

ROUTLEDGE HANDBOOK OF SEABED MINING AND THE LAW OF THE SEA

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I.3

IMPLEMENTING THE PRECAUTIONARY APPROACH FOR SEABED MINING: A REVIEW OF STATE PRACTICE

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I.3

IMPLEMENTING THE PRECAUTIONARY APPROACH FOR SEABED MINING: A REVIEW OF STATE PRACTICE

Robert Makgill†, Aline Jaeckel, and Keith MacMaster

Robert had a sharp intellect and an unwavering passion for the ocean and international and environmental law. He conceived of and led this chapter. The idea for this chapter arose from his involvement in judicial proceedings on the matter of the precautionary approach. He was passionate about demonstrating that the practical obligations arising from the precautionary approach are indeed better understood by courts than some might believe.

When Robert invited us to co-write the chapter with him, his passion for the subject matter was evident from the outset. He was an excellent team player, and we learned a great deal from him during the research and writing of this chapter. We enjoyed frank, rigorous, and insightful discussions during online meetings.

We profoundly appreciate that it was possible to capture Robert's insights and extensive legal experience in this chapter, in honour of his legacy.

Robert will be deeply missed.

Introduction

Much was written on precaution during the 1990s and 2000s, including criticisms that the principle is too vague.¹ This chapter contends that contemporary administrative approaches, international law, and State practice indicate that the obligations arising from the precautionary approach are reasonably well understood. There is little room for debate concerning its requirement for action to be taken to prevent environmental degradation. Incomplete information and scientific uncertainty cannot justify a failure to act to prevent damage. Perhaps, more fundamentally, incomplete information and uncertainty are often invoked as grounds for preventing development from taking place. Precaution is particularly apposite to seabed mining because of the paucity of scientific information presently available on the relevant marine environments and the consequential difficulty in assessing the risk of harm.

¹ P. Sandin et al., 'Five charges against the precautionary principle', *Journal of Risk Research* 5, 2002, 287–99; A. Arcuri, 'Reconstructing precaution, deconstructing misconceptions', *Ethics & International Affairs* 21, 2007, 359–79.

The precautionary approach is not expressly provided for in the United Nations Convention on the Law of the Sea 1982 (UNCLOS).² However, it is found in the International Seabed Authority's (ISA) Exploration Regulations³ and Draft Exploitation Regulations,⁴ and discussed in the Seabed Advisory Opinion.⁵ This chapter reviews the ISA's approach to precaution against selected State practice concerning implementation of the precautionary approach. The first part of the chapter provides an overview of the precautionary principle within different administrative contexts including regulation, impact assessment, and seabed mining operations. Next, the chapter discusses how international courts and tribunals have developed the precautionary approach from a soft law principle to one that stands on the cusp of attaining customary law status.

The chapter then considers the role of State practice in clarifying the interpretation and implementation of the precautionary approach in relation to four Commonwealth State Parties to the UNCLOS: New Zealand, Australia, Canada, and the United Kingdom (UK). The authors acknowledge, from the outset, that these States have been selected based on their familiarity with Commonwealth jurisdictions and for ease of comparison. Each State's precautionary practices vary in their direct relevance to seabed mining. New Zealand sits at one end of the spectrum with legislative provisions and judicial decisions concerning the precautionary approach and seabed mining. Australia, Canada, and the UK, on the other hand, exhibit differing levels of preparedness concerning precaution and its implementation in relation to seabed mining. The chapter concludes with a discussion of how the State practice identified might assist the ISA to satisfy its precautionary obligation in respect of the Area. This includes implementing measures for prerequisite information on the receiving environment, environmental impact assessment (EIA), the burden of proof, and where an adaptive management approach might be consistent with precaution.

Precaution in an administrative context

The precautionary approach administratively and judicially applies to all stages of seabed mining.⁶ First, it applies to States and the ISA when determining the rules and regulations for seabed mining, including the types of precautionary measures that should be imposed. Second, applicants must implement precaution when undertaking preliminary work in support of an application for exploration or exploitation, including establishing environmental baseline information and preparing environmental impact assessments of the proposal's potential environmental effects. Third, States, the ISA, and private applicants (including contractors within the Area) must apply a precautionary approach when managing or overseeing mining operations. Lastly, precaution informs judicial consideration of the legal and evidential questions that might arise concerning the first three stages of seabed mining. In an administrative context, the precautionary approach requires actors to take *early* measures to protect the environment, even if scientific uncertainties remain.⁷

2 *United Nations Convention on the Law of the Sea*, 10 December 1982, 1833 UNTS 3. Hereinafter 'UNCLOS'.

3 ISA, *Regulations on Prospecting and Exploration for Polymetallic Nodules in the Area*, 22 July 2013, ISBA/19/C/17, regulations 2(2), 5(1), 31. Hereinafter 'ISA, Regulations on Prospecting and Exploration'.

4 ISA, *Draft Regulations on Exploitation of Mineral Resources in the Area*, 22 March 2019, ISBA/25/C/WP.1, regulation 2(e)(ii). Hereinafter 'ISA, Draft Regulations on Exploitation'.

5 *Responsibilities and Obligations of States Sponsoring Persons and Entities with Respect to Activities in the Area, Advisory Opinion, ITLOS Reports 2011, case no 17*. Hereinafter 'Seabed Advisory Opinion'.

6 See e.g., Seabed Advisory Opinion, op. cit. note 5; and ISA, Regulations on Prospecting and Exploration, op. cit. note 3, regulations 2(2), 5(1), 31(2), 31(5), Annex IV, section 5.1.

7 Rio Declaration on Environment and Development, 14 June 1992, 31 ILM 874, Principle 15; N. de Sadeleer, 'The precautionary principle and climate change', in M. Faure (ed.), *Elgar encyclopedia of environmental law*, Edward

This mirrors the pro-active rationale of precaution, which contrasts with the outdated notion of waiting for substantial evidence before taking action to prevent environmental harm.⁸

Deciding which precautionary measures are appropriate for seabed mining requires an assessment of the potentially harmful effects and the risks posed by incomplete information and uncertainty. This can be problematic within all UNCLOS' jurisdictional zones due to the paucity of scientific knowledge presently held concerning the biophysical characteristics of the seabed and associated water column together with the costs of obtaining adequate information at a suitable scale. Scientific research, nevertheless, indicates that seabed mining activities may have significant adverse effects on the marine environment and ecosystems.⁹ The paucity of available quantitative and qualitative environmental data means that a high degree of uncertainty remains concerning potential adverse impacts, and their spatial and temporal dimensions. While a short-term localised adverse effect may cause an inappropriate level of harm, a long-term adverse effect could result in an irreversible ecosystem-wide level of harm. The precautionary approach is intended to be applied to seabed mining until science closes information gaps concerning the receiving environment, the range of potential adverse effects, and the measures necessary to address those effects.

The precautionary approach seeks to enable decision-making despite the existence of uncertainty and incomplete information. The degree of risk that we allow ultimately depends on the relative values we assign to the exploitation of seabed minerals versus protection and preservation of the marine environment and its ecosystem-wide services and integrity. This raises important questions concerning the level of environmental harm deemed acceptable¹⁰ and the degree of harm we are prepared to risk in the pursuit of seabed minerals. Science can readily identify what is known and the extent of our knowledge, but value judgments determine 'how safe do we want to play'.¹¹ These value judgments are normally expressed through environmental goals and objectives that must be achieved when making risk-based decisions. They should include a clear framework of effects-based thresholds and precautionary measures to ameliorate the risk that those thresholds might be exceeded. Precautionary measures¹² should be *effective* in achieving environmental goals and objectives. They should also be *proportionate* to the goals and objectives so that they are no more restrictive than is necessary.¹³

Elgar, 2016, 20–31, pp. 25–29; E. Morgera, 'The ecosystem approach and the precautionary principle', in M. Faure (ed.) *Elgar encyclopedia of environmental law*, Edward Elgar, 2017, 70–80.

8 A. Trouwborst, 'The precautionary principle in general international law: Combating the Babylonian confusion', *Review of European Community & International Environmental Law* 16, 2007, 185–95; A.L. Jaeckel, *The international seabed authority and the precautionary principle*, Brill Nijhoff, 2017.

9 W. Roest, H. Brekke and M. Clark, 'The scientific challenges of deep-sea mining', in V. Tassin Campanella (ed.), *Routledge handbook of seabed mining and the law of the sea*, Routledge, 2023, Chapter I.1; K. Miller et al., 'An overview of seabed mining including the current state of development, environmental impacts, and knowledge gaps', *Frontiers in Marine Science* 4(418), 2018. Available online <<http://dx.doi.org/10.3389/fmars.2017.00418>> (accessed 15 December 2021).

10 M. Stanley and T. Arin, *Precautionary management of deep sea minerals – Pacific Possible Background Paper No 2*, The World Bank, 2017, p. 41.

11 Jaeckel, op. cit. note 8, p. 49.

12 For an overview of potential protective measures for deep seabed mining, see Stanley and Arin, op. cit. note 10, pp. 48–49; and Jaeckel, op. cit. note 8, p. 311.

13 S. Marr, *The precautionary principle in the law of the sea: Modern decision-making in international law*, Martinus Nijhoff, 2003, pp. 35–37; and R. Harding and E. Fisher, 'Introducing the precautionary principle', in R. Harding and E. Fisher (eds.), *Perspectives on the precautionary principle*, Federation Press, 1999, 2–25, p. 12.

The State Parties discussed in this chapter have cultivated a reasonable level of jurisprudence and technical expertise concerning the implementation of precautionary measures to achieve different environmental goals. The ISA, on the other hand, has yet to provide clear regulatory guidance on how to implement the key environmental obligations that apply to seabed mining within the Area. The ISA and States are required ‘to ensure effective protection for the marine environment from harmful effects that may arise from [seabed mining] activities’ and ‘the prevention of damage to the flora and fauna of the marine environment’ (article 145, UNCLOS). While the Mining Code restates the ‘effective prevention’ obligation,¹⁴ it does not provide any measurable direction (e.g., objectives or targets) on how this obligation should be achieved.¹⁵ Further, the ISA has yet to promulgate environmental thresholds beyond which the adverse impacts of seabed mining would be determined unacceptable.¹⁶

This means that the 30 scientists and lawyers who comprise the Legal and Technical Commission (LTC) are tasked with interpreting the meaning of ‘effective prevention’ and how the precautionary approach should be implemented to achieve that goal.¹⁷ While the LTC has an important role to play, it does not represent the diverse range of State, inter-governmental organisation (IGO), or stakeholder views concerning environmental goals and objectives, let alone how the precautionary approach should be implemented to achieve them.

