Responding to Ecological Uncertainty in the Context of Climate Change: Thirty Years of the Precautionary Principle in Australia

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Abstract

The precautionary principle is one of the central principles to have emerged from the 1992 international Earth Summit and subsequently to have been integrated into Australian law. It is a principle that responds to the uncertainty attending serious environmental threats by justifying measures to prevent threat materialisation. This article explores the contemporary relevance of the precautionary principle three decades on, at a time when Australia's ecology and biological diversity is subject to multiple compounding and cumulative threats, including the serious and irreversible consequences of climate change. Following the decisions in three recent cases — *Leadbeater's*, *Masked Owl* and *Tree Geebung* — I make three contentions in relation to the principle. First, if particular 'conditions precedent' to the application of the principle are met, then the principle must be applied; the need to apply and act on the principle cannot be trumped by other considerations. Second, application is capable of demonstration. Third, precautionary approaches can and should take into account the state of the environment. These contentions underscore the precautionary principle's importance in the context of activity that threatens to exacerbate the baseline threat of climate change to the species and places that form part of Australia's complex ecological systems.

Please cite this article as: Laura Schuijers, 'Responding to Ecological Uncertainty in the Context of Climate Change: Thirty Years of the Precautionary Principle in Australia' (2023) 45(2) *Sydney Law Review* 249.

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I Introduction

The precautionary principle is a legal and policy principle that guides managers and decision-makers in responding to uncertainty. Articulated in various ways depending on the statute or instrument in which it is found, the essence of the principle is that where there is scientific uncertainty about a particular fact — such as the nature, likelihood or magnitude of a serious or irreversible environmental threat — this lack of certainty should not be a reason to postpone or fail to implement measures that could prevent environmental degradation (or in other words prevent the materialisation of the threat).

The principle is found in international instruments and in the domestic laws of foreign countries. It has an important place in Australian environmental law too, as this article will explore. The principle is non-prescriptive in that applying it does not dictate a particular outcome or require any specific measure to be taken. However, a given situational context will inform a spectrum of appropriate measures and, in some situations, that spectrum could be rather narrow. The precautionary principle has been conceptualised as, in effect, shifting the evidentiary burden of proof from the one asserting a threat to the one denying it.[1] In my view, it might be better conceived slightly differently as lowering the standard of proof for the party asserting potential harm. As I will explain, there must be an identifiable threat of a serious or irreversible nature to enliven the principle, and there must also be uncertainty. Since the threat need not be established as a certain fact, the standard of proof is necessarily lower than it would be were scientific certainty required. But the party denying the risk is not realistically in a position to then prove that no — or only a negligible — risk of harm exists. It would be difficult to prove this, when uncertainty is essential for the principle's enlivenment. Accordingly, I will argue that we can understand the required response to the precautionary principle as follows: once the principle is enlivened, it must be applied to the situation at hand, and a precautionary approach taken. What needs to be proved if there is a challenge is that either the principle was not enlivened (which generally will not be possible if uncertainty and a serious or irreversible threat are established), or that it *was* applied (and potentially, as I will also discuss, was *appropriately* applied). The overarching result of the precautionary principle in any case is that where the nature of a threat is sufficiently grave, uncertainty as to that threat operates to justify preventative measures, and, at the same time, cannot be used to justify a failure to take such measures.

In this article, I consider 30 years of the precautionary principle in Australia, with a particular focus on the decisions in *Leadbeater's* case (*Friends of*

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[1] This conception has been presented in both literature and case law: see, eg, Carl F Cranor, 'Some Legal Implications of the Precautionary Principle: Improving Information-Generation and Legal Protections' (2005) 11(1) *Human and Ecological Risk Assessment: An International Journal* 29; *Telstra Corporation Ltd v Hornsby Shire Council* (2006) 67 NSWLR 256, 273–5 [150]–[155] ('*Telstra*'); *Conservation Council of South Australia v Tuna Boat Owners Association of South Australia* [1999] SAEDRC 86 [23]–[25]; *Warburton Environment Inc v VicForests [No 5]* [2022] VSC 633 ('*Tree Geebung*') [321]–[323], [361].

Leadbeater's Possum Inc v VicForests [No 4] ('original decision')[2] and *VicForests v Friends of Leadbeater's Possum Inc* ('appeal decision')).[3] In the original decision, Mortimer J found that the forestry operations of Victorian logging company VicForests, to be conducted in the critical habitat of an endangered possum species, were unlawful given the context of recent bushfire and VicForests' obligations to apply the precautionary principle. Her decision that VicForests could not continue its logging as planned was overturned on appeal, but the appeal court upheld the findings relevant to the principle. *Leadbeater's* case offers a particularly useful insight into the precautionary principle and invites reflection on how the principle might be relevant in future situations where there is not only a lack of scientific certainty about the impacts of one particular activity, but where those impacts are exacerbated by compounding cumulative impacts. This situation is likely to arise increasingly frequently as economic activity continues in the face of worsening global climate change. The two subsequent decisions of *Masked Owl*[4] and *Tree Geebung*[5] are testament to this, as each concerned forest-dwelling species threatened by direct disturbances to forests, and by climate change.

