industry but argued that it is likely to be more sustainable in the future due to public pressure (Rankin et al. 1999: 7). Nonetheless, a fundamental distinction emerged between the two industries: sustainable and long term fishing versus unsustainable and short term hydrocarbon extraction.

The conflict between the two industries in the area concerns mainly loss of access to fishing grounds and potential damage to fish species by petroleum activities. The ability to have both activities coexisting on Georges Bank was disputed by the fishing industry.

The existence of statutory exclusion zones of 500m radius²³⁰ around jack up rigs and 1000m for semi-submersible flotation rigs which may have rig anchors extending out to 1 km²³¹ precludes fishing in large areas. Further, depending on the spacing between rigs, the area between them falling outside exclusion zones may be too narrow to permit fishing, thus excluding larger areas. Fishing vessels may set gear out 70 km which drifts a few kilometers. Thus some fishing activities need large, unimpeded areas to be successful. Further, other fishing activities take place on narrow ledges in specific locations on Georges Bank. If rigs were to be located on these spots, then they could not be fished. The Canadian fishing industry was also concerned about US reaction to a decision to lift the moratorium, such as banning Canadian catches from lucrative markets in areas such as Boston (Wells 1999: 18). There is no detail regarding whether safety zones around rigs assist the maintenance of fish stocks.

Debris from petroleum operations can damage fishing gear (VanderZwaag 1995: 89). Similar to other offshore regions where there is petroleum activity in traditional fishing areas, compensation programs are established as a precondition for activities. CAPP established a Commercial Fisheries Compensation Program For Loss Resulting from Non-Attributable Gear and Vessel Damage. CAPP has approved this in principle but it is yet to be operational (Canning 1999 and Walsh 2000). However, entitlement to compensation can be difficult due to the need to prove either loss of gear or well-documented loss of opportunity to fish. Statutory liability for major offshore accidents is limited at \$30 million under Nova Scotia Offshore Area Oil and Gas Spills and Debris Liability Regulations.²³² Also, petroleum service traffic may be difficult to manage safely in a fishing area.

A management solution needs to be mindful of fishing which is a pre-existing industry and sustainable. However, conflict avoidance is problematic. As fish are effectively common property, joint management is needed. Oil and fish activities have coexisted in other areas such as the Gulf of Mexico, although the dynamics there cannot easily be extrapolated to the Georges Bank area to due to the smaller area and more

²³⁰ *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act*, S.N.S. 1987, c.3, O.I.C. 92-679 (7 July 1992), N.S. Reg. 137/92 as amended by O.I.C. 96-21 (9 January 1996), N.S. Reg. 5/96, s75(1)(a).

²³¹ However, the safety zone surrounding anchors stabilising drilling installations is 50m: *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act*, S.N.S. 1987, c.3, O.I.C. 92-679 (7 July 1992), N.S. Reg. 137/92 as amended by O.I.C. 96-21 (9 January 1996), N.S. Reg. 5/96, s75(1)(b).

²³² *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act*, S.N.S. 1987, c.3, O.I.C. 92-19 (9 January 1996), N.S. Reg. 3/96 s2.

productive fishery and the absence of a relevant international border. The fishing industry states that it is not opposed to petroleum production *per se*, but that it cannot occur at the expense of a sustainable resource upon which there is traditional reliance. Although drilling rigs themselves are obstacles to vessels but they also assist with navigation and rescue for the fishing industry (Murphy 1987: 570).

In 1989, the Gulf of Maine Council was established as an organisation concerned with marine environmental quality. It is an international provincial/state forum consisting of environment, fisheries and planning organisations from the three states (Massachusetts, New Hampshire and Maine), two provinces (Nova Scotia and New Brunswick), and federal partnering agencies around the Gulf of Maine to monitor, protect and sustain the Gulf of Maine ecosystem. It had an interest in the George's Bank moratorium but no regulatory role. The mission of the Council is to provide a forum for discussion and activity on environmental issues of regional common concern (see VanderZwaag 1995: 223). The Council initiates co-operative programs to protect and conserve the ecological balance within the Gulf of Maine and promotes sustainable use of resources within the Gulf through a co-operative effort. The need for the Council stemmed from recognition of the need for Gulf-wide management due to the overexploitation of fish. The location-specific nature of hydrocarbon resources has traditionally militated against the establishment of such a regime for the industry.

8.9. Georges Bank and the precautionary principle

The precautionary principle is relevant to numerous issues at various scales concerning potential petroleum activity on Georges Bank. Gaps, inconsistencies and other inadequacies in knowledge of Georges Bank prevent the making of reliable quantitative predictions of environmental effects of petroleum activities (Shaw et al. 2000: 728). There are many areas of uncertainty with regard to effects of petroleum activity on fish species and the marine environment. The typology of uncertainty involved includes the following, overlapping issues:

Parameter uncertainty – Many potential impacts remain unstudied. The DFO stated that there is 'uncertainty about the full range and nature of the impacts of drilling discharges on the ecosystem' (Boudreau et al. 1999: 73). Studies on the dispersion and effects of discharges of drilling muds and oil spills on a number of species have not been conducted. Many areas of uncertainty under this head exist, such as how a pipeline with gas moving through would affect the movement of lobsters. Oceanographic processes are not fully understood and there is uncertainty concerning the toxicity of drilling fluids and produced

water to early developmental stages of some fish species. Other areas of production activities are not well understood, such as the risk of blowouts and the effects of long distance transport of oil (Boudreau et al. 1999: 69). The Review Panel was not presented with evidence on various matters of concern such as the effects of seismic activity on spawning behaviour, and on the behaviour of adult lobster, scallops and pelagic fish. Further, only sparse information was presented on the effects on marine mammals (Natural Resources Canada et al. 1999: 31). This is compounded by incomplete knowledge of ecosystem dynamics such as the unknown time periods when fish lay eggs and when fish emerge – of most relevance to the scheduling of seismic activities.

Model uncertainty – Existing models used to predict dispersion rates of discharges of drilling fluids and cuttings are less accurate in the Georges Bank ecosystem than in other marine environments due to complex mixing and stratification of currents. In particular, the DFO noted that the dispersion of drilling mud is a complex phenomenon that is not fully understood. It is also difficult to study the effects of oil on adult fish in the field and thus knowledge is incomplete (Boudreau et al. 1999: 71-3). Similarly, the impact of petroleum on marine organisms is poorly understood because it is difficult to observe the effects in the field. Thus, there is the potential for impacts to be undetected. The studies that have been conducted focus on commercial species and it has been assumed that these results largely can be extrapolated to other species. However, critical components of the ecosystem could be overlooked. Undetected effects could lead to shifts in species composition and ecosystem integrity (Rankin et al. 1999: 11). The extent of model uncertainty is not known in the absence of a full environmental assessment because detailed environmental studies have not been undertaken.

Systemic or epistemic uncertainty – The large scale and long term nature of petroleum activities on Georges Bank mean that the cumulative impacts of the range of activities confound understanding of effects. The number and placement of the wells is yet to be determined and may have effects in complex, interrelated ways. For example, if a number of wells were permitted to be located at critical areas of the Bank, threshold levels of discharges might be reached at those locations but not if they were located elsewhere (Boudreau et al. 1999: 58).

Politically induced uncertainty – The degree to which there is deliberate or inadvertent strategies on the part of authorities to avoid obtaining relevant information cannot be concluded at this stage due to the absence of a full EIA. In relation to the decision to extend the moratorium, the federal and provincial governments considered it satisfactory only to consider seismic and exploration effects and did not concern themselves at this

stage with production effects. However, a number of potential effects of seismic and exploratory activities were not considered or not considered in depth. The DFO report pointed out that issues such as potential lethal and sublethal impacts of operational discharges on a number of marine resources and overall ecosystem structure and function were not investigated (Boudreau et al. 1999: 73). Thus, the decision to extend the moratorium was based on environmental studies that were less comprehensive than those prepared under CEAA.

Indeterminacy and ignorance – Numerous aspects of the environmental effects of hydrocarbon activities on Georges Bank are unlikely ever to be known because of the complexity of the environment and the multitude of activities involved in offshore resource extraction. Understanding is incomplete concerning the overall dynamics and resiliency of the ecosystem. Ignorance will remain concerning effects which are undetectable and unknown. However, that some effects cannot be detected does not mean that they do not exist (Boudreau et al. 1999: 51, 72-3).

Despite this array of uncertainties, Georges Bank is a well-studied area and many aspects of the physical oceanography are well understood. Notwithstanding this, at this point in time, no recent ELAs have been completed; only the less comprehensive moratorium review process. There have been environmental studies completed of seismic and exploratory operations as part of the review process, but there have been no studies of production activities. However, some of the areas of uncertainty do not raise significant concerns. Some areas of uncertainty are quite small, for example, the impact of seismic testing on fish species which is only thought to affect fish in the immediate vicinity of the airgun arrays. The greater uncertainty for seismic activities concerns the flow-on effects from decimation of fish larvae, which limits recruitment to adults. Also, effects may be felt disproportionately by species with greater susceptibility meaning that petroleum activities may create an imbalance among fish species. It is submitted that many areas of uncertainty concerning the environmental effects of hydrocarbon activities on Georges Bank are not of sufficient magnitude to warrant the adoption of strong precautionary responses. However, when considered collectively, different problems and challenges emerge concerning the basis for decision-making. It is important now to consider three larger scale issues pertinent to the understanding of the applicability of the precautionary principle to petroleum development on Georges Bank: perceptions of risk, special characteristics of the Georges Bank ecosystem and broader sustainability issues.

8.9.1. Fear

The main environmental concern with potential petroleum activities on Georges Bank is the threat of a major oil spill and consequent environmental implications. This brings into question perceptions of risk, and fear. In particular, fear of a catastrophic, albeit statistically unlikely, event. In EIAs completed for lease sales on Georges Bank in the US in the early-1980s, the Department of the Interior estimated that there would be a minimum of 5.92 spills of 1,000 barrels (153 tons) and 3.23 spills of 10,000 barrels (1,530 tons) for every billion barrels (152 million tons) of oil produced (Howath 1987: 541). These estimates may be low or otherwise uncertain. An industry study predicted the risk of an extremely large spill (>150,000 barrels) as 1 in 6700 (0.015 per cent chance per year) and for large spills (>10,000 barrels) as 1 in 2200 (0.045 per cent chance per year) (S.L. Ross Environmental Research 1999: 4). The risk of these spills did not include risk from oil transport. Further, this type of data generation does little to allay fears of 'non-expert' citizens if there are concerns of government-industry collusion (O'Riordan 1999: 286).