It may be that the ISA has been slow to develop environmental goals due to debate concerning whether UNCLOS prioritises seabed mining or protection of the marine environment. Some commentators, presently, appear to consider that the decision to permit seabed mining took place at the time parties agreed to the Convention. On this view, seabed mining activities are a *fait accompli*, and the regulatory goal should be minimising harm to the marine environment. Lodge, who is presently the ISA Secretary-General, and Verlaan contend, in this respect, that:

It must be stressed (...) that it is useless and counter-productive to argue that an a priori condition for deep-sea mining is an existential debate about whether it should be permitted to go ahead or not. The international community passed that point already many years ago. This is because the one factor that distinguishes deep seabed mining from any other extractive activity, or indeed any other ocean use, is the nature of the underlying legal regime established by the Law of the Sea Convention.¹⁸

It is unlikely that Lodge or Verlaan intended the above commentary to mean that seabed mining should be permitted in all cases. Framing the question of whether seabed mining should be permitted (or not) as existential, in every case, would clearly risk breaching international obligations to protect and preserve the marine environment. The Seabed Advisory Opinion identified, in this

14 See e.g., ISA, Regulations on Prospecting and Exploration, op. cit. note 3, regulation 21(4)(b); ISA, Draft Regulations on Exploitation, op. cit. note 4, regulation 13(4)(c).

15 V. Tunnicliffe et al., ‘Strategic environmental goals and objectives: Setting the basis for environmental regulation of deep seabed mining’, *Marine Policy* 114, 2020, 103347.

16 A. Jaeckel, *The implementation of the precautionary approach by the international seabed authority*, ISA Discussion Paper No. 5, 2017. Available online <<https://www.isa.org.jm/files/documents/EN/Pubs/DPs/DP5.pdf>> (accessed 25 August 2021), p. 3.

17 *Ibid.*, p. 8.

18 M. Lodge and P. Verlaan, ‘Deep-sea mining: International regulatory challenges and responses’, *Elements* 14(5), 2018, 331–36, p. 336.

respect, numerous *a priori* obligations¹⁹ and measures²⁰ that must be satisfied before seabed mining activities can be permitted.

In any event, it appears that there is some tension within the ISA as to the circumstances under which seabed mining should take place. Some State Parties contend that the benefit of (hu)man-kind principle has a broad application that goes beyond the equitable sharing of economic benefits from seabed mining (article 140, UNCLOS). Those States assert that they will only support deep-sea mining in the Area ‘if it is demonstrably beneficial to mankind’.²¹ It would be pragmatic, if nothing else, to engage States and their governing agencies (as well as IGOs and stakeholders) in the preparation of further regulations for the Area, as their regulatory, judicial, and technical experiences could provide valuable sources of scientific information and decision-making expertise.

Precaution in international law

The precautionary approach is a central and well-established principle under international environmental law.²² At its core, it aims to prevent environmental harm by taking *early* action, even if scientific uncertainty about the risks remains. It is applicable to seabed mining within the Area principally because States, the ISA, and contractors are expressly required to apply a precautionary approach under the ISA’s Mining Code.²³ It applies more generally to seabed mining within that Area and areas under national jurisdiction because it is a means of achieving the protection and preservation obligations under Part XII of UNCLOS. The South China Sea Arbitration underlined the broad jurisdiction of Part XII, in this respect, stating that its obligations ‘apply to all States with respect to the marine environment in all maritime areas, both inside the national jurisdiction of States and beyond it’.²⁴

The precautionary approach prevents scientific uncertainty from being used as a reason for failing to take steps to prevent environmental damage where there is a risk of harm. The definition most frequently referred to is found in Principle 15 of the Rio Declaration.²⁵ Normally, science, by way of an EIA, provides relatively comprehensive information on the adverse impacts of a proposed activity. This enables decision-making powers to be exercised with a degree of certainty as to whether a proposal satisfies regulatory goals. However, the paucity of scientific information

19 R. Makgill and A.P. Linhares, ‘Deep seabed mining – Key obligations in the emerging regulation of exploration and development in the Pacific’, in R. Warner and S. Kaye (eds.) *Routledge handbook of maritime regulation and enforcement*, Routledge, 2016, 231–61, pp. 234–36; Seabed Advisory Opinion, op. cit. note 5, see obligation to ensure and due diligence paras. 107–20, and direct obligations paras. 121–40, and environmental impact assessment paras. 141–50.

20 Ibid., pp. 237–38; and Seabed Advisory Opinion, op. cit. note 5, see due diligence and necessary measures paras. 117–20, and laws and regulations and administrative measures paras. 218–22.

21 African Group, *Request for Consideration by the Council of the African Group’s Proposal on the Economic Model/ Payment Regime and Other Financial Matters in the Draft Exploitation Regulations under Review*, 9 July 2018. Available online <<https://www.isa.org.jm/files/files/documents/nv.pdf>> (accessed 25 August 2021).

22 G. Warwick, ‘The contribution of the precautionary principle to marine environmental protection’, in R. Barnes and S. Kaye (eds.) *Frontiers in international environmental law: Oceans and climate challenges*, Brill Nijhoff, 2021, pp. 368–406.

23 ISA, Regulations on Prospecting and Exploration, op. cit. note 3, regulation 31; ISA, Draft Regulations on Exploitation, op. cit. note 4, regulations 2(e)(ii), 44(a).

24 *Re. Arbitration Between the Republic of the Philippines and the People’s Republic of China, Award, 12 July 2016, PCA Case No. 2013–19*, para. 940. Hereinafter ‘South China Sea Arbitration’.

25 C. Foster, ‘Adjudication, arbitration and the turn to public law “Standards of Review”’: Putting the precautionary principle in the crucible’, *Journal of International Dispute Settlement*, 2012, 525–58, p. 531.

on marine ecosystems, and seabed mining impacts, means that decision-makers are often faced with incomplete information against which to assess the achievement of environmental goals.²⁶ UNCLOS does not make express provision for the precautionary approach, as it predates the rise of the principle in international law. Nonetheless, it has been argued by judges and scholars alike that the precautionary approach can be implied into the Convention.²⁷ It is relevant, in this respect, that various international courts and tribunals have jurisdiction over the ‘interpretation and application’ of UNCLOS (articles 287(1) and 288). Tribunals considering questions of interpretation may ‘take in account ... any relevant rules’ of international law pursuant to article 31, paragraph 3 (c) of the Vienna Convention.²⁸ This includes the use of international jurisprudence as an interpretive aid.

The due diligence doctrine has been used in this manner to interpret the relationship between the obligation to protect the marine environment under Part XII of UNCLOS and the requirement for a precautionary approach to risk. Resort to due diligence originated from an examination of the words ‘to ensure’ under the Convention. State Parties are required ‘to ensure’ effective control of activities within the Area, ‘protection of the marine environment from harmful effects’, and that ‘activities do not cause damage by pollution’ (articles 139(1), 145, and 194(2)). The Seabed Advisory Opinion observed that the words ‘to ensure’ concern conduct and may be characterised as an obligation of due diligence.²⁹ The South China Sea Arbitration, more recently, concurred that the obligation ‘to ensure’ requires ‘due diligence’ in the sense that a State should not only adopt appropriate rules and measures but also a certain level of vigilance in their administration and enforcement.³⁰

The Seabed Advisory Opinion determined that the precautionary approach is an integral part of the due diligence obligation.³¹ This is because due diligence requires States to take ‘appropriate measures to prevent damage’ and applies ‘where scientific evidence concerning the scope and potential negative impact of the activity is insufficient but where there are plausible indications of potential risks’.³² There is an implicit link between due diligence and precaution where there is scientific uncertainty,³³ and States who disregard the risk of negative impacts do not satisfy the due diligence obligation or comply with the precautionary approach.³⁴ The Chamber concluded by observing that the incorporation of the precautionary approach into a growing number of international treaties, and other instruments, reflecting the formulation of Principle 15 ‘has initiated a trend towards making this approach part of customary international law’.³⁵ It might be argued

26 ISA, ‘Biodiversity, species ranges, and gene flow in the abyssal Pacific nodule province: Predicting and managing the impacts of deep seabed mining’, Jamaica: ISA Technical Study No. 3, 2008, pp. 4–6; J. Halfar and R. Fujita, ‘Precautionary management of deep-sea mining’, *Marine Policy* 26, 2002, 103–6, p. 105.

27 For a summary of the discussion, see Jaeckel, op. cit. note 8, Ch. 4.4.

28 *Vienna Convention on the Law of Treaties*, 23 May 1969, 1155 UNTS 331.

29 Seabed Advisory Opinion, op. cit. note 5, para. 110.

30 South China Sea Arbitration, op. cit. note 24, para. 944. See also *Request for Advisory Opinion submitted by the Sub-Regional Fisheries Commission (SRFC)*, *Advisory Opinion*, 2 April 2015, paras. 130–32. Hereinafter ‘Fisheries Advisory Opinion’; Seabed Advisory Opinion, op. cit. note 5, para. 117; *Pulp Mills on the River Uruguay (Argentina v. Uruguay) Merits*, *Judgment*, *I.C.J. Reports 2010*, paras. 101 and 197. Hereinafter ‘Pulp Mills’.

31 Seabed Advisory Opinion, op. cit. note 5, para. 131.

32 Ibid.

33 Ibid., para. 132. See also *Southern Bluefin Tuna (New Zealand v. Japan; Australia v. Japan)*, *Provisional Measures*, *Order of 27 August 1999*, *ITLOS Reports 1999*, paras. 77, 79–80.

34 Seabed Advisory Opinion, op. cit. note 5, para. 131.

35 Ibid., para. 135.

that the precautionary approach applies (as a rule of law) to seabed mining activities in all maritime areas under UNCLOS, irrespective of whether the principle remains an emerging rule or has attained customary status. This is because precaution might be said to be held aloft through its intrinsic relationship with the customary law of due diligence.

State practice: fleshing out the meaning of precaution

Introduction

The chapter turns to a descriptive review of the precautionary practices of four Commonwealth State Parties to UNCLOS: New Zealand, Australia, Canada, and the UK. The UK and New Zealand are governed by traditional Westminster-styled parliamentary democracies;³⁶ Australia and Canada differ slightly from the UK and New Zealand insofar as they are governed by constitutional democracies with federal and State levels of government. Despite the differences between these States, their Commonwealth heritage provides a shared foundation for their respective policy, legislation, and judicial decisions.³⁷ This means that the environmental law of one State is often familiar to another. It is not unusual, in this respect, for doctrine established in one jurisdiction to be found (or at least reiterated) in the common law of the others.

With the ISA's mandate being restricted to seabed minerals, its experience in managing marine activities and applying a precautionary approach is limited. The State Parties discussed, in contrast, have built up varying levels of expertise and experience in the application of the precautionary principle. Their administrative and judicial branches of government are regularly required to consider terrestrial and marine development proposals that are characterised by incomplete information, scientific uncertainty, and the risk of environmental damage. They have variously enacted legislation to govern resource development (including seabed mining) within their territorial sea (TS), exclusive economic zone (EEZ), continental shelf, and the Area.