I make three novel contentions about the operation of the precautionary principle as we enter its fourth decade. These contentions each represent how the principle can be understood in a way that does justice to the normative reasons underpinning its inclusion in environmental laws and policies. These reasons include the ethical values of environmental conservation and the avoidance of irreversible loss, which are typically reflected in the objects and purposes of the instruments in which the principle is found.[6] The first contention is that *if particular 'conditions precedent' to the application of the principle are met, then the principle must be applied*. The need to apply or invoke the principle once it has been enlivened by these conditions should not be trumped, or held to be inconsistent with other objectives. This is important for species protection in the context of irreversible climate change impacts, because it means that threats that might render a species extinct need to be acted upon regardless of the economic value or convenience of ignoring them. It does not mean that risks cannot be taken and it does not remove discretion as to how to apply the principle (that is, what actions to take) as directed by the statutory context and facts of the situation. The second contention is that *the precautionary principle is capable of demonstration*. While the principle does not require any specific course of action, a reviewing judge might find that it was, or was not, (appropriately) applied in a particular case when it should have been. This is one of the more critical points that can be drawn from *Leadbeater's* case and *Tree Geebung*, which arguably signal a developing jurisprudence around a precautionary

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2 *Friends of Leadbeater's Possum Inc v VicForests [No 4]* (2020) 244 LGERA 92 ('*Leadbeater's* original decision').

3 *VicForests v Friends of Leadbeater's Possum Inc* (2021) 285 FCR 70 ('*Leadbeater's* appeal decision').

4 *Bob Brown Foundation v Minister for the Environment [No 2]* (2022) 253 LGERA 356 ('*Masked Owl*').

5 *Tree Geebung* (n 1).

6 On the general normative underpinnings of the principle, see Marko Ahteensuu and Per Sandin, 'The Precautionary Principle' in Sabine Roeser, Rafaela Hillerbrand, Per Sandin and Martin Peterson (eds), *Handbook of Risk Theory: Epistemology, Decision Theory, Ethics, and Social Implications of Risk* (Springer, 2012) 961, 974. Also note the comment of Preston CJ in *Telstra* (n 1) that '[t]o avoid environmental harm, it is better to err on the side of caution': at 273 [151].

standard. The third contention is that *precautionary approaches can and should take into account the state of the environment* — meaning the extent to which the environment is degraded, is in the process of becoming degraded, or is threatened to be degraded in the future. This necessarily involves cumulative impacts. This point was not often contemplated in the literature or case law prior to *Leadbeater's* case and so represents a gap on which the recent cases invite comment.

In Part II, I survey how the precautionary principle is articulated in Australian legislation and explain how it has been interpreted by judges over three decades. In doing so, I set out the first two of the three contentions. An important function of the principle internationally is in guiding the development of environmental and health-based policies, such as regulating new technology. However, my focus is on how the precautionary principle guides executive decision-makers whose conduct is governed by the principle, including in deciding whether to approve a project proposal associated with potentially significant adverse environmental effects. There are two reasons for this focus. One is that executive decision-making is more typically subject to judicial review and thus the potential intervention of courts than is policy-making or standard-setting. This invites discussion on the justiciability of the principle, and on the role of courts in developing a precautionary standard. The other is that I am interested in the context of ecological uncertainty and climate change. Much of the Australian case law on the precautionary principle involves threatened species or protected places and examines executive decision-making in the context of adverse threats to these species and places. In Part III, I present the third contention, exploring what *Leadbeater's* case and science-based or systems thinking can teach us about cumulative impacts. I conclude in Part IV by considering, briefly, the future of the precautionary principle in light of (i) the recent case law discussed in this article, (ii) the most recent federal legislative review of Australia's environmental law, and (iii) the recent change in federal government.

II The Precautionary Principle 1992–2022

A *Statutory Articulation*

The history of the precautionary principle in Australian law has been described by others,[7] and although this history need not be repeated in detail, it will be useful to provide a brief summary here. The emergence of the principle can be understood as a response to the situation that uncertainty around potential threats to the natural environment was being used as a reason to avoid taking action to protect it, despite the reality that certainty and clear evidence cannot always be ascertained before

[7] See, generally, Ronnie Harding and Elizabeth Fisher (eds), *Perspectives on the Precautionary Principle* (Federation Press, 1999); Jacqueline Peel, *The Precautionary Principle in Practice: Environmental Decision-Making and Scientific Uncertainty* (Federation Press, 2005); Justice Brian J Preston, 'The Judicial Development of the Precautionary Principle' (2018) 35(2) *Environmental and Planning Law Journal* 123; A Stewart, 'Environmental Risk Assessment: The Divergent Methodologies of Economists, Lawyers and Scientists' (1993) 10(1) *Environmental and Planning Law Journal* 10; Justice S Escourt, 'The Precautionary Principle, the Coast and *Temwood Holdings*' (2014) 31(4) *Environmental and Planning Law Journal* 288. A summary is sometimes also provided in judgments to which the principle is relevant, including many of those discussed in this article.