The presenters at the Review Panel meetings representing the environmental and fishing lobbies considered the risk of a major oil spill in the Georges Bank was unacceptable. The serious environmental consequences of major oil spills are well known. This is due, in large part, to the rapid dissemination of information concerning them, no matter where in the world they occur. 'Exxon Valdez' is now widely remembered due to extensive media coverage of its breakup in Alaska in 1989. However, concerned participants in the Review Panel process also remembered another incident. On 15 December 1976, the *Argo Merchant* oil tanker ran aground on Nantucket Shoals approximately 70 km west of Georges Bank in US waters. It lost its entire 28,000 tons cargo of oil when it broke in two two days later. The spill affected parts of Georges Bank for eight months after the incident and caused unprecedented environmental concern in the region. Since then, there have been a number of well-publicised incidents involving oil tankers in other areas of the world, most notably the *Exxon Valdez* incident, which have served to highlight the dangers of offshore oil extraction and transport.

A particular concern in the Georges Bank area is the seasonally variable winds and the different effects surface and subsurface winds have for transporting oil. Oil-spill containment and clean up is known to be very difficult, if not impossible, in the Georges Bank area because of routine strong waves and currents (Howath 1987: 549). Dispersal of spilled oil can be so rapid that shortly after discharge it might not be detectable in the vicinity, but may have traveled great distances. It is possible that a large oil discharge on Georges Bank would reach the Nova Scotian shoreline 200km northeast. However, the

prevailing currents suggests that if it were to come ashore, it would be more likely to do so in Massachusetts, thus presenting a transboundary problem for which Canada may be liable.

The effects of oil spills in the marine environment include damage to living organisms including non-commercial plants and animals. Oil tainting in species can be passed up the food chain to reach species fished for human consumption. Distribution of contaminants also occurs in microbial and chemical processes. Depending on the quantity and type of material discharged, this may be 'assimilated' in the ecosystem with no detectable effect, yet the mechanisms whereby this dispersal takes place are intricate and rarely uniform. Backhus (1987: 516) argued that normally 'a certain stratum of the water column, sediment of a certain particle size, a certain organ of a certain fish, or a certain ocean area can become a locus of concentration' for oil. He further noted (at 517) that some pollutants may cause damage at concentrations 'that are little different from their detection concentration'. Less is known about effects of oil contamination on plants and animals in the water column (the pelagic community) where all are moving, than the benthic community which is relatively stationary. Pollution is difficult to assess because concentration of pollutants may be low, and deleterious effects may occur far from the discharge source (Leschine and Lahey 1987: 552). Thus, there is also a need to examine the long term as well as the short term effects of major spills in addition to continuous and routine low level discharges. This also needs to be assessed in an appropriately large temporal and geographic scale, in areas of particular sensitivity and at key times during the year because of seasonal variation.

As discussed in Chapter Four, perceptions of risk vary. Events with catastrophic consequences, albeit with a low probability of occurring, may be less acceptable to the community than events, which are likely to occur, but the environmental consequences of them are within known bounds. In this case, the unique characteristics of the Georges Bank environment, coupled with unknown ecosystem tolerance of oil discharges and the traditional reliance on its waters for fishing, suggest that all reasonable precautions should be taken to avoid a major oil spill in the area. An updated risk assessment has not been conducted for potential petroleum activities on Canadian Georges Bank. Notwithstanding the shortcoming of risk assessment identified in part 4.4.6, there would be a statistical and *believable* chance of a major oil spill indicating the necessity of a rigorous burden for operators to discharge to provide evidence of safety and effective mitigation measures. In the UK North Sea offshore regimes, some petroleum companies are screening for

perceived as well as actual risks due to the public perceptions of risk being just as significant in the process as 'actual' risks (Salter and Ford 2000: 265).

Perhaps the most cogent argument for application of precaution concerning petroleum development on Georges Bank is the unequal outcomes that would result from decision-making based on information that turns out to be incorrect. If the moratorium was extended on the basis of the erroneous conclusion that the Georges Bank ecosystem could not tolerate any impacts from petroleum activities, then the negative consequence of this would be the loss of a present opportunity the petroleum industry has to exploit the region, although this does preclude future development opportunities ('Type I' error). However, if petroleum activities were allowed on Georges Bank, based on the erroneous conclusion that the Georges Bank ecosystem could tolerate impacts from petroleum activities, then there would be potentially catastrophic consequences for, among other things, fish populations and ecosystem integrity ('Type II' error). Thus, the cost of being wrong produces vastly different consequences. The Review Panel was mindful of this dilemma and concluded that 'The arguments that point to the great value of Georges Bank, ecologically and as a fishery, weighed against a lack of public need for and limited benefits from petroleum exploration are persuasive' (Natural Resources Canada et al. 1999: 54, 58). Nonetheless, writing in 1994, VanderZwaag argued (at 8) that the precautionary principle is still of questionable value in Canada due to its limited adoption, and the little academic debate it has produced. No strong definition of it currently exists in Canada and thus it does not pose any real restraints on developers or politicians.

8.9.2. Special characteristics

A number of presenters to the Review Panel noted the special characteristics of Georges Bank and argued that for these reasons it warrants extra protection. They argued that the risk of environmental effects were higher, and the uncertainties greater, in the Georges Bank area than the nearby Scotian Shelf where hydrocarbon production has been underway since 1992. To the extent that the risk of environmental damage in Georges Bank is greater than in other marine environments due to the more severe (as well as unknown) consequences of human activities, the argument for a higher level of protection for Georges Bank is consistent with the precautionary principle. Especially vulnerable ecosystems warrant additional precautionary measures commensurate with their increased susceptibility to harm. The special ecological considerations of Georges Bank that warrant consideration of the principle include its high biodiversity and intricate (and transboundary) oceanographic processes.

Allowing hydrocarbon development on Georges Bank could increase stresses beyond threshold levels when the considerable developments on the nearby Scotian Shelf are taken into account. This provides the argument that an area should be set aside to be free from petroleum activities. Detrimental, and unpredictable, synergistic effects may occur if threshold points are exceeded (Kindt 1984: 287). However, the DFO report, after noting many of the distinct physical oceanographic and biological features of the Georges Bank ecosystem, concluded:

There is a sound knowledge and description of most of these features, but their inter-relations, and the overall dynamics and basis for the resiliency of the ecosystem are not fully understood. While the unique features of Georges Bank provide a basis for special concern regarding impacts of petroleum activities, it is not clear whether they make the ecosystem more or less sensitive to such impacts (Boudreau et al. 1999: 51).

As this is unclear, the principle dictates that decision-makers should err on the side of caution. It is to be noted that some commercial fish species in Georges Bank appear to be robust. In particular, herring were nearly fished out in 1970s but have returned to productive levels since the imposition of various management techniques. The ability of certain commercial fish species to rejuvenate after periods of overfishing does not, however, lend support to the proposition that other marine organisms and processes may also be highly resilient to routine discharges from petroleum activities. It is argued here that Georges Bank is a unique marine environment requiring special consideration of precautionary protection measures. Since the early-1990s, there have been various calls to protect the border region, most recently as a Marine Protected Area (Jegalian 1999: 237). There is also a proposal for an international peace park on the boundary (Ravindra 1998: 2.6.2).

8.9.3. Consistent with sustainable development

A wider issue is whether petroleum development on Georges Bank is consistent with sustainable development policies. As development of offshore oil and gas involves the extraction of non-renewable resources, it would be difficult to construe oil and gas extraction as an aspect of 'sustainable' economic development (Ravindra 1998: 4.5.2). Concern has also been raised about the possibility that new hydrocarbon developments would conflict with Canada's commitment to decrease greenhouse gas emissions. The decision to develop ultimately is one that can only be addressed fully in the context of energy policy, socio-economic policy and environmental risk assessment (Montgomery

1999: 4). As noted above, the risks associated with oil and gas development do not stop with its extraction – it must be transported via pipelines or ships – both with the potential to disturb the marine environment at a distance from the extraction site. Allowing hydrocarbon development on Georges Bank for a life cycle of approximately 30 years is inconsistent with sustainable development because it is not a long term and sustainable solution to the region's environment and inhabitants. Resolution of this issue requires broad discussion about what is appropriate development in the region. In this regard, it is important that debate is not restricted to acceptability and mitigation of localised environmental impacts of petroleum development. It has been argued that to allow petroleum development to proceed on Georges Bank would also send a message that any Canadian ocean, regardless of its importance as a fishery or ecological significance, is open for petroleum development (Rankin et al. 1999: 6). It is consistent with the principles of sustainable development that preference should be given to the protection of renewable resources than to the exploitation of non-renewable resources.

8.10. Existing decision-making process

The law pertaining to offshore development 'leading' to the present regulatory regime is a mix of international law, legislation, judicial and political decisions (Harrington et al. 1987: 272). The International Joint Commission (IJC) between Canada and the US, which has regulatory jurisdiction over activities that may affect boundary waters, has been largely successful in achieving joint management of activities in the Great Lakes region. However, the ICJ has no authority over offshore boundaries issues and thus is not discussed here (see VanderZwaag et al. 1986: 169 cf Christie 1986: 542).

The main decision-making authority, in the absence of the moratorium, is the CNSOPB. Federal involvement is not triggered until a production proposal is submitted which must be after commercial quantities of resources are found. The 'fundamental decisions' provision in the CNSOPB's operating legislation allows federal intervention earlier, yet, in its 12 years of operation, this provision has only been activated once. On this occasion, the intervention took the form of a directive designed to support the ongoing protection of Georges Bank (Montgomery 1999: 20). Thus, not only does the Board have decision-making authority for virtually all offshore petroleum decisions, but, due to the incremental nature of project approval, its decision-making authority to approve seismic and exploratory activities has much greater normative influence than the level of technical power suggests. This means that its environmental policies and practice, which influence the decisions it makes, warrant attention.

The precautionary principle is a guiding principle for the CNSOPB, although the formulation adopted is weak.²³³ CNSOPB operating instructions and rules are very detailed on daily operations and can be seen to implement aspects of precaution. For example, regulations state that hazardous materials associated with drilling activities must be stored and handled in such a way as to prevent damage to the environment.²³⁴ This is in addition to the requirement that they be transferred in closed systems and all reasonable precautions taken to avoid spillage during transfer.²³⁵

The CNSOPB established an Environmental Coordinating Committee (ECC) and Fisheries Advisory Committee (FAC) so it could consult with these bodies on environmental and fisheries-related matters. The CNSOPB also has a comprehensive environmental policy which has flexible environmental standards which allows it to move quickly to impose strict levels on developers when appropriate (d'Entremont 1999). The benefits of flexible standards are that they allow the Board to shape standards as it considers appropriate to the situation. This has presented few problems due to the general consensus that CNSOPB personnel have shown a willingness to set strict standards on petroleum operators. It has allowed the Board to set standards at a level that may in fact be higher than those that would have been required had they been prescribed through federal or provincial legislation. For example, in December, 1997, CNSOPB revised its regulations on the discharge of drilling fluids at well sites. It reduced the discharge limit from 15 per cent to 1 per cent LTMO (Low Toxicity Mineral Oils) by weight on cuttings. This has been imposed on all drilling operations under its jurisdiction from 1 January 2000. This was a remarkable decision considering that present technology cannot achieve such a low discharge. As a result, the new limit effectively provides a prohibition on the discharge of hydrocarbon based drilling fluids. The Board stated that its rationale for the decision includes 'minimizing the discharge of petroleum hydrocarbons into the marine environment, and reducing the potential for the tainting of marine organisms' and that it would mirror regulatory initiatives undertaken in 'more mature' oil and gas areas such as

²³³ See Memorandum entered into with Environment Canada entered into pursuant to s46 *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation Act* S.C. 1988, c. C-28 and s50 *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act* S.N.S. 1987, c.3, as amended by S.N.S. 1992, c.12, c.16.