New Zealand

New Zealand's reliance on natural resources means that their management is a principal focus of environmental policy (irrespective of government).³⁸ Environmental law in New Zealand is largely a branch of public law, comprising a comprehensive set of statutes that codify environmental rights and duties. New Zealand's environmental common law comprises its own judicial decisions and other common law decisions where relevant (especially those of Australia, Canada, and the UK).³⁹ The precautionary approach as a principle of New Zealand public law is concerned with managing risk in the face of uncertain science concerning complex ecosystems. Adaptive management facilitates risk management by enabling an activity to be reviewed, refined, amended, or stopped as information comes to hand.⁴⁰

36 Makgill, 'New Zealand', in R. Martella & B. Grosko (eds.), *International environmental law: The practitioner's guide to the laws of the planet*, American Bar Association, 2014, 909–32, p. 909.

37 Ibid. J. Taberner, 'Australia', 885–908, pp. 885–6; and G. Taylor, 'Canada', 329–48, pp. 330–31.

38 Makgill, 'New Zealand', op. cit. note 36, p. 909.

39 Ibid., p. 910.

40 R. Somerville, 'Policy adjudication, adaptive management and the environment court', *Resource Management Theory and Practice* 9, 2013, 1–28, p. 12.

The Resource Management Act 1991⁴¹ (RMA) is the principal statute for managing natural and physical resources on land and sea.⁴² It has jurisdiction over land (including seabed and foreshore), air, and water out to the TS's 12 nautical mile (M) boundary. The purpose of the RMA (i.e., goal) is deliberately expressed as sustainable management⁴³ rather than sustainable development. The Act does not seek to redistribute wealth or equitably allocate rights to development.⁴⁴ Sustainable management is essentially a science-based statutory goal. It relies on applicants avoiding, remedying, or mitigating the effects of proposed activities rather than strictly prescribing how and where development should occur.⁴⁵ The TS (including the seabed) is part of the public domain, and there is a presumption against its use and development.⁴⁶ This means that the proponents of a development activity must apply for consent and provide a supporting EIA.⁴⁷

The Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012⁴⁸ (EEZ Act) establishes an effects-based regime to manage activities within New Zealand's EEZ and Continental Shelf. It was enacted to fill the gaps in New Zealand's existing environmental management regime beyond the 12 M territorial sea boundary and give effect to New Zealand's obligations under UNCLOS to manage and protect natural resources within those jurisdictional areas.⁴⁹ The EEZ Act continues or enables the implementation of New Zealand's obligations under various international conventions, including UNCLOS.⁵⁰ The EEZ Act's two purposes (i.e., goals) are to (a) promote the sustainable management of natural resources; and (b) protect the environment from pollution.⁵¹ The sustainable management purpose enables integrated decision-making where resource development proposals have cross-boundary effects between the TS, EEZ, and Continental Shelf.⁵² There is a presumption against the use and development of natural resources unless the activity in question is permitted by regulations under the EEZ Act.⁵³

Decision-makers considering applications for marine consents and discharge consents must apply the EEZ Act's information principles to achieve the purposes of the Act.⁵⁴ The information principles require decision-makers to 'take into account any uncertainty or inadequacy in the information available'.⁵⁵ If 'the information available is uncertain or inadequate' the decision-maker 'must favour caution and environmental protection'.⁵⁶ 'If favouring caution and environmental protection means that an activity is likely to be refused' the decision-maker 'must first consider

41 Resource Management Act 1991 No. 69 (RMA).

42 Makgill, 'New Zealand', op. cit. note 36, p. 910.

43 RMA, section 5.

44 Makgill, 'New Zealand', op. cit. note 36, pp. 910–11.

45 Ibid., p. 911.

46 R. Makgill and H. Rennie, 'A model for integrated coastal management legislation: A principled analysis of New Zealand's resource management act 1991', *The International Journal of Marine and Coastal Law* 27, 2012, 135–65, p. 151; Makgill, 'New Zealand', op. cit. note 36, p. 917.

47 RMA, sections 12, 88(2).

48 Exclusive Economic Zone and Continental Shelf (Environmental Effects) Act 2012 No. 72. Hereinafter 'EEZ Act'.

49 R. Makgill, K. Dawson, and N. de Wit, 'The exclusive economic zone and continental shelf (environmental effects) bill', *Resource Management Journal*, April 2012, p. 1.

50 EEZ Act, section 11.

51 Ibid., section 10(1)(a)–(b).

52 Makgill, 'New Zealand', op. cit. note 36, pp. 917–18.

53 EEZ Act, section 35.

54 Ibid., sections 10(3)(b), and 61.

55 Ibid., section 61(1)(c).

56 Ibid., section 61(2).

whether taking an adaptive management approach would allow the activity to be undertaken'.⁵⁷ An adaptive management approach is prohibited where the application is for a marine discharge consent (i.e., pollution).⁵⁸ This is likely because allowing adaptive management of pollution would be inconsistent with the Act's goal of protecting the environment from pollution. In simple terms, once pollution occurs it cannot be undone (i.e., the effects are irreversible).

In *Sustain Our Sounds Inc v New Zealand King Salmon Company Ltd*,⁵⁹ the New Zealand Supreme Court considered whether adaptive management was consistent with a requirement for a precautionary approach under the RMA and, if so, whether the requirements of adaptive management were satisfied.⁶⁰ The Court considered international commentary and New Zealand, Australian, and Canadian case law. It observed that the IUCN guidelines on the application of the precautionary principle⁶¹ included a guideline on adaptive management.⁶² The Court noted that the IUCN guidelines recognise that the precautionary principle may require the prohibition of activities. This may be the case where the potential damage is likely to be irreversible or vulnerable species or ecosystems are at risk.⁶³

The Supreme Court observed that an applicant should not be placed in a position of anticipating and researching all hypotheses before making an application for development. However, an applicant must establish a sufficient case to persuade a decision-maker to grant approval based on an adaptive management plan.⁶⁴ It is important that baseline knowledge is collected, upon which adaptive management plans can build an ongoing and cycling process. Furthermore, plans should have certain and enforceable objectives and establish a process for evaluating monitoring results that enables the review and refinement of hypotheses.⁶⁵

The Court found that the question of whether an adaptive management approach can be considered a part of a precautionary approach is contingent on whether there is an adequate evidential foundation that adaptive management will sufficiently reduce uncertainty and manage any remaining risk for the purpose of achieving the statutory goal. The Supreme Court concluded that whether risk and uncertainty will be sufficiently diminished, for an adaptive management approach to be consistent with the precautionary approach, ultimately depends on the extent of risk and uncertainty and the gravity of the consequences. For example, a small risk of annihilation of an endangered species may mean an adaptive management approach is unavailable. A larger risk of consequences of less gravity may leave room for adaptive management.⁶⁶

There have been several proposals to undertake seabed mining within New Zealand's EEZ and Continental Shelf under the EEZ Act.⁶⁷ Trans-Tasman Resources Ltd's (TTR) proposal to

⁵⁷ *Ibid.*, section 61(3).

⁵⁸ *Ibid.*, section 61(4)(a)(ii).

⁵⁹ *Sustain Our Sounds Inc v New Zealand King Salmon Company Ltd* (2014) NZSC 40, 17 ELRNZ 520 (*Sustain Our Sounds Inc*).

⁶⁰ *Ibid.*, para. 95.

⁶¹ International Union for Conservation of Nature, *Guidelines for applying the precautionary principle to biodiversity conservation and natural resource management*, as approved by the 67th meeting of the IUCN Council, 14–16 May 2007. Hereinafter 'IUCN, *Guidelines for applying the precautionary principle*'.

⁶² *Ibid.*, guideline 12.

⁶³ *Sustain Our Sounds Inc*, *op. cit.* note 59, para. 111.

⁶⁴ *Ibid.*, para. 114.

⁶⁵ *Ibid.*, para. 115.

⁶⁶ *Ibid.*, para. 139.

⁶⁷ In addition to the TTR decisions discussed below, see *Decision on Marine Consent Application by Chatham Rock Phosphate Limited*, Environmental Protection Authority, 10 February 2015.

mine large quantities of iron sand within New Zealand's EEZ and Continental Shelf has been the most lengthy and litigious (by far). TTR's first seabed mining proposal was declined by the Environmental Protection Authority (EPA) in 2014 due to inadequate information. The EPA found that the application was premature, and more time should have been taken to understand the proposed operation, its effects on the receiving environment, and existing interests. For those reasons, the application did not meet the sustainable management purpose of the EEZ Act.⁶⁸

TTR's second seabed mining proposal, while reduced in scope, still sought approval to mine up to 50 million tonnes (per annum) of seabed material for a term of 35 years.⁶⁹ The proposal was not supported by any substantive new information on the receiving environment or potential adverse effects. In addition, legislative changes intended to satisfy international law meant that the proposal's sediment plume was now treated as pollution under the EEZ Act and ineligible for an adaptive management approach. The most fundamental change between the first and second proposals was that the second proposal was supported by a more sophisticated predictive model. TTR sought to withhold the predictive model information and certain data on sediment plume effects from public notification on the basis that the information was commercially sensitive.

The Environment Court ruled, on an application for procedural directions, that the 'public's right to information enabling its effective participation' overrode 'trade secrecy and commercial prejudice considerations'.⁷⁰ Ultimately, the crucial nature of the predictive model in informing the conclusions in the impact assessment, combined with the public's right to participate effectively in the consent process, outweighed any trade secret or business prejudice to TTR by a considerable margin.⁷¹

The EPA ultimately granted TTR's second application⁷² despite the finding that the resulting sediment plume would have significant adverse effects on benthos and other marine life (including within the territorial sea). As the EPA lacked sufficient baseline information to formulate environmental conditions, it imposed conditions requiring TTR to undertake two further years of pre-commencement monitoring to obtain the baseline information necessary to formulate clear effects-based thresholds. The pre-commencement monitoring conditions were, in turn, supplemented by management plan conditions establishing broadly stated goals to be defined as hard thresholds after the pre-commencement baseline information had been collated (i.e., following the two years of pre-commencement monitoring).⁷³

A wide range of sectoral stakeholders appealed the majority decision to approve the seabed mining proposal to the High Court. The joint parties claimed that the majority decision failed to observe the Act's requirement for the decision-maker to 'favour caution and environmental protection' where 'the information available is uncertain or inadequate'.⁷⁴ The High Court allowed the stakeholder appeals finding the EPA had erred by using adaptive management to manage pollution

68 *Trans-Tasman Resources Ltd Marine Consent Decision, Environmental Protection Authority, 17 June 2014 (TTR decision 2014)*; Makgill and Linhares, 'Deep seabed mining', op. cit. note 19, p. 251.