harm occurs.[8] The precautionary principle was and is an important aspect of the international sustainable development agenda, which attempts to ensure development does not continue in a way that jeopardises ecological sustainability.[9] In Australia, this is evinced in the 1992 National Strategy for Ecologically Sustainable Development,[10] which included the precautionary principle as a guiding principle, and in the *Intergovernmental Agreement on the Environment*,[11] which includes a definition that provides for the *application* of the principle:

> Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
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> - careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
> - an assessment of the risk-weighted consequences of various options.[12]

Various state and territory environment statutes incorporate the precautionary principle in some respect. For example, in Victoria the *Flora and Fauna Guarantee Act 1988* (Vic) as amended in 2019 (the relevant legislation in Tree Geebung) requires that decisions, policies, programs and processes 'give proper consideration' to the precautionary principle.[13] The *Environment Protection Act 2017* (Vic) includes the precautionary principle as one of the 'principles of environment protection'[14] central to the legislation, to which Victoria's Environment Protection Authority ('EPA') and Environment Minister must have regard in decision-making. The Act also includes a 'general environmental duty' which provides that '[a] person who is engaging in an activity that may give rise to risks of harm to human health or the environment from pollution or waste must minimise those risks, so far as reasonably practicable'.[15] The *Sustainable Forests (Timber) Act 2004* (Vic), relevant to Victorian forestry cases, includes the precautionary principle as one of the 'guiding principles' of ecologically sustainable development ('ESD') to which 'regard is to be had' in undertaking sustainable forest management.[16] In New South Wales, the *Protection of the Environment Administration Act 1991* (NSW) provides that an objective of the NSW EPA is to 'protect, restore and enhance' the quality of the environment, having regard to ESD,[17] which can be achieved through

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8 International Union for Conservation of Nature ('IUCN'), *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. See also *Telstra* (n 1) 275 [156].

9 *Report of the United Nations Conference on Environment and Development*, UN Doc A/CONF.151/26 (vol I) (12 August 1992) annex I ('*Rio Declaration on Environment and Development*') principle 15; *Convention on Biological Diversity*, opened for signature 5 June 1992, 1760 UNTS 79 (entered into force 29 December 1993) ('*Biodiversity Convention*') preamble.

10 *Prepared by the Ecologically Sustainable Development Steering Committee* and *endorsed by the Council of Australian Governments, December 1992.*

11 *National Environment Protection Council Act 1994* (Cth) sch ('*Intergovernmental Agreement on the Environment*').

12 Ibid s 3.5.1.

13 *Flora and Fauna Guarantee Act 1988* (Vic) s 4A(d).

14 *Environment Protection Act 2017* (Vic) s 20.

15 Ibid s 25.

16 *Sustainable Forests (Timber) Act 2004* (Vic) s 5(1), (4).

17 *Protection of the Environment Administration Act 1991* (NSW) s 6(1).

implementation of the precautionary principle.[18] In Queensland, the *Environmental Protection Act 1994* (Qld) includes the precautionary principle as part of the standard criteria to be considered in impact assessment.[19] These examples demonstrate the influence of ESD — and in particular the precautionary principle — as a foundation or reference point for Australian environmental law and for the actions taken and decisions made under it. Where a piece of legislation requires consideration or application of the precautionary principle, and where there is an avenue of review available to a party contending that the principle was not considered (including as a relevant consideration under judicial review) or not applied, the principle is arguably justiciable.[20] Without a means of reviewing an alleged failure to consider or adequately apply the principle, the principle serves more as a compass, divorced from accountability via the courts.

The federal *Environment Protection and Biodiversity Conservation Act 1999* (Cth) ('*EPBC Act*'), which came into force in 2000, adopts the precautionary principle in two ways. First, its consideration is required by the federal Environment Minister, who must take account of the principle when making decisions under the Act. This includes deciding whether to characterise an action[21] as one to which the EPBC Act applies, as well as whether ultimately to approve an action following impact assessment.[22] Accordingly, under the *EPBC Act*, the principle applies to the decision whether an action requires assessment and approval on the basis that it is likely to significantly impact a protected species or place,[23] and the decision whether an action should be approved if it is indeed found likely to significantly impact a protected species or place. Second, the Minister must take into account the principle as part of the process of considering environmental, social, and economic matters relevant to an approval decision regarding an action, including what conditions might be appropriate.[24] Unlike the *Intergovernmental Agreement on the*

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18 Ibid s 6(2).

19 *Environmental Protection Act 1994* (Qld) sch 4 (definition of 'standard criteria').

20 But see Elizabeth Fisher, 'Is the Precautionary Principle Justiciable?' (2001) 13 *Journal of Environmental Law* 315. Fisher contended (more than two decades ago now) that the principle appeared not to be justiciable, mainly because of a perception that review under the principle does not fall within the courts' institutional or constitutional competence: at 316. However, she does allude to the potential justiciability of the principle if the constitutional relationship between the courts and the executive is reconsidered (so, if environmental and administrative law develop to allow it). Fisher comments that some courts have overcome competence, or reconceptualised the principle so that reviewing it is within their competence. The fact that courts can reconceptualise the principle so that it falls within their competence to review it is relevant to the present developments in Australian law.