²³⁴ *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act*, S.N.S. 1987, c.3, O.I.C. 92-679 (7 July 1992), N.S. Reg. 137/92 as amended by O.I.C. 96-21 (9 January 1996), N.S. Reg. 5/96, s111(a)(i).

²³⁵ *Canada-Nova Scotia Offshore Petroleum Resources Accord Implementation (Nova Scotia) Act*, S.N.S. 1987, c.3, O.I.C. 92-679 (7 July 1992), N.S. Reg. 137/92 as amended by O.I.C. 96-21 (9 January 1996), N.S. Reg. 5/96, ss111(b) and (d).

the UK North Sea where oil-based muds also have been prohibited since 1 January 1997 (CNSOPB 1997 and Salter and Ford 2000: 260). The policy also states that from 1 January 2000, only water-based muds will be permitted in offshore exploration. Nonetheless, some oil or heavy metal compounds may still be discharged in water-based muds and may be concentrated in tissues of organisms exposed to them even at relatively low concentrations. This tainting may be passed along the food web and influence predators (Boudreau et al. 1999: 67).

The authority accorded to the CNSOPB by its statutory base and the Board's commitment to providing a high level of environmental protection have resulted in an effective regulatory body for offshore petroleum activities. It demonstrates that standard-setting can be effective in the absence of higher legislative approach, although this is dependent on the willingness of key personnel to set standards at the high level indicated, but not required, by mandated policy objectives.

Nonetheless, areas for improvement can be identified. The petroleum industry, in its representations to the Review Panel assumed that it would be permitted to discharge drilling muds at the well sites. However, muds could be reinjected and sealed into the drill hole. Alternatively, it is technically possible, although not a CNSOPB requirement, that muds be captured and disposed onshore thus enabling a 'zero discharge' in the marine environment. This can be done by landfill disposal after chemical and thermal treatment and biodegradation by land farming. However, it is to be noted that impacts are associated with disposal of wastes onshore (Salter and Ford 2000: 253). This is a precautionary option open to the CNSOPB to require for Georges Bank activities. Disposal of muds onshore is an example of accepting a known risk to guard against an uncertain, but potentially more severe, outcome.

It can be concluded that the CNSOPB has established a well-regarded approvals and regulatory process. Nonetheless, its mandate is the approval of initial and continuing hydrocarbon activities and it is not suited to addressing the 'need for' developments incorporating wider economic, social and transboundary issues. However, in this regard its policy on SEA is laudable yet it remains to be seen how effective it will be. The key issue here is whether the overall operation of the CNSOPB effectively embodies the precautionary principle as a basis for decision-making. The strict emissions requirements and the conduct of strategic assessments do embody precautionary elements, yet the 'nibbling' effect of incremental approval of individual projects leading inexorably to production approval works against the main precautionary objective of requiring thorough analysis of all pertinent issues prior to the making of decisions with irreversible

consequences. The need to conduct environmental assessments under CEAA prior to the making of 'irrevocable decisions' is also laudable yet this provision is unlikely to be fulfilled in practice. This is because federal involvement commences only with the submission of a production proposal. Yet prior to this, successful seismic and exploratory activities would have been conducted, which, according to the Review Panel, would inevitably lead to production. Although technically, federal approval could be withheld, it is unlikely this would occur due to the significant preparatory work already undertaken and financial expenditure leading to political impetus to approve development. In this regard, it would be prudent to have an early strategic assessment. It is also to be noted that the 'bounded' decision-making provision in CEAA is unlikely to prevent development if many environmental issues have not been studied in sufficient depth to determine 'likely' and 'significant' impacts. Likewise, the transboundary provisions would not operate to meet this standard, particularly when it is borne in mind that there is no requirement that they be considered in final decision-making.

8.11. Challenges

In light of the uncertainties involved in petroleum activity on Georges Bank, including increased risk to US environmental quality, we now turn to the basis for decision-making on this issue. We focus on the precautionary principle and decision-making embodying an ecosystem approach for transboundary issues. It is concluded that various uncertainties remain, and would remain after the preparation of a full CEAA EIA were conducted for a production proposal because, to a large extent, many uncertainties are irreducible. As such, decision-making must take place in spite of the uncertainties involved, but be cognisant of them. It has been argued above that the existing regulatory process in Canada is innovative in terms of the precautionary principle, but that it does not go far enough. Reform opportunities are articulated in the next section. We now turn to the issue of the merits of having a moratorium on hydrocarbon activities rather than relying on the existing approvals.

8.11.1. The merits of the moratorium

An argument put forward during the moratorium review process was that if the CNSOPB approvals process is sound, then that should be a sufficient basis for decision-making and there is no need for a moratorium. It was argued that implicit in the establishment of a moratorium is the statement that existing regulations are not effective enough to protect environmental quality. If this is the case, the argument concludes that the solution would

be to reform the approvals process to an acceptable standard rather than to impose a moratorium. It was also argued that a moratorium does not fairly balance interests of the petroleum, fishing and environmental lobbyists and is a more subjective basis for decision-making than the normal regulatory process. CAPP, which represents 170 petroleum companies, argued before the Review Panel that a moratorium is the 'blunt instrument' of policy tools because it prevents the operation of the regulatory system. It argued that 'a blanket moratorium is no longer needed because the existing regulatory system provides protection for the environment and has mechanisms in place to ensure that all resource user interests are addressed before decisions on petroleum related activities are made' (Denstedt and Jones 1999: 1-2). The argument rested on the effective scrutiny by CNSOPB of petroleum activities. It was also noted that the Board was not operational at the time the moratorium was imposed and there was no need to delay a decision on production for a further twelve years. Another argument put forward by one industry representative is that the market for oil resources may decline by the time the moratorium is to expire due to increased reliance on alternative sources of energy such as hydrogen, and thus it makes economic sense to exploit the resource now so as not to miss economic benefit for the region (Wooder 1999: 3).

The fishing industry and environmental lobby did not share CAPP's optimism concerning the effectiveness of the CNSOPB approval process. While its regulatory structure and environmental standard setting received little criticism, the focus for concern was the Board's alleged 'default assumption' that permission to conduct petroleum activities is granted in the absence of evidence clearly demonstrating harm (Natural Resources Canada et al. 1999: 10). The concern is that if seismic activities were approved and the results were promising, this would inevitably lead to approval for exploratory drilling and then production approval. Most licensing regimes establish a regulatory burden on proponents after which activities or projects are approved. Examples here are permits for residential development which typically provide a right to development in the absence of evidence of harm. When a proponent has a legal interest in an area, such as by owning a residential block or holding an exploratory permit in an offshore lease area, there is a presumption to allow development subject to meeting development criteria. Notwithstanding this, some regulatory regimes such as the licensing of a new drug or project approval after an EIA, normally involve an additional, or otherwise more weighty, judgment on the part of decision-makers. Nonetheless, if evidence is presented about the merits of the proposal after meeting EIA requirements, in general, projects are approved. Experience in EIA demonstrates that it is rare for jurisdictions to prohibit development

outright (Glasson et al. 1994). The Georges Bank Review Panel noted that 'It nearly always takes a deliberate political decision to ban regulated activities' (Natural Resources Canada et al. 1999: 51). In the case of CNSOPB approval and CEEA EIA requirements for production, any impact falling short of 'significant' and 'likely' does not get considered so predicted impacts falling short of this standard cannot affect a project approval decision. More evidence of harm is needed to overcome the 'default' approval assumption. The Review Panel accepted the existence of the default assumption and concluded that 'If commercial quantities of oil or gas were discovered, development and production would eventually follow' (Natural Resources Canada et al. 1999: 58).

When examined in this light, the existing CNSOPB regulations, although generally of a high standard, do not operate in a precautionary way. An insufficient burden is placed on petroleum companies to demonstrate the absence of environmental risk. Nonetheless, full production approval is likely to be authorised by the federal government with insufficient attention being afforded to transboundary issues and environmental uncertainties. Yet, the potential remains for a political decision to be made prohibiting development after considerable expenditure by the petroleum industry, thus potentially contributing to tension among interested parties. Thus, it is submitted that the existence of the moratorium is sound due to the existence of the 'default' assumption. However, the merits of a moratorium would diminish with the absence of the default assumption and clearer ground rules for approval set at an early stage, incorporating sustainability principles. Yet regulations have not prevented major oil accidents in the North Sea (Barrett and Howells 1990: 58). Further, a moratorium does not stop progress on debate. A constructive dialogue between oil and fish industries can take place during the moratorium process to reach agreement on acceptable methods for development. The key to avoiding disharmony between these two interest groups in the North Sea and Gulf of Mexico has been consultation (Meltzer 1998). If, as the Review Panel suggested, that the absence of the moratorium would inevitably lead to initial activity and then production if commercial quantities of resources were found during the exploratory stage, then it becomes critical to focus on production effects early. An objective is to have more certainty for developers to prevent the submission of poor quality proposals and the expenditure of money and resources on projects that would be prohibited anyway.

If the argument against a moratorium were taken further, it would postulate that there is no need for any national parks or preserves if they potentially contain commercial resources. In this regard, any intrinsic value of preserving the Georges Bank environment due to its unique and valuable characteristics is negated in the event of competing industry

interests. It is argued here that a presumption of high protection for Georges Bank should be adopted. The incrementalism of the existing approvals process with the default assumption that development would proceed suggests a moratorium is warranted. A precautionary benefit of a moratorium is that it enables areas to be protected for a period so that a decision concerning its exploitation can be delayed until knowledge progresses and technology improves. More research can be conducted, together with more examination of scientific knowledge and public opinions to fill data gaps and base decisions on 'up to date, timely data' (Shaw et al. 2000: 729). Thus, a missed present opportunity to exploit allows a future opportunity to exploit when conditions are likely to be either safer or better known. Further, the resources can be preserved for future generations. However, if the default assumption is removed and a more rigorous precautionary approvals process is adopted, then arguments for a moratorium lose cogency because environmental interests would receive a high level of protection. At present, precautionary action is warranted because potential impacts to the marine environment and commercial fish species are sufficiently uncertain with potentially large threats. This requires either a temporary prohibition on development or a thorough and precautionary approvals process.

8.12. A more precautionary approach

The uncertainty that attaches to many of the physical processes on Georges Bank and the potential impact of petroleum activities, creates the need to consider precautionary approaches for future developments. This is apposite considering that the ecosystem is highly valued for its diversity and productivity for a sustainable but competing resource. Further, the transboundary implications warrant evaluation of legal issues. The following sections discuss possible precautionary options to be taken in the approvals process, together with methods to ensure that the overall decision-making process meets precautionary objectives and is undertaken mindful of transboundary issues in the US.