69 *Trans-Tasman Resources Ltd Marine Consents and Marine Discharge Consents Decision, Environmental Protection Authority, 3 August 2017*, pp. xi and xvi. Hereinafter '*TTR decision 2017*'.

70 *Kiwis Against Seabed Mining Inc. v Environmental Protection Authority (2016) NZEnvC 217*, para. 62. Hereinafter '*Kiwis Against Seabed Mining Inc.*'.

71 *Ibid.*, para. 68.

72 *TTR decision 2017*, op. cit. note 69, p. xi, para. 2.

73 R. Makgill, J. Gardiner-Hopkins, and N. Coates, 'Current legal developments: New Zealand', *The International Journal of Marine and Coastal Law* 35, 2020, p. 837.

74 *Ibid.*, p. 838.

effects (i.e., sediment plume) which is prohibited under the EEZ Act.⁷⁵ It is noteworthy, in light of the following judgments, that the High Court went on to observe that it was doubtful that an adaptive management approach would have been available, in any event, ‘because one of the prerequisites for using an adaptive management approach is to have sufficient baseline information so that appropriate conditions can be drafted. There must be real doubt that this is the case here’.⁷⁶ TTR appealed the High Court’s decision to the New Zealand Court of Appeal.

The Court of Appeal set the scene for its judgment, describing it as an inquiry that ‘must be informed by the principles of international law to which the EEZ Act is intended to give effect’.⁷⁷ The Court observed that the EEZ Act provides a clear direction to decision-makers to ‘favour caution and environmental protection’ where the available information is ‘uncertain or inadequate’ (i.e., the information principles).⁷⁸ The Court was clear that these information principles are how New Zealand has sought to implement its international obligations, including under the ‘precautionary approach’ or ‘precautionary principle’ contemplated by Principle 15 of the Rio Declaration.⁷⁹ The Court did not agree that the EPA had erred by imposing an ‘adaptive management approach’ in contravention of the prohibition under the EEZ Act. Rather, the error was more fundamental. The EPA had failed to make the connection between favouring caution and the protection purpose of the Act (i.e., protecting the environment from pollution).⁸⁰ The ‘high degree’ of uncertainty about the effects of the proposal could not be cured by ‘post-decision information gathering and monitoring of effects’. This uncertainty, moreover, was not solved by ‘overly broad’ conditions that employed vague requirements to avoid adverse effects on certain environments which, in turn, were ‘to be fleshed out through subsequent management plans’.⁸¹ TTR was granted leave to appeal to the Supreme Court.

The Supreme Court’s judgment⁸² was delivered in four parts reflecting some differences in reasoning. Nevertheless, the judges largely agreed on most matters before them, including New Zealand’s obligations under international law. It determined that UNCLOS and the Convention on Biological Diversity 1992⁸³ directly applied to TTR’s application.⁸⁴ Most of the Court’s discussion went on to focus on UNCLOS, commencing with the simple observation that UNCLOS applies to activities within the EEZ. Part XII of UNCLOS, as set out in article 192, is identified as establishing the fundamental obligation of all State Parties to ‘protect and preserve the marine environment’.⁸⁵

Article 194 of UNCLOS is referenced as establishing obligations to take measures to prevent, reduce, and control pollution of the marine environment. Article 194, paragraph 3 is specifically

75 *Taranaki-Whanganui Conservation Board v. Environmental Protection Authority* (2018) NZHC 2217, (2019) NZRMA 64, para. 404.

76 *Ibid.*, para. 405.

77 *Trans-Tasman Resources Limited v. The Taranaki-Whanganui Conservation Board & Ors* (2020) NZCA 86, (2020) 21 ELRNZ 700, para. 3. Hereinafter ‘*TTR Court of Appeal*’.

78 *Ibid.*, para. 114; EEZ Act, section 61.

79 *Ibid.*, paras. 114, 127.

80 *Ibid.*, paras. 129–31.

81 *Ibid.*, para. 227.

82 *Trans-Tasman Resources v. Taranaki-Whanganui Conservation Board* [2021] NZSC 127 (*TTR Supreme Court*). For a discussion, see E. Macpherson et al., ‘Case analysis: A new “high-water mark” for seabed mining’, *New Zealand Journal of Environmental Law* 25, 2021, 277–91.

83 *Convention on Biological Diversity*, 5 June 1992, 1760 UNTS 79.

84 *TTR Supreme Court*, per Young and France JJ, *op. cit.* note 82, para. 87.

85 *Ibid.*, para. 88.

identified as requiring that the obligation to take measures includes, amongst other things, ‘those designed to minimise to the fullest possible extent’ pollution from various sources, including pollution from seabed activities subject to national jurisdiction. The judgment notes, referencing one commentator, that the objective of article 194, paragraph 3 ‘is not to eliminate pollution as such but to reduce it, thus minimising it to the greatest extent possible’. That is seen as a ‘realistic approach, as otherwise most kinds of ocean uses would have to be banned’.⁸⁶

It is evident, the Court reasoned, that environmental protection has priority over economic development because article 193 ‘provides that States can exploit resources “in accordance with” their duty to protect and preserve the environment’.⁸⁷ Moreover, UNCLOS and the Convention on Biological Diversity support the proposition that the protection purpose of the EEZ Act⁸⁸ imposes a heightened threshold in favour of environmental protection.⁸⁹ The EPA’s key legal error was its failure to achieve the environmental bottom line imposed under the protection purpose of the EEZ Act.⁹⁰ Protection is a separate and additional consideration to whether the sustainable management goal is achieved.⁹¹ The environmental bottom line requires that a proposed discharge (i.e., pollution) must be refused where the environment cannot be protected from material harm.

The Supreme Court also considered whether the EEZ Act’s requirement to favour caution and environmental protection is a statutory implementation of the ‘precautionary principle’ under international environmental law. The Court acknowledged that counsel, while observing the Seabed Advisory Opinion had identified ‘a trend towards making’ the precautionary ‘approach part of customary international law’,⁹² did not contend that precaution had attained that status.⁹³ Referencing international commentary, the Court found that: ‘[a]t its most basic, environmental precaution involves the idea that it is better to be safe than sorry when the effects of activities are uncertain’. The concern underlying the reference to the need to favour caution in the EEZ Act clearly reflects that idea,⁹⁴ and the language under the Act’s information principles⁹⁵ could ‘be taken to embody’ the precautionary principle.⁹⁶

The Supreme Court unanimously found that the principal error in the decision granting approval to TTR’s proposal was the failure to favour caution and environmental protection. The judgment states, in a finding reminiscent of the earlier Environment Court decision,⁹⁷ that the EPA’s attempt to rectify the information deficits by pre-commencement monitoring inappropriately deprived the public of the right to be heard on a fundamental aspect of TTR’s proposal.⁹⁸ The Supreme Court, ultimately, agreed with the Court of Appeal that there was insufficient information for the decision-maker to be satisfied it had taken the required cautious approach under the Act.⁹⁹

86 *Ibid.*, paras. 89–91.

87 *Ibid.*, para. 93.

88 EEZ Act, section 10(1)(b).

89 *TTR Supreme Court*, op. cit. note 82, per Young and France JJ, para. 101.

90 *Ibid.*, para. 3; per Glazebrook J, paras. 250 and 267; per Williams J, para. 294; per Winkelmann CJ, paras. 305, 320.

91 *TTR Supreme Court*, op. cit. note 82, per Glazebrook J, para. 245.

92 Seabed Advisory Opinion, op. cit. note 5, para. 135.

93 *TTR Supreme Court*, op. cit. note 82, per Young and France JJ, fn. 290.

94 *Ibid.*, para. 108.

95 EEZ Act, section 61 (and repealed s. 87E).

96 *TTR Supreme Court*, op. cit. note 82, per Young and France JJ, para. 110.

97 *Kiwis Against Seabed Mining Inc.*, op. cit. note 70.

98 *TTR Supreme Court*, op. cit. note 82, para. 11.

99 *Ibid.*, per Young and France JJ, para. 205; per Glazebrook J, para. 271.

New Zealand State practice shows evidence and belief that the precautionary principle is an obligation under UNCLOS and international environmental law. It is sufficient, here, to signal some of the key themes evident from New Zealand's application of the precautionary principle to seabed mining. First, it does not matter whether legislation expressly refers to the precautionary principle, the precautionary approach, caution, or some other language. It is all one principle where the objective is to prevent environmental harm in the face of uncertain science or incomplete information. Second, the precautionary approach may require that a seabed mining proposal be declined because inadequate information and uncertainty mean that the risk of harm cannot be sufficiently diminished. Third, an adaptive management approach may be consistent with precaution, provided it can be proven that the proposed form of adaptive management will sufficiently diminish the risk of harm. Fourth, the precautionary approach requires adequate baseline information concerning the receiving environment and the proposal's potential impacts to determine whether a risk will be sufficiently diminished. Fifth, adequate baseline information is a prerequisite of adaptive management as the alternative is prohibition until any deficiencies in baseline information are remedied. Sixth, seeking to withhold information concerning risk for commercial or trade competition reasons is inconsistent with the precautionary obligation to base decisions on the best available information.

Australia

Australian precautionary practice, as compared to New Zealand, is not as clearly established in terms of its application to seabed mining. Its precautionary policy, legalisation, and judicial decisions may be discerned from the principle's general implementation in marine and terrestrial environment decision-making. We do not provide an exhaustive review of Australia's precautionary practice. Rather, it seeks to draw on examples of practice that are relevant to the precautionary principle's application to seabed mining. The precautionary principle, likely, first found expression under the Great Barrier Reef Marine Park Act 1975¹⁰⁰ (GBMP Act). The Act's objective is the 'ecologically sustainable use' of the Great Barrier Reef and its natural resources. The precautionary principle is listed as one of the subsidiary principles of that statutory goal.¹⁰¹ Of more direct relevance, Australia's Northern Territory declared a moratorium on seabed mining in 2012 pending a review of the likely impacts of seabed mining on the environment and other resources (including commercial and recreational fishing).¹⁰² In July 2021, the Minister for the Environment invoked precautionary language to declare a ban on seabed mining, stating that it 'poses real risks of significant impacts (...) and due to the risks and uncertainty (...) seabed mining is unable to be adequately assessed and appropriately regulated'.¹⁰³

The Environment Protection and Biodiversity Conservation Act 1999¹⁰⁴ (EPBC Act) is relevant because it provides that proposed activities (including seabed mining) must not have a significant

100 Great Barrier Reef Marine Park Act 1975 No. 85 (GBMP Act).

101 GBMP Act, sections 3AA–3AB.

102 *Moratorium on exploration and mining in coastal waters of Northern Territory until 2015*, Northern Territory Government (2012). Available online <https://ntepa.nt.gov.au/__data/assets/pdf_file/0003/504255/seabed_mining_moratorium.pdf> (accessed 2 September 2021), para. 5b(ii).