21 An action, defined in s 523 of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) ('*EPBC Act*'), includes a project, development, undertaking, activity and series of activities.

22 Ibid s 391(3).

23 More specifically, the relevant impact is an impact on one of the nine matters of national environmental significance ('MNES') listed in pt 3 of the *EPBC Act*. These are the heritage values of a World Heritage property or National Heritage place, the ecological character of a Ramsar wetland, a listed threatened species or ecological community, a listed migratory species, the environment (generally) where a nuclear action is concerned, the environment (generally) from an action taken in a Commonwealth marine area or the Great Barrier Reef Marine Park, and water resources where the action is a coal seam gas development or large coal development taken by a corporation or the Commonwealth. More information on these categories can be found in the specific provisions of pt 3, which incorporate legislation, lists of species and places, and treaties to which Australia is a party (these are the basis of several MNES).

24 Ibid s 136(2)(a).

Environment, the *EPBC Act* does not articulate how the precautionary principle might be applied in practice. Whether 'take into account' requires the taking of a precautionary approach, and the subsequent question what a precautionary approach looks like, may be open to interpretation. I discuss some thoughts below.

It is worth noting that the precautionary principle does not tend to appear in conjunction with — let alone interlinked with — climate change obligations in Australian statutory law. An exception is Victoria's *Flora and Fauna Guarantee Act 1988*, recently amended to insert climate change as a matter which, together with the precautionary principle, must be given proper consideration.[25] Explicitly, the Act does not require that climate change be considered *when applying* the precautionary principle; rather, the precautionary principle and climate change are each relevant considerations for decisions, policies, programs and processes under the Act.[26] Nonetheless, in *Tree Geebung*, Garde J found that the tree geebung (*Persoonia arborea*), which needs to grow back from seed to regenerate, is vulnerable to climate change–induced alteration in fire patterns, and this was relevant when applying the precautionary principle to the consideration of timber harvesting activities.[27]

Because of the different possible future warming scenarios and the complex causative factors that will determine climate trajectories, a lack of full scientific certainty characterises our understanding of the expected effects of climate change on species and ecological communities. Such effects may well be serious or (often *and*) irreversible. Given the trend of more frequent and more diverse climate change litigation,[28] recognising the relevance of the principle to threats that may be exacerbated by the impacts of climate change (for example, loss of available habitat for particular species, as in the forest cases) could be an important priority for federal legislative reform. The new federal *Climate Change Act 2022* (Cth) does not include the precautionary principle, and the *EPBC Act* mentions climate change only incidentally. Without statutory interlinkage of climate change and the precautionary principle, it is up to executive decision-makers (and reviewing courts) to consider the two issues together. Internationally, climate change and the precautionary principle have to an extent always been linked. The *United Nations Framework Convention on Climate Change*[29] — a treaty to emerge as part of the 1992 bloom in international environmental law that also brought the precautionary principle onto the world stage — explicitly incorporates the principle as art 3.3. Similarly, the 1992 *Convention on Biological Diversity* incorporates the precautionary principle,[30] and

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25 Ibid s 4A.

26 See *Tree Geebung* (n 1) [313].

27 Ibid [358].

28 For example, note the recent challenge to a series of pending fossil fuel projects, which argues that the Environment Minister should reconsider her predecessors' conclusions that the projects will not significantly impact threatened species, on the basis that the projects' contributions to climate change will result in a significant impact on all Australian threatened flora and fauna and all Australian natural heritage sites: see Part IV of this article. See further Laura Schuijers and Margaret Young, 'Climate Change Litigation in Australia: Law and Practice in the Sunburnt Country' in Ivano Alogna, Christine Bakker and Jean-Pierre Gauci (eds), *Climate Change Litigation: Global Perspectives* (Brill, 2021) 47; Sabin Center for Climate Change Law, 'Australia', *Climate Litigation Database* (Web Page, 2023) <http://climatecasechart.com/non-us-jurisdiction/australia>.

29 *United Nations Framework Convention on Climate Change*, opened for signature 9 May 1992, 1771 UNTS 107 (entered into force 21 March 1994).

30 *Biodiversity Convention* (n 9) preamble.

work under the convention directly recognises the threats to biodiversity from climate change.[31]

B *Judicial Interpretation*

The precautionary principle's ubiquity across environmental statutes rendered it a fashionable topic of discussion in the years following its integration into Australian law. In 1993, in an early case to consider its meaning, the principle was described by Stein J as 'a statement of commonsense'.[32] This notion was echoed by Mortimer J several decades later in *Leadbeater's* case. Although faced with lengthy submissions on the application of the precautionary principle to the loss of native possums' habitat, she felt that applying the principle could be treated as a 'relatively straightforward' exercise that need not be 'overcomplicated', lest the point of the precautionary principle be frustrated or lost.[33] Yet, in the intervening years, it was not always treated as uncomplicated.