The preliminary conclusions are that the precautionary principle is relevant to development on Georges Bank on two scales. One is with regard to the comprehensiveness of environmental assessment making sure that uncertainty is taken into account (for example, to include the proposals here for a tighter environmental assessment approach incorporating uncertainty and to adopt an ecosystem approach whereby the existence of the border does not limit environmental studies). The second is that the broad nature of the approvals process is more precautionary. There is also a need for a broader discussion of the merits of proposals in EIAs. Rather than assessing the environmental impacts of a proposal, issues such as the need for the proposal, alternatives, and parity with

national policy, should be included in the process to enable a better-considered decision. If development is to be a *fait accompli*, then these issues need to be discussed early in the process. It is noted that CEAA is advanced in these respects, although more opportunity exists for effective discussion and determination of these issues rather than being pro forma procedural requirements. The following sections detail adjustments that could be made to the existing approvals process to ensure the implementation of precaution measures at the detail level of the decision-making process. Later, more substantive reforms are suggested. The focus is to improve awareness of distant and uncertain environmental effects at times when this knowledge could most effectively assist the decision-making process.

8.12.1. Environmental assessments: preliminary precautionary measures

As a starting point, where uncertainty concerning a proposed development reaches a threshold level, there should be a responsibility to implement precautionary measures such as halting activities, carrying out full research or imposing stringent monitoring plans. Some precautionary measures are straightforward in relation to petroleum activities. For example, in production, if there is to be transport of oil by tankers which presents a relatively high risk of accident, these vessels should be required to have double-bottomed hulls and transit along controlled tanker routes. Also, seismic testing can be prohibited during peak spawning times. Determining optimal survey times is, however, problematic due to fish spawning throughout the year. The preferred period for surveying from the position of the petroleum industry is summer (May through to October) because during winter there is more background noise caused by higher winds and rougher seas which makes testing less accurate, as well as more human safety concerns. However, this coincides with the most significant spawning events. A further option would be for CNSOPB to require offshore operators, as a condition of licence for exploration or seismic activities, to fund the Board to retain a compliance monitor officer onboard vessels and to contribute to a reserve fund for compensation (Montgomery 1999: 100).

The environmental assessments that are conducted should be done in a manner consistent with the precautionary principle. A number of the environmental reports prepared in preparation of the moratorium review process demonstrate a number of the shortcomings in environmental assessments seen in other jurisdictions. For example, the terminology used by LGL in its 2000 exploratory impact report uses phrases such as 'no significant impact' and determining that an impact 'is' negligible. Again, it is implicit in these reports that the findings are conclusive, yet uncertainty attaches to these issues although this is not reflected accurately in the conclusions. Thus phrases could be replaced

as discussed in 6.6.2.b. to build in uncertainty into conclusions to avoid the impression that there is no uncertainty when it exists. Further, adaptive management measures should be instigated such as providing follow-up programs and monitoring and to enable mitigation measures to be implemented quickly if unexpected issues arise. We now turn to the two principal issues for concern: effective inclusion of transboundary effects and enabling a truly precautionary decision-making process.

8.12.2. Including transboundary effects in a Georges Bank approvals process

There are strong biological and physical linkages between the Canadian and US portions of the bank (Boudreau et al. 1999: 3). However, the DFO has concluded that the effects of exploration activities are likely to be local and without significant distant impacts (Boudreau et al. 1999: 67). Yet potential cumulative impacts of multiple exploratory wells have not been considered in detail. There will be some transboundary effects of production operations, but these are not thought to be significant. The main issues are the increased risk to US waters of an oil spill in Canadian waters and the probable construction of a pipeline to Massachusetts, the closest landfall, thus denying Nova Scotia of a cheap source of energy and value-added processing. It is interesting to note the DFO's comments on *production* impacts:

Potential impacts from production activities...are expected to be different than those...for exploratory activities. There is a wide range of production scenarios depending on many factors, such as the product being produced, the market, available technology and best practices at the time of development. The potential impacts will be dependent, to a large degree, upon the actual production scenario (Boudreau et al. 1999: 74).

The issue of transboundary effects would not receive much attention in the CEAA process because any impact falling short of 'likely' and 'significant' is not triggered in CEAA. The probability of a significant oil spill appears to be statistically unlikely. Further, the consideration afforded to transboundary impacts is less than that afforded to impacts solely within Canada. Nonetheless, increased risk, and uncertainty ecosystem effects make potentially transboundary issues significant.

An objective is to ensure that if there is a decision by Canada to allow petroleum activities, they are done with proper consideration of the potential effects on the environment and fish resources both within Canadian territorial waters, as well as the US and the nearby High Seas. The number and magnitude of the uncertainties and competing

interests involved suggests that there is a scale of precautionary approaches for environmental management. The most concerning potential transboundary impact is the effects of an oil spill in Canadian waters which, due to the prevailing currents, most likely would head to US waters and may even wash ashore in Massachusetts. In addition to this disaster scenario are the potential effects on numerous species which frequent both US and Canadian waters. That significant uncertainty remains about the dynamics and behavioural patterns of many of the transboundary species, coupled with incomplete knowledge of the impacts of petroleum activities on them, suggests that were petroleum activities to proceed on the Canadian portion of Georges, it would be done with the prospect of transboundary effects to US environmental quality and US marine resources. However, it would seem that the standard for liability for likely significant impact would not be met as there is insufficient information to predict the likelihood of such a result. The US National Oceanic and Atmospheric Administration urged the Review Panel to recommend extending the moratorium and argued that petroleum exploration and drilling 'would subject nationally and internationally important marine resources to unnecessary environmental risks', including to the Stellwagen Banks National Marine Sanctuary west of Georges Bank (Baker 2000). Also, other commercially important fisheries away from Georges Bank are based on fish stocks that are ecologically connected to Georges Bank (Natural Resources Canada et al. 1999: 57). The Panel noted that what happens physically and biologically on one side of the border will affect the other side (Natural Resources Canada et al. 1999: 48). The Panel noted this was particularly the case with Georges Bank because of the circular movement of water around the bank from Canadian waters to the US and back – a seasonal natural process that itself is transboundary which may transport pollutants across the border. In addition to the potential environmental effects, political relations militate against making development approval in this context in a unilateral manner. It is poor international relations to subject the US to risk from petroleum activities when they have a moratorium at the same time. The Review Panel raised concerns about possible US retaliatory measures if their fish species are harmed (Natural Resources Canada et al. 1999: 48). A joint moratorium or border buffer zone would reduce the potential for tension by not operating to frustrate US environmental quality and conservation goals.

It is essential to have a transparent decision-making process that considers the region as a whole. There has been increased recognition of the need for this in the marine context (see Boczek 1984: 39). The precise delineation of the border does not remove the need for joint management of shared resources. The ICJ experience demonstrates that

Canada and the US can be effective in joint management, in that case in relation to the Great Lakes. There have also been bilateral arrangements in the Gulf of Maine, most notably the Gulf of Maine Council and the Canada-US Marine Contingency Plan which provides for joint responses to oil spills (VanderZwaag 1995: 222). In relation to the issue of permissible grounds for hydrocarbon production on Georges Bank, it is prudent that both countries address this issue jointly. For example, incorporating joint research programs to collect data (Christie 1986: 540). Yet to date, no joint EIA agreement has been concluded, and any prospective agreement under the auspices of NAFTA is unlikely to incorporate the transboundary and precautionary provisions articulated here. Yet, the unique characteristics of the Georges Bank region indicate that proposed activities on it should be considered in light of international obligations concerning transboundary harm and EIA. A regional EIA agreement is needed. This could be done under Espoo or possibly NAAEC, or independent of either framework convention. As argued in Chapter Four, this would respect states' adherence to sovereignty. The goal would be to mandate that states have far more stringent *domestic* EIA processes, which fulfill sustainability principles. However, the principle of good neighbourliness means that the other country should be informed, and ideally involved, throughout the EIA. Canadian federal EIA presently limits US involvement to, under certain circumstances, requesting the conduct of an EIA. Writing in 1987, Backhus et al. concluded (at 478): 'Broad cooperation is now demanded, and successful joint management will likely involve trade-offs on the analytical basis for management...and on the political mechanisms to be used'. Spiller and Roanowicz, writing in 1986 and referring to the transboundary provision in the previous EARP Guidelines Order, noted that consideration of indirect transboundary effects is undermined simply because they are elusive. They argued (at 133) that legislating

their consideration apparently does not improve their chances of being considered. Rather, only a changed way of thinking about assessment, one that focuses on specifying unknowns, uncertainties, and disagreements, will ensure scrutiny for these issues.

There is a need for either a regional EIA structure or, at minimum, harmonised processes, which effectively integrate public policy concerns, economic issues and environmental impacts.

8.12.3. Overall decision-making process: strategic approaches to reduce impacts and costs

It is to be noted that the federal EIA process is only triggered once a specific and developed proposal is submitted. Yet this only occurs once considerable work has been undertaken in seismic and exploratory activities which cause their own environmental effects. Further, the cost of finding offshore hydrocarbon resources and determining commercial viability are very high, with chances of success often as low as one in ten, yet approval may be denied for mainly political reasons. It is prudent to determine whether these issues can be determined early in the process to avoid costs and environmental impacts. The Review Panel noted that precise quantification of impacts would necessarily be theoretical or speculative in the absence of a specific proposal. At this point in time, this is difficult to determine because it remains unknown what type of resource, if any, exists. In particular, different production activities, with different environmental risks and economic benefits, are involved depending on whether the resource to be extracted is oil or natural gas (Natural Resources Canada et al. 1999: 46). There could be a range of production scenarios depending on the product being produced, market conditions, available technology and current best practice. The effects depend on the actual scenario and it is expected that environmental impacts would be more severe for oil production than natural gas production (Howath 1987: 540 and Boudreau et al. 1999: 74).