103 *Declaration of Prohibition Action: Subsea Mining, Environmental Protection Act 2019*, 30 July 2021. Available online <https://depws.nt.gov.au/__data/assets/pdf_file/0012/1032150/declaration-prohibited-action-subsea-mining.pdf> (accessed 16 September 2021), paras. 2, 7(b).

104 Environment Protection and Biodiversity Conservation Act 1999 No. 91. Hereinafter 'EPBC Act'.

impact on the marine areas within the Territorial Sea (beyond 3 M), EEZ, and Continental Shelf.¹⁰⁵ The EPBC Act's objectives include promoting 'ecologically sustainable development through the conservation and ecologically sustainable use of natural resources'.¹⁰⁶ The precautionary principle, as with the GBMP Act, is listed as a subsidiary principle of the Act's 'ecologically sustainable development' object (i.e., goal).¹⁰⁷ The precautionary principle must be taken into account when making decisions in relation to such things as EIA and approval.¹⁰⁸ The onus is on a proponent of an activity to identify whether an EIA is required under the EPBC Act.¹⁰⁹

Australia's principal judicial decisions on the precautionary approach concern its terrestrial environment. These decisions, despite their terrestrial focus, confirm several precautionary practices of general application. In *Telstra Corp Ltd v Hornsby Shire Council*¹¹⁰ the New South Wales (NSW) Land and Environment Court considered a decision declining an application to develop a mobile telephone tower. Members of the community had raised concerns that the development would potentially have adverse radiofrequency and electromagnetic energy effects on public health. The Court observed that the case raised questions about 'fear, rationality and the law', and the application of the precautionary principle when 'thinking about public health, safety, and the environment'.¹¹¹ It found that precautionary jurisprudence created a two-part test for the application of the precautionary principle: (a) a threat of serious or irreversible environmental damage; and (b) scientific uncertainty as to the environmental damage.¹¹² Both parts need to be satisfied for a precautionary approach to be applied to an anticipated threat of environmental damage. Scientific uncertainty must be grounded in reasonable scientific plausibility.¹¹³ The burden then shifts to the proponent of the activity to demonstrate that the threat does not exist or is negligible.¹¹⁴ It is not necessary that serious or irreversible environmental damage has occurred. It is sufficient that there is a threat of such damage, and the environmental damage threatened reaches the threshold of being serious or irreversible.¹¹⁵ If there is no threat of serious or irreversible environmental damage, the precautionary principle is not triggered.¹¹⁶ The Court held that the requirement of serious or irreversible environmental damage was not met in this case.¹¹⁷

In *Environment East Gippsland Inc. v VicForests*,¹¹⁸ the Victorian Supreme Court stated that the precautionary principle does not require the avoidance of all risks.¹¹⁹ The degree of precaution will depend upon the combined effect of the seriousness of the threat and the degree of uncertainty.¹²⁰ The test for the application of the precautionary principle raised the following fundamental issues: (a) is there a real threat of serious or irreversible damage; (b) is it attended by a lack of full scien-

105 EPBC Act, sections 23(1)–(2), 24.

106 *Ibid.*, section 3(1)(b).

107 *Ibid.*, section 3A(b).

108 *Ibid.*, section 391.

109 *Ibid.*, section 68.

110 *Telstra Corp Ltd v Hornsby Shire Council* (2006) 67 NSWLR 256. Hereinafter '*Telstra Corp Ltd*'.

111 *Ibid.*, para. 9.

112 *Ibid.*, para. 128.

113 *Ibid.*, paras. 133–134.

114 *Ibid.*, para. 148.

115 *Ibid.*, para. 149.

116 *Ibid.*, paras. 137–138.

117 *Ibid.*, para. 185.

118 *Environment East Gippsland Inc. v VicForests* (2010) VSC 335. Hereinafter '*East Gippsland Inc.*'.

119 *Ibid.*, para. 203.

120 *Ibid.*, para. 204.

tific certainty; (c) if yes to (a) and (b), has the proponent demonstrated the threat is negligible; (d) is the threat able to be addressed through adaptive management; and (e) is the measure allegedly required proportionate to the threat in issue.¹²¹ The Court observed that measures should not go beyond what is appropriate and necessary to achieve the objective in question.¹²² Uncertainty may, in some circumstances, be adequately managed through an adaptive management approach.¹²³

In *Telstra Corp Ltd*, the Court observed, regarding the margin of error to implement a step-wise or adaptive management approach, that the more significant and uncertain the threat the greater the degree of precaution required.¹²⁴ Prudence would suggest some margin of error is retained.¹²⁵ One means of managing the potential for error is through an adaptive management approach, whereby the scale of the development increases as the extent of the uncertainty is reduced.¹²⁶ In *Newcastle v Upper Hunter Shire Council*,¹²⁷ the NSW Land and Environment Court described adaptive management as:

a concept which is frequently invoked but less often implemented in practice. Adaptive management is not a ‘suck it and see’, trial and error approach to management, but it is an iterative approach involving explicit testing of the achievement of defined goals. Through feedback to the management process, the management procedures are changed in steps until monitoring shows that the desired outcome is obtained. The monitoring program has to be designed so that there is statistical confidence in the outcome. In adaptive management the goal to be achieved is set, so there is no uncertainty as to the outcome and conditions requiring adaptive management do not lack certainty, but rather they establish a regime which would permit changes, within defined parameters, to the way the outcome is achieved.¹²⁸

Australian State practice demonstrates evidence and belief that the precautionary principle is an obligation. The discussion of Australia’s application of the precautionary approach illustrates some further themes of precautionary practice. First, the precautionary principle has been invoked to declare a ban on seabed mining in the Northern Territory on the grounds that seabed mining poses real risks of significant impacts and is unable to be adequately assessed and appropriately regulated at present. Second, the precautionary approach obligation is not invoked merely because there is a perceived risk of harm. The threat of damage arising from harm must be scientifically plausible. The burden of proof then shifts to the proponent to demonstrate that either there is no threat or that any threat is negligible. Third, precautionary measures should be proportionate to the objective in question. Fourth, adaptive management may be used to manage risk in some circumstances. It is not a ‘suck it and see’ approach based on trial and error. It requires an iterative approach where monitoring is undertaken against clear triggers designed to achieve specific outcomes.

121 *Ibid.*, para. 212.

122 *Ibid.*, para. 207.

123 *Ibid.*, para. 205.

124 *Telstra Corp Ltd*, *op. cit.* note 110, para. 161.

125 *Ibid.*, para. 162.

126 *Ibid.*, para. 163.

127 *Newcastle & Hunter Valley Speleological Society Inc. v Upper Hunter Shire Council* (2010) NSWLEC 48. Hereinafter ‘*Newcastle & Hunter Valley Speleological Society Inc.*’.

128 *Ibid.*, 320, para. 184.

Canada

Canada, as with Australia, has not established clear precautionary measures for the regulation of seabed mining. The federal government has not enacted seabed mining legislation and has been slow to adopt legislation and regulations concerning the precautionary approach.¹²⁹ Precaution, on the other hand, is incorporated into many provincial statutes, regulations, and policies for the purpose of protecting the environment.¹³⁰ The Oceans Act sets out Canada's federal responsibilities for ocean governance within its TS, EEZ, and Continental Shelf.¹³¹ The Act's preamble states: 'Canada promotes the wide application of the precautionary approach to the conservation, management and exploitation of marine resources in order to protect these resources and preserve the marine environment'.

The Oceans Act requires that strategies and plans for the marine environment are based on sustainable development, integrated management, and the precautionary approach.¹³² The Act calls on the Minister to lead and facilitate the development of a national oceans strategy that guides the management of Canada's estuarine, coastal, and marine ecosystems. These principles are to be applied through the preparation and implementation of integrated management plans.¹³³ The principles guiding integrated management under the Act include ecosystem-based management, sustainable development, the precautionary approach, conservation, shared responsibility, flexibility, and inclusiveness. These principles apply to all activities or measures in (or affecting) estuaries, coastal waters, and marine waters that form part of Canada or in which Canada has sovereign rights under international law.¹³⁴

Although the Oceans Act would appear to set out a regime for implementing precaution to seabed mining, the authors have not been able to unearth any significant policy or judicial decisions that might help inform a description of State practice. On the other hand, decision-making under the Fisheries Act 1985¹³⁵ has been the subject of significant litigation and is a source of legal precedent concerning Canadian precautionary practice. The Fisheries Act's purpose (i.e., goal) is to provide a framework for the management, control, conservation, and protection of Canada's fisheries.¹³⁶ The responsible Minister, when making a decision under the Act, may consider the application of a precautionary approach, an ecosystem approach, and the sustainability of fisheries.¹³⁷ In addition,

129 D. VanderZwaag, S. Fuller, and R. Myers, 'Canada and the precautionary principle/approach in ocean and coastal management: Wading and wandering in tricky currents', *Ottawa Law Review* 34-1, 2002, 117–58, p. 125.

130 For example, see the Canadian Environmental Protection Act, Fisheries Act, and Impact Assessment Act.

131 Oceans Act, SC 1996, Ch. 31, sections. 4, 7, 8(1), 10, 13(1), 14, 15(1), 17(1), 18, 19(1). These provisions set out the Act's jurisdiction over Canada's TS, EEZ, and Continental Shelf.

132 *Ibid.*, sections 29, 30.

133 A. Chircop and L. Hildebrand, 'Beyond the buzzwords: A perspective on integrated coastal and ocean management in Canada', in D. Rothwell and D. VanderZwaag (eds.), *Towards principled oceans governance: Australian and Canadian approaches and challenges*, Routledge, 2006, pp. 19–71. For an overview of the principle of 'integrated management' see Makgill and Rennie, 'A model for integrated coastal management', *op. cit.* note 46, 138–43.

134 Canada, *Policy and Operational Framework for Integrated Management of Estuarine, Coastal and Marine Environments in Canada* (last updated 17 August 2016). Available online <<https://www.dfo-mpo.gc.ca/oceans/publications/cosframework-cadresoc/page01-eng.html>> (accessed 23 September 2021); Fisheries and Oceans Canada, *Canada's Oceans Strategy* (2002). Available online <<https://waves-vagues.dfo-mpo.gc.ca/Library/264678.pdf>> (accessed 23 September 2021), p. 6.

135 Fisheries Act 1985, R.S.C., Ch. F-14.

136 *Ibid.*, section 2.1.