1 *Enlivening the Precautionary Principle*

(a) *The Bifactorial Approach: Seriousness or Irreversibility, and Scientific Uncertainty*

In Australian law, it is now well established that the precautionary principle is relevant in situations where there are threats of serious or irreversible environmental harm, and not in situations where harm is trivial or easily reversible.[34] This question, in each instance, is one of fact.[35] The seminal case to clarify when the principle is enlivened and should be applied is *Telstra Corporation Ltd v Hornsby Shire Council*.[36] Preston CJ, in the NSW Land and Environment Court, found that there are two conditions precedent, or thresholds, that trigger the principle's application: one is the threat of serious or irreversible environmental damage; the other, scientific uncertainty. Preston CJ's bifactorial approach to the enlivenment of the principle has been repeatedly endorsed, even though the elaborative judgment could be critiqued as deviating from the simplistic sensibilities earlier articulated.[37] The facts of the case, which involved concern over radiation from mobile phone towers, readily distinguish it from nature conservation cases.[38] However, the approach has proven to be translatable across contexts. It was applied by Osborn J in *Brown Mountain*[39] to threats from logging to the threatened long-footed potoroo (*Potorous longipes*)

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31 'Climate Change', *Convention on Biological Diversity* (Web Page, 2023) <https://www.cbd.int/topic/climate-change>.

32 *Leatch v National Parks and Wildlife Service* (1993) 81 LGERA 270, 282.

33 *Leadbeater's* original decision (n 2) 303–1 [846]–[847].

34 *Telstra* (n 1).

35 See *Leadbeater's* original decision (n 2) 297 [810]; *Tree Geebung* (n 1) [321].

36 *Telstra* (n 1).

37 See also Jacqueline Peel's broader critique in 'When (Scientific) Rationality Rules: (Mis) Application of the Precautionary Principle in Australian Mobile Phone Tower Cases' (2007) 19(1) *Journal of Environmental Law* 103.

38 In *Leadbeater's* original decision (n 2), Mortimer J accepted the 'conditions precedent' established in *Telstra* (n 1), but noted that the context 'could hardly be more different': at 300 [826].

39 *Environment East Gippsland Inc v VicForests* [2010] 30 VR 1 ('*Brown Mountain*').

and sooty owl (*Tyto tenebricosa*), and over a decade later in *Tree Geebung*, both of which concerned the Victorian statutory regime. Recently, in *Masked Owl*, the Federal Court endorsed Preston CJ's test and confirmed that it applies to the federal *EPBC Act*.[40]

There has been some debate as to whether the two conditions precedent can be considered together in sequence, or whether they need to be considered as two separate prongs, but the difference may not be material. In *Leadbeater's* case, Mortimer J's approach was to consider threats of serious or irreversible environmental damage as the primary consideration or enlivening trigger, with uncertainty as the secondary or consequential consideration, such that if there were threats of serious or irreversible environmental damage, then, consequently, VicForests could not justify its lack of preventative actions with a lack of scientific certainty about what it needs to do.[41] This manner of expressing the principle aligns with the way in which the principle is worded, as an if-then principle. On appeal, VicForests argued that Osborn J's 'two pronged' approach in *Brown Mountain* should be preferred to Mortimer J's 'consequent obligation' approach, and that Mortimer J should not have departed from Osborn J's approach without finding it was plainly wrong. The appeal court found that Mortimer J was entitled to depart from Osborn J's approach, noting that she had said that application of Osborn J's approach would lead her to the same result in any case.[42] What we might take from this is that even if the precautionary principle is phrased as a consequent obligation, there are two critical elements (a serious or irreversible threat, and scientific uncertainty). The notion that once a serious or irreversible threat is established, a failure to take precautionary measures cannot be justified on the basis of a lack of full scientific certainty is essentially the other side of the coin to the notion that, once a serious or irreversible threat is established, precautionary measures must be taken if there is also a lack of full scientific certainty.

It should be noted that the relevant Victorian Code of Practice for timber harvesting operations has now been amended to specifically incorporate Osborn J's understanding of the principle evinced in *Brown Mountain*,[43] meaning that his is the preferred interpretation of the principle for Victorian forest cases governed by that Code. One such case was *Tree Geebung*, in which Garde J traced Osborn J's approach to Preston CJ's decision in *Telstra*.[44] Preston CJ had said that the bifactorial approach was to treat the two conditions precedent or thresholds as cumulative.[45] Garde J considered first whether there was a threat of serious or irreversible damage to the environment by reason of the proposed timber harvesting

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40 *Masked Owl* (n 4) 365 [19]

41 *Leadbeater's* original decision (n 2) 303 [845].

42 *Leadbeater's* appeal decision (n 3) 115 [183].

43 *Code of Practice for Timber Production 2014* (Vic) (as amended 2022) Glossary, 'Precautionary principle' Note: 'It is intended by this definition and section 2.2.2.2 that the precautionary principle and its application in section 2.2.2.2 be understood as it was by Osborn J in *Environment East Gippsland Inc v VicForests* [2010] VSC 335 (in relation to the precautionary principle as it appeared in the *Code of Practice for Timber Production 2007*).'