The precautionary measure suggested here would be to have a preliminary 'production scenario/concept' study performed to determine whether production would be acceptable rather than proceeding with piecemeal seismic and exploratory approval. Information that needs to be known to determine the environmental impacts of petroleum activities are the dynamics of the Georges Bank environment, the type, number and location of resource exploration and extraction activities that would be undertaken, the effects predicted discharges of wastes would have on marine biota and how contamination in organisms is recruited into commercial species. Nonetheless, production 'scenarios' can be envisaged. Although, by definition, many details of an actual production proposal would be absent, many issues involved in resource extraction for oil and gas are known. Key elements that are not disputed are the necessity for drilling wells, support facilities and increased tanker movements. The potential exists for some projects to be approved without CNSOPB taking into account future applications from companies holding leases in adjacent areas. It is suggested that rather than relying on the existing incremental process which builds momentum by political inertia, environmental and petroleum interests would be better served by the preparation of EIAs of likely oil extraction

scenarios and natural gas extraction scenarios. These can determine the type of activities that are likely to be acceptable and thus merit further study, and, more significantly, they can rule out unacceptable types of development at an early stage. This would avoid grounds for dispute between the petroleum industry and the fishing industry and make the regulatory 'playing field' clearer for the petroleum industry so it would not devote resources to examining options that would not be approved. Studies can be conducted of hypothetical wells in various locations to examine discharge levels, predicted impacts and cumulative effects. These would be different to actual operations due to unknown stratigraphic conditions, but they could enable technical improvements to industry (Boudreau et al. 1999: 60). It is essential to look at maximum possible production to consider the total impact to the environment. This analysis then may suggest that the cumulative impact of large-scale production is too high and a safer and acceptable option is to limit the number of wells (see Rankin et al. 1999: 19). A key issue would be to take an ecosystem approach and look at total scale of impacts to determine a safe total number of exploratory and production wells. This may pave the way for production for 2 or 3 wells rather than a dozen that could result from the existing individual application process. A total allowable number may be determined and petroleum companies would then determine the merits of submitting proposals within these limits. A less environmentally stressful option may be to open up lease areas to production at different times to minimise the ecological footprint at any one time.

Thus, the approvals process could be improved by having decisions made earlier about the parameters within which development would be acceptable. However, a decision to have a strategic scenario EIA cannot substitute for an EIA of a specific proposal at a later stage. Due to the 'default' assumption in the existing process, it is not prudent to assess seismic and exploratory drilling applications individually without considering production impacts. In this regard, the CNSOPB is not an appropriate body to make these decisions. No matter how well the CNSOPB fulfills its mandate, it is an inappropriate body to enable *de facto* decision-making at this level. The main risks are from production activities but these are not addressed by the time the effective basis for decision-making is reached – when commercial quantities of resources are located. The costs associated with the preparation of scenario can be borne by interested petroleum companies in a manner similar to their funding of class assessments. Joint studies would also be cheaper by avoiding duplication of research. It also would avoid future costs of assessing projects which would not be approved. The scenarios in which production is considered unacceptable would operate as a *de facto* moratorium for those production

activities. In recognition that environmental knowledge and technical programs improve over time, scenarios that are deemed unacceptable could be open for reconsideration after a period of ten years for further review. This also avoids concerns about present decision-makers precluding decision-making options in the future.

The most significant issue is *how* decisions about hydrocarbon production on Georges Bank should be made. This links to larger issues concerning sustainable development and international obligations to consider transboundary effects. If a scenario EIA is completed and it is clear that certain scenarios are unacceptable, then it can be established that no production would be approved unless it came within certain restrictions. This would provide clearer rules for industry and would save money otherwise spent on seismic and exploration to no avail. The main precautionary aspect is avoiding any of the environmental impacts associated with seismic and exploratory activities which do not proceed to production. The first precautionary aspect would be to consider the total scale of activities involved in production rather than in three separate steps. This is an illustration of the principle not being a 'no development' principle but rather allowing development where there is more confidence about possible environmental effects.

8.12.4. An overall precautionary approach

A number of small scale precautionary steps can be implemented to improve the environmental conditions under which seismic and exploratory activities take place. These include scheduling seismic survey in non-key fish spawning periods and limiting the number of exploratory wells. However, a truly precautionary approach requires early consideration of the more fundamental issue of whether any development is acceptable considering sustainability objectives. The 'scenario' EIA approach advocated here would mean that impacts of seismic testing and exploratory activities are avoided if full production is considered to be unacceptable.

A specific preferred precautionary outcome is not identified here for two reasons. First, not enough environmental assessments have been completed to determine the most appropriate development decision. Second, the focus here is to identify the most appropriate *process* by which to reach such a decision. The approach articulated here ensures effective consideration of precaution and obligations at international law to consider transboundary effects. Final decisions should be consistent with measures articulated in Chapter Five concerning a duty explicitly to consider precautionary measures and to presume implementation of them.

8.13. Conclusion

The determination of whether, and under what conditions, to allow petroleum production on Georges Bank is a complex task that involves the integration of public policy analyses, economic benefits evaluation and EIA. Determining a neat 'solution' is illusory due to the fundamental differences in standpoints of the fishing and oil industries, and the environmental lobby. Overlaying this complex of policy issues surrounding Georges Bank is an unpredictable political process that cannot always be relied upon to generate decisions that are rationally connected to well defined and prudent objectives. The political nature of large-scale developments is arguably unavoidable. The prospect of petroleum production on an extremely productive fishing bank within metres of an international border provides no exception.

For decision-makers to focus only on technological improvements regarding drilling techniques and pollution reduction only enables precaution and prevention to be applied at the project development stage. However, precaution should be linked to strategic design such that the focus is on the most appropriate, and environmentally safe, development in a region by examining the need for a project and the best method for achieving it taking into account environmental exigencies. This is to encourage improved project proposals at the inception stage. This discussion has focused on opportunities to ensure that a transparent and rigorous process that incorporates precautionary approaches makes final decisions about resource use and development. It has found that different levels of precautionary responses can be applied. These range from small scale issues such as scheduling seismic survey in non-key spawning times, more precise wording requirements in EIA, consideration of alternatives, and confining discretion to decrease the threat to fish larvae, to more fundamental approaches such as re-evaluation of the timing of key decisions, and de facto decisions. The most precautionary approach would be to have detailed production scenario environmental assessments prior to the commitment of resources and environmental impact of seismic and exploratory activities. The challenges to achieve this include establishing an effective EIA framework that spans the border and mandates full assessment and consideration of uncertainty and presumes decision-making will be based on precautionary approaches. The principal benefits of this approach are that it would:

- minimise interstate conflict by working within, and in advance of, existing international obligations concerning EIA and liability for transboundary harm;

- provide clarity to petroleum companies at an early stage in relation to what type of developments would be acceptable; and
- avoid environmental impacts from pre-development activities and provide confidence that any development that would proceed has received adequate environmental assessment against sustainability criteria.

It is inevitable that the full ramifications of human activities on Georges Bank will remain uncertain. The challenge is to determine optimal decision-making approaches in light of this uncertainty. An EIA process that takes into account large-scale ecosystem dynamics, transboundary issues and is focused on addressing uncertainty can ensure that decision-making is based on good science and is sound. In this regard, the issue of petroleum development on Georges Bank can be pursued in a precautionary manner.

Chapter Seven

Conclusions

9.1. Main findings

A significant challenge to policy-makers is the management of transboundary environmental impacts relating to development projects and the exploitation of natural resources that span jurisdictions. Reducing interstate conflict over transboundary environmental problems and resource exploitation issues is one of the most pressing challenges facing national governments in light of almost universal commitment by them to sustainable development principles. Although many of the advances in environmental law and theory have occurred in international fora, implementation of sustainable development principles is less evident at the international than at local level. This is due, in large part, to the difficulties created by multiple jurisdictions, the existence of jurisdictional borders that arbitrarily split ecosystems, and the increased complexity of regional or global environmental problems.

Advances in international environmental law and sustainability policy are interlinked. Notwithstanding the influence of developments in environmental theory and policy on law, international jurisprudential developments determine the degree to which theoretical and policy developments in environmental management can achieve practical application at the regional and global scale. As a result, options for improved management practices for transboundary and regional environmental problems must adhere to current, albeit evolving, law concerning state responsibility for the negative consequences of action or non-action in areas outside national jurisdiction. The three countries covered in detail – Denmark, Sweden and Canada – have developed EIA processes or practices that satisfy the most recent pronouncements on international law articulated by the International Court of Justice respecting the responsibility incumbent on states to undertake a form of environmental assessment in appropriate circumstances. In this regard, jurisprudential developments of the *Trail Smelter* doctrine reflect the common practice of states to conduct domestic EIA. However, the ICJ has not concerned itself with EIA practice as

such, but rather with the responsibilities, which resemble aspects of procedural EIA, that flow from the established legal principle of preventing significant transboundary harm where this is foreseeable and likely to occur. These developments in customary international law have not proceeded in advance of standards adopted in countries with established EIA processes, except in so far as providing for the consideration and notification of environmental effects outside national jurisdiction.

Although customary law rules respecting state conduct in relation to activities that may cause transboundary harm have developed, it is their effective codification in a number of treaties that provides clearer and more effective obligations on state parties. In some areas, such as transboundary pollution, rules for liability have been thoroughly codified.²³⁶ Further, there are numerous prohibitions on state conduct²³⁷ and regulation of activities²³⁸ entered into voluntarily by states. The proliferation of treaties also has normative influence on the development of customary law. In this regard, regional and international agreements such as the EU EIA Directive, the UN Espoo Convention and the Aarhus Convention (with respect to public participation) have imposed higher EIA duties on states for activities potentially affecting other countries than existing jurisprudence. It was found in Chapter Seven that had the Espoo Convention entered into force earlier such that Denmark and Sweden would have been required to implement its provisions for the Øresund Link, both countries would have been obligated to conduct their environmental assessments differently. In particular, Espoo requires a level of assessment and consultation with other countries more extensive than the measures undertaken for the project. However, the nebulous state of transboundary precautionary obligations at international law currently provide an insufficient legal basis to challenge the environmental assessment processes the Danish and Swedish governments used under customary law. In relation to Georges Bank, the reluctance of the United States to ratify the Espoo Convention undermines the rigor and effectiveness of Canadian EIA for potential offshore hydrocarbon proposals. Without US ratification, Canada need not implement Espoo for activities on Georges Bank despite otherwise being bound by the convention because it only applies to activities affecting two or more states that have

²³⁶ E.g. Convention on the Law of the Sea (1982), Convention for the Protection of the Marine Environment of the North-East Atlantic (1992) and Convention on the Protection of the Marine Environment of the Baltic Sea Area (1974).

²³⁷ E.g. Treaty on the Non-Proliferation of Nuclear Weapons (1968).

²³⁸ E.g. Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal (1989) and Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa (1991).

ratified it. Although the transboundary provisions contained in the *Canadian Environmental Assessment Act 1995* provide fewer transboundary obligations than those contained in the Espoo Convention, they would be sufficient to identify activities that could lead to liability under the *Trail Smelter* rules. Satisfactory completion of an EIA would not, however, enable Canada to avoid liability for harm subsequently caused.

The standards currently established by the Espoo Convention and the EU EIA Directive concerning the general conduct of EIA tend to be low in comparison with advanced domestic processes due largely to the need for consensus among parties with varying EIA processes and commitments to environmental protection. The transboundary EIA agreements do, however, provide the most effective instrument to advance practice in environmental management for transboundary issues because of their ability to set agreed standards across jurisdictions. The challenge is to improve their effectiveness by linking them to advances in environmental theory and policy. An established process of member workshops and updates provide appropriate fora to build consensus concerning transboundary EIA practice and further harmonisation of procedures. In this regard, there is no need to intrude on state sovereignty to create a supranational EIA body. Rather, what is required is further refinement of the provisions in Espoo. This needs to be done in such a way as to require increased standards of domestic EIA. This can be achieved to a high standard by the adoption of stringent bilateral and regional EIA agreements that can complement the Espoo Convention.