137 *Ibid.*, section 2.5.

the Act empowers the Minister to create policies and guidelines for (amongst other things) conservation, management, scientific study, and protection of the ocean.¹³⁸

The Supreme Court of Canada in *Castonguay Blasting v Ontario*,¹³⁹ recognising its foundation in international law, stated that the precautionary principle as an ‘emerging international law principle recognises that since there are inherent limits in being able to determine and predict environmental impacts with scientific certainty, environmental policies must anticipate and prevent environmental degradation’.¹⁴⁰ The Federal Court of Canada in *Morton v Canada (2015)*¹⁴¹ considered the application of precaution to a ministerial decision authorising the transfer of diseased salmon from their hatchery to a fish farm in territorial waters under the Fisheries Act 1985 (and subsidiary regulations).¹⁴² The Court commenced its decision by stating that the ‘precautionary principle is, at a minimum, an established aspect of statutory interpretation, and arguably, has crystallised into a norm of customary international law and substantive domestic law’.¹⁴³

The Court overturned the Minister’s decision authorising the transfer. It made it clear, in doing so, that it was not arbitrating the science. Rather, clear evidence that there was a risk that the diseased salmon could be harmful was inconsistent with the legislative requirements to protect fish.¹⁴⁴ The Court found that a purposive, contextual, and plain meaning analysis of the words ‘may be harmful’ suggested that any disease or disease agent that might be harmful to the ‘protection and conservation’ of fish required a precautionary approach to decision-making.¹⁴⁵ The Minister, on the evidence, had not erred on the side of caution.¹⁴⁶ The phrase ‘may be harmful’ did not require scientific certainty that harm would be a likely consequence of the transfer.¹⁴⁷ It was sufficient that the proposed transfer risked harming fish for it to be contrary to the goal of protection.

In *Morton v Canada (2019)*,¹⁴⁸ the Federal Court of Canada held that a subsequent ministerial transfer policy had disregarded *Morton (2015)* by allowing transfer licences to be issued without testing fish for disease. The Court found that the policy appeared to allow a threshold or ‘level’ of potential harm that permitted transfer of diseased fish unless the transfer placed genetic diversity, species, or conservation units of fish at risk. This approach was not consistent with the requirement for conservation because it risked severe potential impact and serious or irreversible harm on a localised scale.¹⁴⁹ The Court observed that:

the Minister’s Interpretation (sic) permits harm to genetic diversity, species or ecosystem of a stock or conservation unit to the point where a stock or conservation unit “cannot” sustain

138 Ibid., section 10(1).

139 *Castonguay Blasting Ltd v Ontario (Environment)*, (2013) 3 SCR 323, 2013 SCC 52. Hereinafter ‘*Castonguay Blasting Ltd*’.

140 Ibid., para. 20.

141 *Morton v Canada (Fisheries and Oceans)* (2015) FC 575. Hereinafter ‘*Morton v Canada*’.

142 Ibid., para. 3. *Fishery (General) Regulations*, 1993, SOR/93-53.

143 Ibid., para. 43.

144 Ibid., para. 47.

145 Ibid., paras. 56–57.

146 Ibid., paras. 63, 65.

147 Ibid., para. 97.

148 *Morton v Canada (Minister of Fisheries and Oceans)* (2019) FCJ No 178. Varied on other grounds by the Federal Court of Appeal in *Namgis First Nation v. Canada (Minister of Fisheries, Oceans and Canadian Coast Guard)* (2020) FCJ No. 778.

149 *Morton v. Canada* (2019), op. cit. note 141, para. 140.

biodiversity and the continuation of evolutionary and natural production. It is difficult to see how this is consistent with the precautionary principle. And, in my view, it is not.¹⁵⁰

Canadian State practice demonstrates both evidence and belief that the precautionary principle is an obligation under international and domestic law. Key themes evident from the Canadian State practice include, first, in terms of legislation, a precautionary approach is necessary for achieving other environmental goals and principles (e.g., integrated management, ecosystem-based management, and sustainability). Second, judicial acknowledgement that the precautionary approach is an accepted norm of international law. Third, the precautionary approach will require a proposal to be declined where the risk of harm is not sufficiently diminished to achieve the goal of environmental protection. Fourth, the risk of a severe adverse impact on a local marine environment cannot be justified on the basis that it does not pose a more existential threat to wider marine environments or ecosystems.

United Kingdom

Although the United Kingdom (UK) makes legislative provisions for seabed mining and the precautionary principle, its judicial decisions concerning precaution, like Australia and Canada, have not directly grappled with any seabed mining proposals. Its case law does, however, agree with and add to the Commonwealth jurisprudence on precaution that is generally applicable to seabed mining. In terms of legislation, the Marine and Coastal Access Act 2010 (MCAA)¹⁵¹ regulates a range of activities within the UK's marine area, including its TS, EEZ, and Continental Shelf.¹⁵² The MCAA requires activities within the marine area to be managed with the objective (i.e., goal) 'of making a contribution to the achievement of sustainable development (...) taking account of all relevant facts and matters'.¹⁵³ Seabed mining proposals are regulated under the MCAA's general licencing framework.¹⁵⁴ A decision-maker considering an application for a seabed mining licence must have regard to requirements to protect the environment and prevent interference with other legitimate uses of the sea.¹⁵⁵ A seabed mining proponent must prepare an EIA if the activity is likely to have a significant effect due to its size, nature, or location.¹⁵⁶

The Deep Sea Mining Act 1981 (DSMA) regulates seabed mining activities under UK jurisdiction within the Area.¹⁵⁷ A decision-maker considering an exploration or exploitation licence must 'have regard to the need to protect (as far as reasonably practicable) marine creatures, plants and other organisms and their habitat from any harmful effects' that might arise from authorising a licence.¹⁵⁸ It is UK government policy that decisions made under the DSMA need to take account of the Seabed Advisory Opinion's findings on environmental obligations, including EIA and the precautionary approach.¹⁵⁹

150 *Ibid.*, para. 170.

151 Marine and Coastal Access Act 2010 (c. 23) (MCAA).

152 *Ibid.*, section 42.

153 *Ibid.*, section 2(1)(a)–(b).

154 MCAA, Part IV, Ch. 1, section 66.

155 MCAA, section 69(1)(a) and (c).

156 The Marine Works (Environmental Impact Assessment) Regulations 2007, No. 1518, regulations 2(F3), 2(F28) (b), 8.

157 Deep Sea Mining Act 1981 (c. 53), and Deep Sea Mining Act 2014 (c. 15) (DSMA).

158 DSMA, section 5(1).

159 J. Harrison, 'The United Kingdom and seabed mining', in V. Tassin Campanella (ed.), *Routledge Handbook of seabed mining and the law of the sea*, op.cit., chapter VI.2.14.

The precautionary approach has general application under UK environmental law. The role of the precautionary approach appears to have been first outlined in government policy during the early 1990s.¹⁶⁰ *This common inheritance* stated that the government should take precautionary action to limit the use of potentially dangerous materials or the spread of potentially dangerous pollutants, where scientific knowledge was inconclusive as to whether likely costs outweighed the benefits.¹⁶¹ More recently, the UK, as part of the Brexit Trade and Cooperation Agreement,¹⁶² committed to respecting European Union (EU) environmental law principles, including the principles of precaution and prevention.¹⁶³ The Environment Bill is intended to give effect to the UK's commitment to the EU's environmental law principles in its domestic decision-making.¹⁶⁴ The Bill calls for long-term targets and environmental improvement plans to be established for the natural environment (including marine, terrestrial, and water environments).¹⁶⁵ This is intended to enable the promulgation of regulations to achieve the Bill's principles within the UK's TS, EEZ, and Continental Shelf.¹⁶⁶

In *Bova v Highland Council*,¹⁶⁷ the Inner Court of Scotland was asked to consider whether amendments to the Scottish Planning Policy's (Policy) requirement for a precautionary approach to flood management were material.¹⁶⁸ The old Policy had obliged the Council to 'err on the side of caution where flood risk is an issue', whereas the new Policy directed developers and planning authorities to take a 'precautionary approach' to decision-making where flood risk is an issue.¹⁶⁹ The Court approvingly cites Jans and Vedder's comment in *European environmental law*¹⁷⁰ that:

the precautionary principle is all about 'risk management,' which does not mean that all risks must be reduced to zero. Judging what is an acceptable level of risk for society is a political responsibility. Where the action is deemed necessary, measures based on the precautionary principle should be proportional to the chosen level of protection.¹⁷¹

The Court found, on this basis, that adopting a precautionary approach rather than erring on the side of caution means the same thing.¹⁷² The Court emphasised there may be multiple types of precautionary approaches, as the language used in the Policy refers to 'a' rather than 'the' precau-

160 J. Zander, *The application of the precautionary principle in practice: Comparative dimensions*, Cambridge University Press, 2010, p. 215.

161 Great Britain, Department of the Environment, *This common inheritance: Britain's environmental strategy*, HMSO Publications 1990.

162 *Trade and Cooperation Agreement between the European Union and the European Atomic Energy Community, of the one part, and the United Kingdom of Great Britain and Northern Ireland, of the other part*, 30 April 2021.

163 *Ibid.*, Part Two, Heading One, Title XI, Ch. 7, article 7.4.

164 The Environment Bill, 26 May 2021, HL Bill 16, clause 16(5)(d).

165 UK Government, *Explanatory Notes to Bill 16, 2021*, sections 65, 110, 370. Hereinafter 'Explanatory Notes to Bill'.

166 *Ibid.*, para. 564.

167 *Bova v Highland Council*, 2013, CSIH 41, 2013 SC 510.

168 Scotland, *Scottish Planning Policy*, June 2014. Available online <<https://www.gov.scot/publications/scottish-planning-policy/pages/7/>> (accessed 23 September 2021), sections 204, 255. Local Government and Housing Directorate.

169 *Ibid.*, para. 36.

170 *Ibid.*, para. 42. See J. Jans and H. Vedder, *European environmental law*, Europa Law Publishing, 2008, p. 38.

171 *Ibid.*, para. 43.