44 *Tree Geebung* (n 1) [315].

45 *Telstra* (n 1) 269 [128].

operations central to the case, and then whether the threat was attended by a substantial lack of scientific certainty[46] (he found both).

In tort law, 'a risk though remote may nevertheless be real and not fanciful or far-fetched'.[47] The precautionary principle recognises that real risks may also be uncertain. Scientific uncertainty can mean that the likelihood (probability), the nature (kind), or the magnitude (gravity) of a risk is not well, or not fully, understood, and there might be a combination of these. Uncertainty does not necessarily mean a lack of data (although it can) or that there is methodological uncertainty; in science, uncertainty may also refer to uncertainty of an epistemic or ontological kind. For the purpose of the precautionary principle, uncertainty does not need to be quantified in order for the principle to be enlivened. As mentioned above, Garde J required 'substantial' uncertainty in *Tree Geebung*, echoing Osborn J's requirement that there be 'substantial' uncertainty in *Brown Mountain* (remembering that Garde J was obliged by the relevant Code of Practice to follow Osborn J's interpretation of the precautionary principle). Osborn J did not clarify what he meant by his standard of substantial uncertainty and, further, he did not say that uncertainty must *always* be substantial — instead, he said that in that particular case (*Brown Mountain*), he was imposing a standard of substantial uncertainty which he felt was 'within the ambit' of the principle.[48] In *Telstra*, Preston CJ said the principle will not be enlivened if there is 'no or no considerable' uncertainty.[49] Most other decisions have either followed *Telstra* or not mentioned a specific standard for uncertainty.

Full scientific certainty is essentially an oxymoron, which might imply that the principle is almost always going to be invoked where there are threats of serious or irreversible harm unless there is an additional standard for establishing uncertainty. Scientists do not express their findings as fully certain, but as associated with a particular value (known as a 'p' value), which reflects the likelihood that they would have arrived at their finding if the null hypothesis (rather than the hypothesis being tested) were true. To apply the precautionary principle, we might well impose a standard of substantial uncertainty, but another approach would be to look at the degree and kind of uncertainty present in order to inform what actions are needed to achieve better certainty, if that is possible, with a view to ultimately minimising risk. In other words, focus not on *whether* there is uncertainty but on *what* and *how substantial* is the uncertainty, so that we know how to respond to it and therefore what is an appropriate precautionary response. At one end of the spectrum, a small degree of uncertainty will mean a threat is relatively well understood and will tend toward the need for a preventative rather than a precautionary approach. At the other end, a great deal of uncertainty may mean that critical information and data are lacking, justifying an approach that postpones environmentally degrading measures at least until more information is gathered to better understand the risk, or until the uncertainty itself is understood and can be better accommodated. To consider a climate-related example, where there has been a recent extreme weather event and

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46 *Tree Geebung* (n 1) [339]–[363].

47 *Wyong Shire Council v Shirt* [1980] 146 CLR 40, 48 (Mason J), quoted in *Brown Mountain* (n 39) 47 [191].

48 *Brown Mountain* (n 39) 48 [197].

49 *Telstra* (n 1) 273 [149].

the likely aftermath is poorly understood, or where there are so few members of a species or community remaining that scientists face difficulties studying their behaviour and chances of survival in situ, uncertainty may be high yet the risk of serious or irreversible damage grave.

The decision in *Masked Owl* confirmed that failure to adequately engage the first condition precedent — namely, to consider and make a finding as to whether there is a serious or irreversible risk of harm — amounts to an error. Moshinsky J considered whether a delegate of the Environment Minister failed to consider or apply the precautionary principle as she was required to do under the *EPBC Act*, concerning an application by foreign-owned mining company MMG to conduct works relating to a waste storage facility in Tasmania's *takanya*/Tarkine rainforest. Moshinsky J found that the Minister's delegate had failed to take account of the precautionary principle50 regarding, for example, potential threats to the Tasmanian masked owl (*Tyto novaehollandiae castanops*). He noted that a decision-maker must engage the bifactorial test, and that regarding the first factor, considering whether there is a serious or irreversible risk of harm 'requires the decision-maker to bring an active intellectual process to this matter'.[51] Identifying threats was not enough: the decision-maker needed to discuss the threats and make a finding.[52] Costs were awarded to the Bob Brown Foundation.[53] Interestingly, Moshinsky J did not refer to either *Brown Mountain* or *Leadbeater's* case in his judgment. The decision is significant, though, because it tells us that the Minister (or a delegate) cannot determine that the precautionary principle is not enlivened by simply saying as much; they must actively find the absence of a serious or irreversible threat. Presumably, if the two-pronged approach is preferred, the Minister could alternatively find the absence of a lack of full scientific certainty (for example, to the standard of there being no *substantial* lack of certainty, or only a *negligible* amount of uncertainty) in order to validly conclude that the precautionary principle does not apply. In such a case, the implication would be that either the threat is certain, or that there is certainly no threat.