The use of transboundary EIA agreements is not only an effective way to improve transboundary EIA practice; it is also necessary in relation to the responsibility states have to implement the precautionary principle. The principle has emerged as a general duty on states at customary law, due principally to the widespread support given to it in international fora and its adoption as an overarching goal in numerous treaties, notwithstanding typically imprecise definitions, expression in permissive language and location in non-operative provisions. Although the principle's usefulness in certain policy areas is still debated vigorously, there is widespread support for it in the environmental field. The principle is established as a central plank of sustainable development policy and its future in environmental protection and international law is secure. It will continue to shape national and international environmental policy and it will continue to be refined for more effective application as the debate about its merit closes and attention is placed on methods for implementation. It has been argued in this thesis that the existing practice of EIA and the principle are complementary and that the precautionary standard required by international law can be implemented through modifications to EIA processes. Claims that

EIA, as currently practiced, is precautionary are misguided. Only a handful of jurisdictions have seriously attempted formally to link EIA with precaution. Yet even in the Australian federal process that came into effect in mid-2000 – the most detailed linkage of EIA and precaution to date – effective integration is undermined by the use of weak definitions and a continued focus on assessment of only those environmental effects that are likely and significant. Requirements for extensive consideration of uncertainty in EIA remain absent in all jurisdictions. Further, mandatory application of specific precautionary measures is absent. The case studies reveal that methodological problems and political intervention can result in key objectives of EIA being undermined. The case studies also highlight the need for the overall manner in which projects are approved to be precautionary. Yet, the potential for EIA to be an effective precautionary problem-solving instrument remains undermined by methodological constraints and a reluctance to consider seriously limitations of science.

The proposal to link explicitly EIA with the precautionary principle is consistent with the consensus among environmental planners and resource managers that EIA must reflect sustainable development principles and broader policy concerns more closely. However, little has been done in a formal capacity to give effect to this goal. The issue of appropriate approaches for decision-making is often overlooked in EIA practice. It is the decision-making component of EIA, rather than the treatment of uncertainty in scientific studies, where the real precautionary potential of EIA lies. This requires that attention be directed to appropriate ways to frame issues for study, consideration of them, and methods to weigh them appropriately in final decision-making. In this regard, the focus of current EIA tends to be on mitigation and technical compliance with procedures rather than ensuring that the pivotal issues concerning development projects are addressed. These are: whether a project or activity is suitable for the context in which it is proposed to be located, that there is a sufficient level of confidence respecting a decision that predicted environmental impacts are acceptable, and that, where possible, environmental impacts are actually avoided. It has been seen in the Øresund case that EIA can be used for the purpose of diminishing the most obvious and negative environmental impacts of development without serious regard to the concept of sustainability. Novek (1995: 145) argued that in practice EIA often internalises rather than overcomes conflict between economic development and environmental protection and that EIA is often used by governments to legitimate projects. In some jurisdictions, EIAs tend only to be conducted if their preparation is considered to be politically expedient. 'Fast-track' legislation may be used to avoid normal approval processes, such as in Denmark with the Øresund Link.

This undermines the fundamental purpose of EIA to provide environmental assessment of proposals prior to the making of decisions regarding them. In practice, it is rare for projects to be rejected following the preparation of an EIA (Gilpin 1995: 158 and Thomas 1996: 10). As a result, methods to avoid the incremental nature of project approval inherent in approval processes, such as that adopted by the CNSOPB with regard to strategic assessment, warrant consideration.

A fundamental issue is the substantive outcomes of EIA inquiry. In this regard, it is apparent that EIA practice has largely proceeded independently from its theoretical roots. With the exception of NEPA, most EIA regimes are not ambitious in their objectives. Nonetheless, EIA theory has developed, most notably in serving to highlight and enhance the connections between EIA and the sustainable development concept (see generally Novek 1995, Lawrence 1997ab and Gullett 1998). Yet, the numerous calls to incorporate sustainable development principles in EIA have tended to focus on reforming EIA procedure and have neglected substantive outcomes. Further, the research that exists on EIA decision-making tends to focus on the final project approval stage rather than upon the numerous earlier and significant decisions made in the screening and scoping phases which shape the whole EIA process (Weston 2000: 185). This thesis has responded to these challenges in the transboundary context and has considered the opportunities that exist for improving the implementation of the precautionary principle as a sustainability objective at the international level. It has concentrated upon approval processes for development projects with potential cross-border environmental effects. The main findings of this study are that:

- the nature of transboundary environmental problems is analogous to 'tragedy of the commons' situations whereby a country may conduct an activity that causes environmental impacts to another country or to the global commons with knowledge that the negative consequences of the impacts are at least partly distributed to other jurisdictions, although the benefits derived from the activity in question remain predominately or exclusively within its own borders. The challenges presented by this situation cannot be overcome by existing rules of liability for transboundary harm. Further, these challenges are not recognised in formal decision-making. This is evidenced by the omission of or weak implementation of requirements in domestic EIA procedures to assess and address transboundary environmental impacts. Hobbesian logic provides a useful conceptual approach to determine the appropriateness of developing legal liability rules or mandating standards for state conduct to prevent

environmental harm in other jurisdictions. Nascent transboundary EIA agreements, most notably the Espoo Convention, go some way to overcoming the neglect of the specific and incremental causes of transboundary environmental harm;

- the precautionary principle is a sound concept on which to base environmental protection strategies and is particularly suited to transboundary and regional environmental problems because of their inherent scientific and epistemological complexity. Transboundary EIA agreements are the most effective instruments for further refining precautionary responsibilities of states;
- the existing process of EIA captures some of the objectives of precautionary decision-making, but in its present form, does not give effect to the principal objectives of the principle. This is because the focus of EIA practice tends to be the identification and mitigation of environmental effects rather than the substantive issue of considering the appropriateness of a proposal and conducting a genuine search for less harmful alternatives. Precautionary reforms to generic project-specific EIA are proposed;
- two case studies, one of a transboundary development, the other of a potential development adjacent to an international border in a particularly significant ecosystem, demonstrate the complexity and range of issues to be addressed for development approval of large-scale projects in border regions. They also demonstrate that, while precautionary options are generally case-specific, decision-making processes are largely generic and precautionary options at the process level are applicable in a more general fashion. The case studies also identified a number of challenges to more precautionary decision-making; namely political and administrative differences across jurisdictions and the incremental force of economic imperatives.

A prescription for modifying existing project-specific EIA was developed following analysis of the merits of the precautionary principle as a theoretical and practical approach for environmental protection. In part, this approach is consistent with the handful of works that articulate various technical ways to implement precaution at key points in decision-making processes (e.g. Deville and Harding 1997, Cornwell and Costanza 1999 and James 1999). Yet, the key challenge for enabling overall precautionary decision-making has only very recently received serious academic attention (e.g. Fisher and Harding 1999, M'Gonigle 1999, Tickner 1999 and Fisher 2001). The reform

prescription for EIA argued here seeks to allow precaution to be implemented in EIA at the technical and process level by ensuring that:

- *EIAs are conducted where a sufficient level of uncertainty exists regarding the environmental impacts of a proposal* (the standard threshold to trigger the process should be lowered to where there is insufficient information available to predict whether non-negligible environmental harm may occur. Assessment levels may be tiered where appropriate. Uncertainty concerning whether an activity would meet the threshold would be reduced by the use of lists of designated developments);
- *there is adequate assessment of environmental uncertainties* (the level of uncertainty associated with a proposal must be anticipated and evaluated. Environmental practitioners must be able to understand the nature and type of uncertainty. Developing methods to assess uncertainty is the challenge here, particularly as some uncertainty will always be irreducible. The aim is to recognise the pervasiveness and unavoidability of different forms of uncertainty and to focus not on quantitative risk assessments but, rather, upon the confidence with which predictions of potential environmental effects are made. Expression of findings in statement form would diminish the misconception that statistical predictions are accurate, as can occur with expression of findings in numerical form. Thus, it is argued that uncertainty statements should accompany EIA reports. These would identify uncertainties and clarify the degree of confidence with which conclusions are drawn. An onus must be placed on developers to: obtain all available scientific evidence, lead evidence that proposals are within acceptable environmental standards and commit themselves to implement mitigation measures if predictions of no harm prove to be incorrect); and
- *environmental uncertainties are given appropriate weight in final decisions* (presumption of application of precautionary action if this is recommended following independent review of the adequacy of the EIA. This would 'bound' administrative discretion although it would allow transparency with regard to the basis for decision-making. It would allow a utilitarian adoption of the precautionary principle by allowing some precautionary action to be avoided if sufficient and compelling reasons are given as to why it is inappropriate to implement them in the instant case. This would ensure that there would be

express consideration of uncertainties involved in a proposal at the final decision-making stage).

These reform steps are applicable to generic EIA although their success is contingent on them being located in enforceable provisions in EIA legislation or treaties. In this regard, the policy context and rigour of the law is significant. EIA treaties should not be drafted in such a way as to allow states flexibility in their interpretation of key provisions, such as 'details of the project' (see Ebbesson 1996a: 47). This point is reminiscent of Ophuls's notion of 'mutual self-restraint' and Hobbes's observation that people are unlikely to voluntarily relinquish rights unless this is done in a cooperative fashion such that there could be equal enforcement of responsibilities against everyone. The goal is to have the proposed steps entrenched as minimum standards in regional or bilateral EIA agreements or included in the Espoo Convention. This would assist in the harmonisation of domestic EIA processes because states would be required to implement agreed standards. The success of these reform steps is also dependent on the conduct of EIA otherwise being in a sound manner. This would include, for example, adequate time periods within which to conduct environmental assessments and to present information for public review and comment. Processes must ensure the evaluation and consideration of project alternatives and that project-specific EIA be linked in part to developments in strategic and cumulative environmental assessments. In total, these reforms would change the focus of EIA so that it would better resemble its theoretical roots and purpose. The steps would also have normative influence by promoting thinking about sustainability issues at all levels of the EIA process. The EIA process would maintain high standards in environmental assessment while changing the focus from the acceptability of risk to the merits of the proposal relative to other interests. It would enable a more holistic approach to EIA and would avoid focusing on quantifying benefits of developments without adequate consideration of possible negative consequences. The approach articulated here also responds to a key challenge in the development of precautionary approaches: how to ensure overall decision-making is proceeded with in a precautionary manner. In this regard, the more guidance provided in EIA legislation and treaties on the detail required in environmental assessment the more effective and clear the overall process will be.

The impact of globalisation trends in numerous facets of society – institutional, cultural and social, political and economic – provide a pointer to the direction of environmental law and policy, particularly in relation to regional ecosystem awareness and recognition of shared interests in environmental issues. As a result, there will continue to be increased efforts at international cooperation on environmental matters. This trend

indicates progression towards a stricter regulatory environment for activities. Strengthened transboundary EIA provides an effective means of allowing 'effective active government without the statism of the past' (Giddens 2000).