172 *Ibid.*, paras. 30, 36, 40, 52.

tionary approach.¹⁷³ The intention and effect of the amendment did not substantively change the Policy's precautionary approach to assessing flood risk. The alteration in the language used was no more than textual or cosmetic. The amendment expressed the precautionary nature of the existing policy more emphatically and did not introduce a new and different policy approach.¹⁷⁴ The Court found, on this basis, that adopting a precautionary approach rather than erring on the side of caution means the same thing.¹⁷⁵

In *BASF Agro BV and ECPA and ESA*, the Court of Justice of the European Union (CJEU) was asked to consider the precautionary principle in relation to UK law and decision-making.¹⁷⁶ The CJEU commenced by observing that the precautionary principle is a general principle under EU law. It requires decision-makers to take appropriate measures to prevent specific potential risks to (amongst other things) the environment by giving precedence to the requirements related to protecting that interest over economic interests.¹⁷⁷ It enables protective measures to be taken where there is scientific uncertainty as to the existence or extent of risks, without waiting until the reality and seriousness of those risks become fully apparent or materialise.¹⁷⁸ The Court identified three stages to precaution, including: (a) identification of the potentially adverse effects arising from a phenomenon; (b) assessment of the risks to the environment related to that phenomenon; and (c) when the potential risks identified exceed the acceptable threshold for risk management by adopting appropriate protective measures.¹⁷⁹

The CJEU observed that scientific risk assessment is not required to provide conclusive scientific evidence of the reality of the risk or the seriousness of the potential adverse effects. Adopting preventive measures or withdrawing them cannot be made subject to proof of the lack of risk, as proof is generally impossible to give in scientific terms. Zero risk does not exist.¹⁸⁰ Scientific risk assessment should be based on the best scientific data available and should be undertaken in an independent, objective, and transparent manner.¹⁸¹ It may prove impossible to carry out a full scientific risk assessment because of the inadequate nature of the available scientific data. That does not stop a decision-maker from taking preventive measures in accordance with the precautionary principle.¹⁸² Preventive measures may be taken if the risk, while not 'fully' demonstrated by conclusive scientific evidence, appears to be adequately backed up by the scientific data available at the time.¹⁸³

The CJEU found that responsibility for determining the level of risk deemed unacceptable lies, provided that the applicable rules are observed, with the institutions responsible for the political choice of determining an appropriate level of protection. It is for those decision-makers to determine the critical thresholds for adverse effects. They must then exercise their judgment in deciding the point at which such adverse effects are no longer acceptable for society.¹⁸⁴ Their decision-making powers, and exercise of judgment, are subject to the obligation to ensure a high level of

173 *Ibid.*, para. 49.

174 *Ibid.*, para. 53.

175 *Bova v Highland Council*, *op. cit.* note 167, para 49.

176 *BASF Agro BV and ECPA and ESA*, Case T-584/13, ECLI:EU:T:2018:279. *Hereinafter* '*BASF Agro BV*'.

177 *Ibid.*, para. 58.

178 *Ibid.*, para. 59.

179 *Ibid.*, para. 60.

180 *Ibid.*, para. 65.

181 *Ibid.*, para. 66.

182 *Ibid.*, para. 67.

183 *Ibid.*, para. 69.

184 *Ibid.*, para. 71.

protection is afforded to the environment, but that does not have to be the highest that is technically possible.¹⁸⁵ The precautionary principle requires the withdrawal or amendment of approval where new data invalidates an earlier conclusion that the approval criteria have been satisfied.¹⁸⁶

UK State practice demonstrates evidence and belief that the precautionary principle is domestically applicable through UNCLOS, international environmental law, EU law, and UK law. Key themes evident from the UK include, first, recognition that the Seabed Advisory Opinion's environmental obligations, including the precautionary approach, must be satisfied when considering seabed mining proposals. Second, as in the case of New Zealand, different legislative expressions of precaution normally recognise the precautionary principle unless the language is clearly inconsistent with the international obligation. Third, it requires decision-makers to take appropriate measures to prevent potential risks to protect the environment and give precedence to protection over economic interests. Fourth, preventive measures may be taken if the risk is adequately backed up by the scientific data available at the time. Fifth, the precautionary principle requires that an application for a proposed development is declined where the risk of harm jeopardises achieving a high level of environmental protection.

Precautionary lessons from State practice

International law

It is reasonable to contend that the precautionary principle has evolved from a soft statement of international law into a hard obligation. It is evident from the four States discussed that they acknowledge the precautionary principle as an international law obligation through legislation, policy, and judicial decisions. By way of example, the EEZ Act expressly enables the implementation of New Zealand's obligations under UNCLOS. New Zealand Courts have, in turn, found that decisions under the EEZ Act must be informed by international law obligations, including the precautionary approach.¹⁸⁷ Australia incorporates the language of the precautionary principle directly into the GBMP Act. In *Morton v Canada (2015)* the Court held that the precautionary principle is an established aspect of statutory interpretation and, arguably, a crystallised norm of customary international and domestic law.¹⁸⁸ Likewise, seabed mining decisions under the UK's DSMA need to take account of the Mining Advisory Opinion's findings on international law obligations (i.e., including the precautionary principle).

Meaning of precaution

The language of precaution differs slightly between each of the four States. New Zealand has elected under the EEZ Act to require decision-makers to 'favour caution and environmental protection'.¹⁸⁹ Elsewhere New Zealand, Australia, Canada, and the UK have variously incorporated Principle 15 of the Rio Declaration, the precautionary approach, or precautionary language into their legislation, policy, and judicial decisions. The States described appear to concur that it

185 *Ibid.*, para. 72.

186 *Ibid.*, para. 91.

187 *TTR Supreme Court*, op. cit. note 82, per Young and France JJ, paras. 108 and 110; *TTR Court of Appeal*, op. cit. note 77, paras. 114, 127; Makgill et al., 'Current legal developments: New Zealand', op. cit. note 73, p. 841.

188 *Morton v. Canada (2015)*, op. cit. note 141, para. 43.

189 EEZ Act, section 61(2).

is the intent of precautionary language that is important rather than textual or cosmetic differences in expression.¹⁹⁰ It seems agreed that policy or legislative language adheres to the precautionary principle where it calls for caution or prudence where there is a risk of harm accompanied by incomplete information and/or scientific uncertainty (e.g., due diligence is required).

A precautionary approach is required where there is a risk of serious or irreversible damage and a lack of full scientific certainty.¹⁹¹ It commonly requires the following measures: (a) obtaining adequate baseline information on the receiving environment; (b) assessing the potential impacts of a proposed activity on that receiving environment through EIA; (c) establishing whether there is a risk of serious or irreversible harm; (d) discerning whether the risk of harm can be sufficiently diminished; and (e) preventing approval of any element of a proposal where the contingent risk cannot be diminished.¹⁹²

The precautionary principle may enable the approval of an activity where the risk of harm can be appropriately managed or require refusal where there is insufficient information to establish that risk can be sufficiently diminished. The ISA, at the time of writing, is still to promulgate regulations for commercial-scale mining operations. The ISA might, in the meantime, promulgate policies or guidance on the meaning of precaution and its common requirements. This would provide contractors with some preliminary indication of the measures they will need to take to satisfy information requirements and diminish risk.

UNCLOS requires the ISA to take an active role in assessing the environmental implications of seabed mining in the area (articles 165(2)(d), UNCLOS), while the LTC is to consider such assessments when drafting rules, regulations, and procedures. In practice, the ISA's Mining Code places the burden of conducting EIAs on contractors.¹⁹³ ISA contractors are required to collect baseline information during their exploration work.¹⁹⁴ This is intended to provide the foundation for a contractor's assessment of the effects of exploration¹⁹⁵ and future mineral exploitation. Four EIAs were submitted to the ISA between 2018 and 2021. All focus on small-scale testing of a nodule collector pre-prototype or prototype mineral exploration work.¹⁹⁶ It is unlikely that these EIAs provide sufficient information against which to assess the potential implications of exploitation let alone inform rules, regulations, or procedures for exploitation. It is difficult to make a definitive statement, in this respect, however, as the contractors' annual reports are treated as confidential. The ISA might consider, as a step towards promulgating exploitation regulations, making existing and future baseline and EIA information publicly available. State Parties (and key stakeholders) could be provided with an opportunity to scientifically review that data for information gaps, adverse effects, and alternative approaches to minimising harm. Scientific transparency would be

190 *TTR Court of Appeal*, op. cit. note 77, para. 114; *Bova v. Highland Council*, op. cit. note 167, paras. 49, 53.

191 *Sustain Our Sounds Inc.*, op. cit. note 59, para. 111; *Telstra Corp Ltd.*, op. cit. note 110, para. 128; *BASF Agro BV*, op. cit. note 176, para. 59.

192 *Ibid.*, para. 129; *East Gippsland Inc.*, op. cit. note 118, para. 212; *BASF Agro BV*, *ibid.*, para. 60.

193 Jaeckel, op. cit. note 8, p. 231.

194 ISA, Regulations on Prospecting and Exploration, op. cit. note 3, regulation 32; ISA, *Recommendations for the Guidance of Contractors for the Assessment of the Possible Environmental Impacts Arising from Exploration for Marine Minerals in the Area*, 30 March 2020, ISBA/25/LTC/6/Rev.1, paras. 32–33.

195 ISA, Regulations on Prospecting and Exploration, op. cit. note 3, regulation 32.

196 The environmental impact assessments for Belgium and Germany are available online <<https://www.isa.org.jm/minerals/environmental-impact-assessments>> (accessed 25 September 2021); the Environmental Impact Statement for Nauru is available online <<https://www.eisconsultationnauruun.org/>> (accessed 12 November 2021), and a summary of the Environmental Impact Statement for India is contained in ISA, *Review of the environmental impact statement submitted by the Ministry of Earth Sciences of the Government of India*, 18 June 2020, ISBA/26/LTC/5.

consistent with the interest that all State Parties have in the Area. Moreover, it would offer the ISA another avenue through which data and analysis could be collated to assess the implications of seabed mining and discern the regulatory steps required to implement precaution within the Area.

The regulatory goal of precaution

It is evident from the State practice described that there are a range of statutory goals that the precautionary principle might serve. The statutory goal invariably informs the outcome that the precautionary principle is intended to achieve, including the threshold of harm which might be appropriate in any case. New Zealand's judiciary has ruled that 'sustainable management' and 'protection' establish two different environmental goals that must be satisfied under the Act. The protection purpose is cumulative to the sustainable management purpose.¹⁹⁷ It may be consistent with sustainable management for a seabed mining activity to cause adverse effects on the environment provided such effects can be appropriately remedied or mitigated under the sustainable management purpose. However, protecting the environment from pollution means keeping it safe from harm caused by the discharge of harmful substances. Protection from pollution can only be achieved by ensuring the proposed seabed mining activity avoids pollution causing material harm to the environment or by prohibiting the discharge.¹⁹⁸ Whatever goal precaution is intended to achieve, it is evident from State practice that the precautionary approach would oblige a decision-maker to decline approval of a seabed mining proposal where the risk of harm means that the environmental goal cannot be achieved.¹⁹⁹

The ISA faces a similar interpretative exercise to the one addressed under New Zealand law. On the one hand, the ISA is tasked with ensuring 'the development of the resources of the Area'.²⁰⁰ On the other hand, the ISA must 'adopt rules, regulations, and procedures' for 'prevention, reduction and control of pollution'²⁰¹ and 'prevention of damage to the flora and fauna of the marine environment'.²⁰² New Zealand practice illustrates that the precautionary principle can affect the interpretation of express instruments, by requiring decision-makers to err on the side of caution and in cases requiring 'environmental protection' to minimise environmental harm. The ISA's mandate, namely to 'organize and control' mining activities in the Area,²⁰³ affords the ISA some scope to determine its policy direction and apply the precautionary principle. However, the ISA's discretion is subject to Part XII of UNCLOS, including the general obligation to protect and preserve the marine environment (i.e., goal).