(b) *Burdens of Proof*

As I alluded to in Part I, there is a view that once the precautionary principle is enlivened, it operates to shift the evidentiary burden of proof onto the party objecting to the principle's application, to prove that no threat exists. In *Telstra*, Preston CJ said that what happens is that once both conditions precedent are met, a decision-maker 'must assume that the threat … is no longer uncertain but a reality',[54] and '[t]he burden of showing that this threat does not in fact exist or is negligible effectively reverts to the proponent of the economic or other development plan, programme or project'.[55]

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50 *Masked Owl* (n 4) 371 [48].
51 Ibid.
52 Ibid.
53 *Bob Brown Foundation Inc v Minister for the Environment and Water [No 3]* [2022] FCA 989.
54 *Telstra* (n 1) 273 [150].
55 Ibid.

He continued:

> The rationale for requiring this shift of the burden of proof is to ensure preventative anticipation; to act before scientific certainty of cause and effect is established. It may be too late, or too difficult and costly, to change a course of action once it is proven to be harmful. The preference is to prevent environmental damage, rather than remediate it. The benefit of the doubt is given to environmental protection when there is scientific uncertainty. To avoid environmental harm, it is better to err on the side of caution.[56]

Essentially, the view is that a preventative approach should be taken unless the proponent of the action linked to the harm in question is able to show that it should not be because the threat is not real or is only negligible. However, when a court is reviewing the actions of a ministerial decision-maker under the *EPBC Act*, or the proponent of a project associated with the risk of an environmental threat, it does not tend to require the potential risk-taker to show no risk or, if it cannot, to hold that party to a standard of prevention. Courts have not required proponents or decision-makers to act as though a risk is a certainty unless the party denying the risk can discharge the burden of proving that the risk can fairly be denied. In my respectful view, the burden of proof might be a useful metaphor to conceptualise the sentiment captured in the passage extracted above, but at the same time it has the potential to cause confusion.

Instead, we might characterise the process in practice as one in which the party asserting a threat must show that there is a threat, but the standard of proof is low on account of the precautionary principle. There must be seriousness or irreversibility, and a degree of uncertainty, but that is all that is required in terms of proof. Once the principle is enlivened, the decision-maker must then take a precautionary approach. The required approach (or spectrum of acceptable approaches) may be afforded a degree of discretion. However, if the proponent has *no* evidence denying the risk, then, most likely, they should properly act as though the risk was a certainty; and if they have *some* evidence denying it — or a credible plan to gather more information and overcome the uncertainty before significant harm is occasioned — then they may be able to act accordingly depending on the facts.[57] In this manner, case by case, we might start to see the evolution of a precautionary standard, so long as courts are comfortable intervening to help develop that standard. The notion of a precautionary standard is underpinned by the following two arguments: that the precautionary principle must be applied once it is enlivened, and that application is capable of demonstration.

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[56] Ibid 273 [151].

[57] In *Adani Mining Pty Ltd v Land Services of Coast and Country Inc* [2015] QLC 48, the Queensland Land Court recognised uncertainty in relation to groundwater-related impacts of the Adani Group's Carmichael coal mine. Applying the precautionary principle, the Court determined that an adaptive management approach would allow the Adani Group to commence mining operations despite not knowing critical information about potential environmental impacts, such as to the Doongmabulla Springs Complex. Later modelling determined an impact to the Springs above the set acceptable threshold. The Queensland Department of Environment and Science subsequently issued Adani with an order prohibiting it from commencing underground mining operations until it could demonstrate compliance with the conditions of its environmental approval: 'Adani's Australian Arm Bravus Issued with Environment Protection Order over Future Underground Works at Carmichael Mine', *ABC News* (online, 4 March 2023) <https://www.abc.net.au/news>. To be effective, adaptive management needs to involve monitoring, and an appropriate response to new information.

2 *Application May Be Informed but Not Trumped by Other Considerations*

In *Lawyers for Forests Inc v Minister for the Environment, Heritage and the Arts*, Tracey J found that the Minister, who had used conditions to justify the approval of a pulp mill in Tasmania under the *EPBC Act*, was not obliged to accord pre-eminence to the principle: 'So long as the Minister … takes account of the precautionary principle, it is a matter for him to determine what weight is to be accorded to the principle having regard to the wide range of other considerations'.[58] This argument is rooted in the notion that, in accordance with the separation of powers doctrine, the judiciary's role in administrative review is not to tread into the territory of merits review. There is a concern that scrutinising how a factor was taken into account, as opposed to whether it was taken into account, might constitute an overstep.