It is to be noted that some of the procedural reforms articulated have already been applied, to varying degrees, in some jurisdictions. Most notably, consideration of alternatives is an existing, albeit poorly performed, element in EIA. The most innovative reform – to bound administrative discretion in accordance with pre-articulated precautionary criteria and presume application of certain measures – has been applied in part in the Canadian federal EIA legislation, although without a precautionary objective. Also, elements such as requiring developers to present evidence regarding the safety and acceptability of the environmental consequences of an activity have parallels to prior justification procedures.²³⁹ Case study analysis identified more challenges and options for precautionary decision-making. The political and administrative differences that exist across jurisdictions provide the most significant constraint on the implementation of these and other harmonisation measures. The Øresund case demonstrated the usefulness of empowering an independent panel of experts to review EIAs and indicates ways in which other panels with expanded mandates could be established. In particular, panel members should include non-scientists to assist in the broadening of discussions about environmental uncertainty. The Georges Bank findings demonstrate how many 'small' precautionary measures could be implemented and how the overall decision-making process could be improved.

9.2. Revisiting the tragedy of the commons

The tragedy of the commons discourse sheds light on the institutional dynamics of the transboundary environmental problems in question. In regard to the Øresund fixed link approval process, the potential environmental effects to areas outside Danish and Swedish territory were considered in a perfunctory manner and had no influence in the decision to build the link. In regard to the Canadian approval process for potential hydrocarbon developments on Georges Bank, there remain inadequate processes to assess and consider environmental effects in US waters. The most notable shortcoming is the current inability to consider adequately the impact of petroleum activities on fisheries – a sustainable resource that is remarkable for its migratory nature. Not only is the approval process for

²³⁹ E.g. see the process used for avoiding the dumping of industrial wastes in the North Sea (discussed in part 5.2) whereby panels must be satisfied that harmful effects will not occur.

Georges Bank petroleum activities currently insufficient with regard to possible effects in the US, the situation is more problematic if the effects would also be felt outside Canadian jurisdiction on the high seas – the quintessential unmanaged commons. This is because of the absence or weakness of legal and political action that could be brought against Canada for potentially causing harm to territory outside the jurisdiction of any country. Yet, if one country's environmental quality is affected by activities of another country in the global commons, then the situation is different. A recent example is the remarkable action of the Canadian Coast Guard in 1995 to seize a Spanish fishing trawler on the high seas in the North Atlantic, just outside Canada's exclusive economic zone off the coast of Newfoundland. Canada undertook this unilateral action to protect Greenland Halibut (turbot) within its jurisdiction from being affected by overfishing in adjacent waters, principally by the Spanish fishing fleet. Despite initial widespread criticism and questionable legality of Canada's unilateral and extraterritorial enforcement action, the boldness of seizing a ship in international waters – normally referred to as piracy – focused attention on the problems of overfishing and facilitated the conclusion of the UN Straddling Fish Stocks and Highly Migratory Fish Stocks Agreement (Teece 1997: 90). This multilateral treaty – not yet in force – would impose an affirmative duty on states to conserve fish on the high seas,²⁴⁰ and would allow action to be taken against states whose fleets habitually deplete the world's ocean resources, thus providing a mechanism to regulate the previously unmanaged commons of the high seas in relation to fish stocks. However, the provisions of the treaty could not be used against a country that is not a party to it. In this case, recourse must be made to imprecise and contestable obligations under customary international law to prevent overfishing. On this point, Teece (1997: 102; see also Magraw 1990: 7) concluded that:

The soft law principles derived from nonbinding agreements during the past twenty-five years reveal a general trend toward the belief that states must prevent public or private activities that cause significant environmental harm to the global commons.

In this regard, for a country to enforce customary law conservation measures – such as preventing overfishing – against states not party to applicable treaties, an assertion of extraterritorial jurisdiction would need to be based in international law on the universality principle that provides jurisdiction to all states regarding universally prohibited acts such

²⁴⁰ Article 117 states: 'All States have the duty to take, or to co-operate with other States in taking, such measures for their respective nationals as may be necessary for the conservation of the living resources of the high seas.' See also Article 192.

as slavery, piracy and hijacking (see Kobrick 1987: 1520). However, the exercise of universal jurisdiction at customary international law in this context requires that the majority of countries follow the practice of allowing other countries to capture the transgressors so that jurisdiction can be exercised over them (Teece 1997: 123). Although there is considerable evidence that many countries consider habitual overfishing to be a breach of international law, this has occurred because there is a long and well-documented history of overfishing, and, significantly, there is strong evidence that intensive fishing can decimate fish populations with serious implications for marine biological processes, and critically, fishing industries. As a result, many countries recognise the problem of overfishing on the high seas and a consensus has emerged about appropriate practices that arguably is strong enough to support unilateral action under customary international law such as Canada's action against Spain. Further, due to the recognition of the need for conservation management practices and the unclear legal approach under customary law, countries have recognised the need for an overarching treaty framework to restrain the otherwise unlimited freedom of states to fish on the high seas. However, with regard to the problem context of this thesis, it would currently not be possible for a country to take action against Canada if it considered Georges Bank petroleum activities – or even overfishing – could detrimentally affect the high seas. This is because the level of evidence of harm of the transboundary effects of petroleum activities is lower than that which exists concerning overfishing. Also, the harm occurs to the commons rather than specifically to the territory of one country. Further, the exercise of extraterritorial jurisdiction under the universality principle is limited to actions that are proportionate to the injuries suffered and are necessary to terminate the violation and prevent future breaches (see Teece 1997: 107). A corollary of this limitation on a state's action under this head is that a state cannot intrude on another state's sovereignty other than in relation to actions that are appropriate and adapted to preventing the international breach in question. Although Canada might legally prevent another country from causing harm to Canada's territory due to the conduct of activities on the high seas, no country could unilaterally prevent Canada from conducting activities within its jurisdiction that may cause harm to the high seas. In this regard, the intrusion on Spain's sovereign rights outside its territory by Canada seizing one of its flagged vessels thousands of kilometres from Spain adjacent to Canada is arguably less extensive than the intrusion on Canada's sovereign rights over the conduct of activities within its territorial jurisdiction that another country may wish to make to prevent any proposed Georges Bank activities that may cause damage to the high seas.

As no direct action could be taken against Canada for activities which it conducts within its jurisdiction that may cause harm to the high seas (absent contravention of a specific treaty provision or acceptance of more precise precautionary obligations), the dynamics of the exploitation of natural resources located close to international borders lend weight to the proposition that more attention should be given to the overarching legal framework concerning developments that one country may wish to undertake that may result in harm outside its jurisdiction. In relation to fishing, the international community surrounding the North Atlantic has recognised the merits of establishing a regional fishing commission with the aim of managing high-seas fisheries, recognising the need for a form of international coercion to prevent the tragedy of the commons on the high seas. The North Atlantic Fisheries Organization is empowered to set sustainable fishing quotas and conservation measures such as net size, and importantly, to enforce its regulations such as by providing independent inspectors on fishing fleets (Teece 1997: 121). It is argued here that the dynamics of transboundary environmental problems presented by large development activities have the potential to mirror aspects of the tragedy of the commons dilemma and require responses that address these challenges. In this context, codification of rules of customary international law and precise articulations of appropriate environmental policy in regional EIA treaties is an appropriate coercive influence on state behaviour. This can be modelled in part on regional institutions established principally to address problems associated with exploitation of transboundary resources²⁴¹ or environmental effects that are spread over great distances (e.g. global warming and ozone depletion to which international agreements are being developed to limit the contribution of harmful substances to the atmosphere). Presently, although Canada is under an obligation at international law to consider the potential effects of Georges Bank upon the high seas, there are no requirements as to how Canada is to take these effects into account and no means of ensuring that Canada actually does so. An overarching legal framework – a Leviathan in spirit – is therefore needed. This requires the imposition, or acceptance of, a general duty to conduct precautionary EIAs whether environmental harm may occur within the jurisdiction of another country or the global commons. An important issue for future study is the ability of regional EIA treaties to require assessment of environmental harm to the global commons, such as by legislating standing by third states. It is to be noted that on this point the Espoo Convention is silent. Although environmental ‘impact’

²⁴¹ Most notably, ‘straddling’ or ‘highly migratory’ fish stocks that spend a portion of their existence on the high seas and a portion within the jurisdiction of states: UN Straddling Stocks Agreement at the Conference on Straddling Fish Stocks and Highly Migratory Fish Stocks (adopted 4 August 1995) (Colburn 1997: 324). Few states have ratified the Agreement. See Kaye (2001: 258).

is defined quite broadly, and Parties are required to describe any such impacts and measures to mitigate them,²⁴² the Convention operates to prevent 'transboundary' impacts.²⁴³ These are limited to impacts in areas within the jurisdiction of a Party²⁴⁴ and therefore do not encompass impacts to the commons.

The perennial problem of insufficient enforcement processes of international law and the general voluntary nature of most international law obligations reminds us of Hobbes's conclusion that people must be held to what they covenant. The existence of comprehensive treaty provisions do not necessarily translate into compliance. Thus it is essential that there are effective measures for enforcement or commitment to strong standards. In relation to transboundary EIA, compliance cannot be guaranteed in the absence of a meaningful monitoring program. Transboundary EIA processes must have adequate institutional and legal support. The proposed method for presumptive application of precautionary measures entrenched in regional EIA agreements is the partly coercive manner by which a range of transboundary environmental harm can be avoided.

The Espoo Convention is the most appropriate instrument for inclusion of the precautionary reform methods because of its widespread application among the numerous European countries. Further, although it was established under the auspices of the UN Economic Commission for Europe and accession to the convention is presently restricted to ECE countries, or countries such as Canada and the US that have consultative status to the ECE, there are tentative proposals to open up the convention to all countries (Schrage 2000). However, more rapid inclusion of environmental objectives can be entrenched in international law by virtue of bilateral and regional EIA agreements. With regard to a specific development proposal where only the jurisdiction of two countries is likely to be affected, it is more likely that cooperation could be reached on an appropriate framework because the benefit of cooperation is more apparent to the parties. Where neighbouring states share cultural values and are reasonably well integrated economically, opportunities are greatest for the establishment of uniform high EIA standards.

9.3. Benefits of precautionary transboundary EIA

The precautionary principle responds to the problems presented to decision-makers by uncertainty involving gaps in scientific knowledge. It also has the potential to meet

²⁴² Appendix II.

²⁴³ Article 2.