State practice seems to acknowledge the difficulties of mitigating or remediating marine pollution once it has occurred. Pollution from sediment plumes is one of the key potential adverse effects to arise from seabed mining within the Area. The ISA will need to determine how the risk of pollution satisfies the due diligence obligations to control activities within the Area and protect

197 *TTR Supreme Court*, op. cit. note 82, per Glazebrook J, para. 245.

198 *TTR Court of Appeal*, op. cit. note 77, para. 86; Makgill et al., 'Current legal developments: New Zealand', op. cit. note 73, p. 840.

199 *TTR Supreme Court*, op. cit. note 82, para. 3; per Glazebrook J, paras. 250 and 267; per Williams J, para. 294; per Winkelmann CJ, paras. 305 and 320; *TTR Court of Appeal*, op. cit. note 77, para. 86; *Morton v. Canada (2015)*, op. cit. note 141, para. 47, 140; *BASF Agro BV*, op. cit. note 176, para. 91.

200 UNCLOS, article 150(a).

201 *Ibid.*, article 145(a).

202 *Ibid.*, article 145(b).

203 *Ibid.*, article 157(1).

the marine environment from harmful effects (articles 139, paragraph 1, and 145). State practice indicates that harm includes such things as the significance of the impact, scale, and duration. Harm cannot be minimised simply on the basis that its impacts are localised as opposed to having ecosystem-wide significance.²⁰⁴ The ISA requires contractors to prevent, reduce, and control pollution,²⁰⁵ while working towards a regime that enables seabed mining in the medium-term future. The ISA will need to reconcile aspirations for development with the requirement for protection before it commences assessing applications for mineral exploitation.

Baseline information and assessment of potential impacts

It is a basic premise of the State precautionary practice described that incomplete information and/or scientific uncertainty cannot be used as a reason for postponing action to prevent degradation of the environment. The flip side of this premise is a requirement for adequate baseline information and EIA. It is for the proponent of a seabed mining activity to prove that the potential adverse effects of the proposal on the environment can be adequately avoided, remedied, or mitigated.²⁰⁶ If the information provided in support of a proposal is so incomplete and uncertain that potential effects and/or risks of harm are unable to be adequately assessed, the proposal cannot be approved. State practice suggests that, in these circumstances, the ISA should consider preparing regulatory provisions that include express directions on the need for adequate baseline information and EIA. These regulations should make it clear that paucity of baseline information and inadequate impact assessment will trigger the requirement for a precautionary approach with greater emphasis on caution and environmental protection depending on the nature of the information deficit.

Threshold of potential harm

As a rule of thumb, the more significant and uncertain the threat, the greater the degree of precaution required.²⁰⁷ The risk of a severe adverse impact on a local marine environment cannot be justified on the basis that it does not pose a more existential threat to wider marine environments or ecosystems.²⁰⁸ The precautionary principle does not require the avoidance of all risks, and the degree of precaution will depend upon the seriousness of the threat and the degree of uncertainty.²⁰⁹ The question of whether a proposal is consistent with the precautionary approach ultimately rests on whether the extent of risk and uncertainty and the gravity of the consequences can be sufficiently diminished. A small risk of annihilation of an endangered species may mean a proposal is inconsistent with the precautionary approach, while a greater risk of an impact with less gravity may be consistent.²¹⁰ This suggests that the ISA should identify express environmental goals, objectives, thresholds, and indicators. ISA regulatory measures presently lack this level of clarity.²¹¹ Important questions include whether the impacts of deep seabed mining can be

204 *TTR Court of Appeal*, op. cit. note 77, paras. 12(a) and 111; Makgill et al., 'Current legal developments: New Zealand', op. cit. note 73, pp. 839–40.

205 ISA, Regulations on Prospecting and Exploration, op. cit. note 3, regulation 31(5); ISA, Draft Regulations on Exploitation, op. cit. note 4, regulation 49.

206 *Sustain Our Sounds Inc.*, op. cit. note 59, para. 114.

207 *Telstra Corp Ltd*, op. cit. note 110, para. 161.

208 *Morton v. Canada (2019)*, op. cit. note 141, para. 170.

209 *East Gippsland Inc.*, op. cit. note 118, paras. 203–4.

210 *Sustain Our Sounds Inc.*, op. cit. note 59, para. 139.

211 Tunnicliffe et al., op. cit. note 15.

reduced sufficiently to avoid biodiversity loss.²¹² If a seabed mining activity results in biodiversity loss, it will contravene the Convention on Biological Diversity and its express provision for the precautionary principle.²¹³ If ISA regulations for exploitation do not provide thresholds for environmental impacts, they will need to set out clear pathways through which decision-makers can identify those thresholds on a case-by-case basis, in order to satisfy environmental obligations within the Area.

Burden of proof

It is a basic principle of resource development that it is for the proponent of an activity to prove their case through a supporting EIA. This should include adequate information on the receiving environment and the potential effects of the proposal on that environment. The States described have developed several salient principles around where the burden of proof lies in terms of risk identification. The mere perception of risk is not sufficient to require a proponent to adduce evidence that there is no risk. Rather, an allegation of scientific uncertainty, where such uncertainty has not been identified in the proponent's EIA or where it is not clear on the face of the EIA, must be grounded in reasonable scientific plausibility.²¹⁴ Equally, scientific risk assessment does not require conclusive evidence of the risk or the seriousness of the potential adverse effects. This is because the existence or absence of risk, by its very nature, is the subject of scientific uncertainty (e.g., zero risk does not exist).²¹⁵ Scientific risk assessment should be based on the best available data.²¹⁶ Preventative measures may be taken if the risk appears to be demonstrated by the scientific information available at the time.²¹⁷ It would be judicious for the ISA to make it clear that mineral exploitation can only occur where the risks have been reduced to an acceptable level. In this context, it may be recalled that the draft regulations developed by the ISA's Preparatory Commission in 1990 provided that '[a]ctivities in the Area shall only take place if they do not cause serious harm to the marine environment'.²¹⁸

Adaptive management

It is evident from the State practice discussed that adaptive management is the principal tool for enabling an application to proceed in the face of incomplete information or scientific uncertainty. The core elements of adaptive management include: (a) monitoring of impacts on agreed indicators; (b) promoting research to reduce uncertainty; (c) ensuring evaluation of outcomes to review and adjust measures adopted; and (d) establishing efficient and effective compliance.²¹⁹ Adaptive management should not be available where the precautionary principle requires the prohibition of activities (e.g., the potential damage is likely to be irreversible or vulnerable species or ecosystems

212 H. Niner et al., 'Deep-sea mining with no net loss of biodiversity—An impossible aim', *Frontiers in Marine Science* 5, 2018, 53; C.L. Van Dover et al., 'Biodiversity loss from deep-sea mining', *Nature Geoscience*, 10, 2017, 464–65.

213 *Convention on Biological Diversity*, preamble.

214 *Telstra Corp Ltd*, op. cit. note 110, paras. 133–34.

215 *BASF Agro BV*, op. cit. note 176, para. 65.

216 EEZ Act, section 61(1)(b); *Kiwis Against Seabed Mining Inc*, op. cit. note 70, para. 64; *BASF Agro BV*, op. cit. note 176, para. 66.

217 EEZ Act, section 62(2); *BASF Agro BV*, op. cit. note 176, para. 67.

218 *Preparatory Commission for the ISA and ITLOS*, 8 February 1990, LOS/PCN/SCN.3/WP.6/Add.5, article 105.

219 IUCN, *Guidelines for applying the precautionary principle*, op. cit. note 61, guideline 12.

are at risk).²²⁰ Adaptive management may include such things as commencing on a small scale for a short period so that effects can be monitored, or allowing an activity to be undertaken so that its effects can be assessed and continued or discontinued on the basis of those effects.²²¹ In the case that an activity is continued or discontinued based on its effects, it is important to have adequate baseline information and ongoing monitoring in order to enable evaluation of targets and refinement of hypothesis.²²²

Adaptive management is not a ‘suck it and see’ approach.²²³ It does not allow a development to proceed based on trial and error. Rather, it requires explicit testing against defined goals. The goal to be achieved is established with certainty as to the outcome. Adaptive management conditions only permit changes within defined parameters to ensure that established outcomes are achieved.²²⁴ In simple terms, adaptive management must be calibrated against clear thresholds that can be monitored to determine whether an activity should be adjusted or stopped all together. It is respectfully suggested that the ISA should seek to ensure through regulation that any adaptive management machinery employed within the Area is based on scientifically verifiable thresholds that are designed to prevent harmful impacts.

Conclusion

The scientific uncertainties surrounding the potential environmental impacts of seabed mining present significant challenges for this nascent industry and trigger an obligation to apply the precautionary principle. Commonwealth States and domestic courts have developed considerable experience in applying the precautionary principle, both in marine and terrestrial contexts. It is clear from a cursory review of each State that there is a fair degree of consensus on the principle’s meaning and the kinds of measures necessary to ensure its implementation. Although legislative wording may differ in its expression of the precautionary approach, State practice exhibits many similarities when it comes to determining what the obligation means and requires. This includes such things as the requirement for sound baseline information on the receiving environment and avoidance of irreversible environmental damage. The principle requires regulators to minimise harm and, where necessary, prevent an activity, or, at minimum, postpone it until adequate environmental baseline data exists and EIA is possible.

The ISA’s broad mandate to ‘organize and control’ mining activities in the Area is subject to the precautionary principle. State practice provides some salient ideas on the kinds of measures the ISA might consider when giving expression to precaution in future regulations. First, the meaning of precaution should be defined to include commonly accepted precautionary measures ranging from requirements for sufficient baseline information and EIA through to demonstrating the risk of harm can be satisfactorily diminished. Second, the goal of precaution should be expressly identified (e.g., protection, sustainability, etc.). Third, it should be clear that insufficient baseline information and inadequate EIA will trigger a greater emphasis on caution and environmental protection. Fourth, the regulations should incorporate environmental thresholds, or a decision-making pathway for determining thresholds, that the adverse effects of a proposal may not exceed. Fifth, it should be plain that the onus of satisfying information and EIA requirements rests with the propo-

220 *Sustain Our Sounds Inc*, op. cit. note 59, para. 111.

221 EEZ Act, section 64(2).

222 *Sustain Our Sounds Inc*, op. cit. note 59, para. 114.

223 *Ibid.*, para. 125; *Newcastle & Hunter Valley Speleological Society Inc*, op. cit. note 127, para. 184.

224 *Newcastle & Hunter Valley Speleological Society Inc*, op. cit. note 127, para. 184.

ment of an activity. Proponents should not, however, be placed in a position of having to disprove an allegation of risk in the absence of evidence as to the existence of a risk. Sixth, the precautionary approach does not always enable an adaptive management approach. Adaptive management should only be employed where clearly calibrated parameters can be monitored in a manner that enables a mining operator to avert environmental harm before it occurs.

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