²⁴⁴ Article 1.

challenges presented by less-tangible forms of uncertainty induced by political and social processes. As a result of the wide-ranging and pervasive nature of uncertainty that the principle seeks to address, precautionary approaches need to be mindful of a broad range of issues affecting public decision-making. Fisher and Harding (1999: 290) call for a 're-evaluation of decision-making structures and processes' and highlight the need for processes that enable the substance of uncertainty to be debated. The process advocated here allows consideration of scientific uncertainty and risk acceptance to be conducted early in the decision-making process before irrevocable decisions are made. As a result, it would facilitate the identification of precautionary steps for the planning, construction and operational phases of development projects and, more significantly, would ensure that the overall manner in which the approval process was conducted was precautionary. This would diminish the potential for politics and economics to circumscribe EIA processes, thus limiting politically induced uncertainty. Lowering the trigger threshold for EIA and increasing contents requirements would also ensure that assessments include cumulative effects more effectively. This would result in a structured, coherent and legitimate process for decision-making in situations of uncertainty.

The precautionary steps proposed here for transboundary EIA would make state practice, in relation to considering and addressing transboundary implications of development activities, consistent with evolving precautionary standards in international law. It would also decrease the chances of legal liability flowing under current law for subsequently caused harm because the activities causing them were approved on the understanding that harm would not occur (thus negating the foreseeability element) and the presumption element provides that approval is conditional on the implementation of all reasonable precautionary steps in the absence of compelling reasons that it is not appropriate to implement them. Thus, precaution would be operationalised in EIA at the practice level and EIA would be more consistent with its theoretical purpose of avoiding harm. The theoretical underpinning of EIA has, to a significant degree, been eroded by excessive focus on matters such as procedural compliance (e.g. US) and discretion (e.g. Australia).

In addition to improving EIA processes, the conduct itself of EIA as proposed here (that assesses and addresses transboundary impacts and incorporates consultation with potentially affected states) has the potential to reduce interstate conflict. On this point, Cooper (1986: 296) expressed the rationale for transboundary EIA:

[w]hen a state contemplates an action that may cause detrimental effects to external interests, awareness and consideration of those effects at the planning

stage and treatment of them as costs of the proposed action will obviously result in sound planning and likely mitigation of the externalities and therefore avoidance of international disputes. The procedures of notification, consultation, and obtaining prior consent, as well as the more diffuse concept of evaluation, are the techniques that state practice and international law have developed in furtherance of that end, particularly in response to detrimental environmental externalities.

Transboundary EIA can prevent interstate disputes by providing an open dialogue and consultation between agencies and the public of affected countries. It can also facilitate mediation and negotiation before irrevocable decisions are made concerning approval of activities that may cause serious environmental effects in other countries (Kennett 1995: 269). Significantly, disputes would be avoided by applying precautionary standards to all developments where there is reason to assume transboundary effects, rather than triggering EIA only by proposals that are well developed and inexorably leading to project approval due to financial and political commitments irrespective of environmental effects. The precautionary principle is highly suited to the nature of decision-making for projects which might have transboundary environmental implications. Even if the precautionary EIA process leads to increased time for approval, benefits lie in the overall manner in which the decisions are made being more sound, and the increased likelihood that better environmental results can be achieved.

The specific precautionary EIA measures identified in this thesis are timely because they are relevant to a range of existing and future development projects and transboundary resource exploitation disputes. The reforms are relevant to the approval process for any proposed development project or activity that may cause environmental harm to territory outside the jurisdiction in which it is proposed to be located. In particular, they are relevant to the approval processes used for activities such as:

- large projects to be located near an international border with possible transboundary effects, such as dams located in an upstream country with potential effects to downstream countries (e.g. Danube and Colorado rivers: Hungary-Slovakia and US-Mexico); nuclear power stations (e.g. France-Germany); salmon farms or navigational channels in shared rivers (e.g. Sweden-Norway); and decisions to allow development in border park regions impacting on protected habitats in another country (e.g. Maine-New Brunswick/Quebec) and resource extraction (e.g. Timor Gap: Australia-East Timor); and

- projects to be located near an internal border, such as pulp mills (e.g. Alberta-Saskatchewan) and large incinerators (e.g. New South Wales-Victoria).

The Timor Gap dispute discussed in part 2.2.1.a has parallels to the Georges Bank case study in so far as development of hydrocarbon reserves will take place in a border region only recently determined and will involve revenue sharing issues. The conclusions here also have relevance for another development issue that has arisen at the time of writing: proposals for allowing exploratory activity to determine the hydrocarbon potential of areas adjacent to the Australia's Great Barrier Reef Marine Park. Similar to the Georges Bank case, there are concerns that if oil reserves are found, this would inevitably lead to production approval, notwithstanding the proximity to particularly valuable ecosystem.

9.4. Challenges for precautionary EIAs

The reform proposals present procedurally straightforward modifications to the long-established practice of EIA. Perhaps the most significant barrier to the establishment of more detailed procedural requirements is the perception that they will impose further cost burdens on developers. However, a number of studies on environmental performance, resource efficiency, regulatory compliance and new product and service opportunities have found that financial penalties do not necessarily result from environmentally proactive corporate activity (see Salter and Ford 2000: 268). Studies that highlight the increased cost of regulation tend to focus on the cost of compliance, such as the cost of cleaning up oil spills and decommissioning plants rather than the economic benefits of improved environmental performance. Strengthening EIA will reduce some costs. Further, environmental regulations could be applied equally across, or otherwise within, jurisdictions. Then all developers would need to adhere to the same regulations and no individual operator would suffer a competitive disadvantage. Further, inefficient EIA processes – such as where development approval may be withheld at the final stage due to political reasons – may act as a deterrent to economic activity.

Another significant barrier to the adoption of the proposed precautionary measures in transboundary EIA regimes is the piecemeal process of reform at the international level. Countries with different traditions in public administration and economic and environmental policy commitments need to agree on the precise wording of the minimum standards suggested without allowing the substance of them to be diminished. The preferred option is for these measures to be adopted in bilateral or regional treaties where agreement is more readily achieved. The benefit of this is twofold: first, with a smaller

number of parties, the potential exists for a higher uniform standard to be set; likewise, the necessary process of harmonisation of EIA procedures is easier to achieve. Secondly, bilateral and trilateral regimes presuppose a regional approach whereby countries in an identifiable geographic region can develop policies and management strategies for the region rather than focusing on the location of political boundaries. In this regard, the current negotiation processes on bilateral EIA agreements in some of the Scandinavian countries provide the most promise for precautionary assessments. It is also hoped that a bilateral agreement can be concluded between Canada and US. The major challenge here remains the differences in the nature of political power in countries. This emerged in the two case studies. Denmark and Sweden differ greatly in public administration; likewise Canada and the US differ in terms of the relative power of the sub-national jurisdictions in the environmental arena. The international agreement process is slow, as evidenced by the inability of Canada, the US and Mexico to conclude the proposed trilateral EIA agreement under NAFTA after four years. The adoption of the proposed measures in the Espoo Convention would be optimal, although it may be necessary to adopt them in stages. The first step could be articulating a refined version of the precautionary principle as an explicit overriding objective of the convention.

9.5. The precautionary principle in transition from guiding principle to a normative transdisciplinary framework for decision-making: embodying precaution in transboundary EIA

The precautionary principle should not be viewed as a policy prescription divorced from wider environmental objectives. Rather, it is, as Fisher (2001) notes, 'directly concerned with the role and nature of public administration.' It requires decision-making processes that are responsive to the wide-ranging and pervasive nature of uncertainty. Fisher and Harding (1999: 297) note that:

[i]mplementation of the precautionary principle requires institutions that are actively and conscientiously committed to solving problems created by scientific uncertainty. Such problems need to be defined in their broadest sense and require a deliberative, transdisciplinary decision-making process. As such the application of the precautionary principle is not merely about scientific uncertainty but rather about good governance in the democratic state.

The authors argue the need for a 'deliberative' process, grounded in notions of democratic theory, whereby formal and informal processes are utilised to communicate and consider issues and new solutions. They also suggest a transdisciplinary approach to utilise wide-ranging expertise in recognition of the multifaceted nature of uncertainty. Arguments to base decision-making on 'sound science' ignore the tendency for scientific studies to focus narrowly on problems and to generate conclusions that are tentative and do not go beyond the generated data. Thus, the usefulness of scientific studies for decision-making is limited. More attention needs to be placed on other socio-political aspects of uncertainty. The involvement of the public enables the broadening of the information base and the expansion of the overall learning capacity of EIA. To this end, it is essential that countries adhere to the rule of law so that citizens potentially affected by decisions requiring authorisation by the Executive or the Legislature are equally subjected to the same body of stable and sound law rather than arbitrary decision-making. In this regard, it is essential that precautionary processes operate at the technical level, but also at the institutional level to ensure that the overall manner in which public decision-making is conducted is precautionary. This thesis has argued that this can be achieved in the context of EIA in relation to development projects where all the intricacies of uncertainty – environmental, social and political – play out in the most problematic fashion: at the international level. It is at this level that implementation of precaution is crucial, and most challenging. It is also at this level where the rule of law requires strengthening. For this reason, this thesis has examined democratic countries subject to the rule of law and with advanced environmental standards to consider on the most stringent and effective precautionary standards that can be achieved. In relation to multinational companies operating in developing countries without some of these characteristics, domestic legislation could be introduced in the country in which they are incorporated making it a condition that can only operate in the first-mentioned country if they comply with their own EIA standards.

This study has responded to one part of the challenge facing the precautionary principle: to refine implementation methods in the context of approval processes for development projects with transboundary implications. Although the principle evolves and shapes its contours according to particular sets of problems in different contexts, it is concluded that it is conceptually and theoretically useful and that it is an effective concept to apply in the area of environmental protection. To this end, it is not necessary for implementation methods to include the term 'precautionary principle'. Rather, the substance of the methods used should fulfil precautionary objectives such that focus is placed on establishing precautionary results rather than terminology. The principle

remains undermined because it has not featured prominently enough in situations where public decisions need to be made in conditions of uncertainty. Many projects receive approval only after consideration of environmental effects. However, the case studies and literature demonstrate that this often is not rigorous enough and many environmental imperatives do not influence the decision-making process. This study has demonstrated the need for better integration of scientific knowledge into decision-making frameworks in public administration. While this is also required at other levels – philosophical, political and policy – the focus here is on formal public administration and specific measures that can be taken in the EIA context. This would enable a partial reconceptualisation of EIA so that the focus shifts from considering the environmental acceptability of proposals that come forward to a conscious process of determining the most appropriate developments for a region. This would improve EIAs conceptual framework as a tool to affirm and implement environmental values.

EIA is one of the most obvious vehicles for giving effect to the precautionary principle. However, the necessary procedural reform of the EIA process suggested cannot be allowed to overshadow the *purpose* of EIA – that matters affecting the environment are fully examined and taken into account in development decision-making so that activities avoid or minimise anticipated adverse environmental effects. It is vital that precaution is entrenched in transboundary EIA regimes and given presumptive application in project approval. EIA is a tool which assists us in determining the future implications of our activities, and the precautionary principle enables us to consider carefully whether we proceed with potentially risky endeavours in the face of uncertainty. Precautionary transboundary EIAs would advance precaution in both a practical and normative sense and give transboundary EIA a more concrete conceptual foundation.

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