Although s 136 of the *EPBC Act* (which sets out the matters and factors for consideration in a federal-level approval decision) does not require supremacy to be given to the precautionary principle over the other matters and factors listed in that section, it also does not allow other matters and factors to negate the principle as if it did not exist. I suggest that it is appropriate to interpret the requirement to consider or have regard to the principle as a requirement to apply the *Telstra* test. If one or both of the conditions precedent in *Telstra* are not met, then there is no need to apply a precautionary approach, and the decision-maker may wish to be informed by other relevant factors whether to take a preventative or permissive approach to harm, as a matter of discretion.[59] As we recently learned from the *Masked Owl* decision, findings are required in the proper application of the test. If the precautionary principle is enlivened, because both thresholds are established, then a precautionary approach should be taken, no matter how compelling competing social or economic considerations: Preston CJ's judgment in *Telstra* mentions 'the concomitant need to take precautionary measures' that follows a finding that the principle has been enlivened,[60] and as just discussed, he felt that it is then to be assumed that the threat is no longer a possibility but a reality.[61]

If precautionary measures are not taken after the principle is enlivened, it is then arguable that the principle cannot have been given due regard or adequately to have been taken into account (although note that the expression of the principle might including qualifying words, such as that the precautionary principle must be applied 'wherever practicable'). Measures need not go beyond what is appropriate

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58 *Lawyers for Forests Inc v Minister for the Environment, Heritage and the Arts* (2009) 165 LGERA 203, 219 [36] ('*Lawyers for Forests*').

59 In *Telstra* (n 1), Preston CJ noted that if there is no, or no considerable, scientific uncertainty, but there is a threat of serious or irreversible damage, then '[m]easures will still need to be taken but these will be preventative measures to control or regulate the relatively certain threat of serious or irreversible environmental damage, rather than precautionary measures which are proportionate in relation to uncertain threats': at 273 [149].

60 Ibid 269 [128].

61 Ibid 273 [150].

and necessary; in other words, they can be proportionate to the facts of the case,[62] and may, for example, be dealt with through conditions rather than by not issuing an approval for the action or activity associated with the threat.[63] This may depend on the proponent's evidence either denying or otherwise accounting for management of the threat, as discussed. However, the need to apply the principle cannot be outright rejected or dismissed by the argument that it is only one of a number of relevant factors. This question could be avoided in *Leadbeater's* original decision because the applicable Code of Practice explicitly stated that the principle should be applied.[64]

With respect to s 391(1) of the *EPBC Act* (which requires the principle to be taken into account for decisions made under the Act), the precautionary principle need only be taken into account to the extent that this can be done consistently with the other provisions of the Act. In *Australian Conservation Foundation v Minister for the Environment* (2016) 251 FCR 308, a case concerning the climate-related impacts of the Adani Group's Carmichael coal mine, Griffiths J noted that 'other provisions of the Act' included the definition of 'impact' found in s 527E. He implied that because the Minister had allowed the mine proposal to proceed on the basis that, inter alia, downstream combustion emissions associated with the mine ('scope 3 emissions') were not an 'impact' of the proposal for the purposes of the *EPBC Act*, he could not apply the precautionary principle to the scope 3 emissions.[65]

In that case, it would have been open to the Federal Court reviewing the decision to determine that the principle had not been applied to scope 1 and 2 emissions, but it did not do so. It would also have been open to the Minister to determine that scope 3 emissions *were* an impact of the proposal, adopting similar reasoning to that of Preston CJ in the subsequent NSW Land and Environment Court decision in *Gloucester Resources Ltd v Minister for Planning*.[66] The issue of whether scope 3 emissions are an 'impact' of coal mining, and how the precautionary principle is relevant, may return to the Federal Court soon. The present Environment Minister has recently determined that three Australian coal projects pending final approval will have no net effect, or only a very small effect, on global climate change, and therefore will not have an impact on the matters protected under the *EPBC Act*, within the meaning of s 527E.[67]

The aspect of s 391 that requires the precautionary principle to be taken into account to the extent that this can be done consistently with other provisions of the

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62 According to Preston CJ in *Telstra* (n 1), the 'degree of precaution' that is appropriate in a given situation will depend on the combined effect of the seriousness of the threat and the degree of uncertainty, and the margin of error may be controlled by an adaptive management approach: at 276–9 [161]–[178].

63 See above (n 57).

64 *Leadbeater's* original decision (n 2) 302 [841]. See also *Code of Practice for Timber Production 2014* (n 43).

65 *Australian Conservation Foundation v Minister for the Environment* [2016] 251 FCR 308 [185].

66 *Gloucester Resources Ltd v Minister for Planning* (2019) 234 LGERA 257.

67 See Statement of Reasons: Decision under Section 78 (Notice) for each of Ensham Life of Mine Extension (EPBC No 2020/8669), Narrabri Underground Mine Stage 3 Extension Project NSW (EPBC No 2019/8427) and Mount Pleasant Optimisation Project (EPBC No 2020/8735), each published 11 May 2023 on *EPBC Act Public Portal* (Web Page, 30 May 2023) <https://epbcpublicportal.awe.gov.au/all-notices>.

EPBC Act has been mentioned in other cases (for example, in *Masked Owl*),[68] but it has not otherwise been held that another provision of the *EPBC Act* is inconsistent with the precautionary principle. At least where an impact has been determined, it is difficult to see how taking into account the precautionary principle could be impossibly inconsistent with many, if any, of the legislative provisions designed to protect the environment and conserve biodiversity through impact assessment. Specifically, the precautionary principle is unlikely to be inconsistent with s 136, which introduces social and economic considerations into the *EPBC Act*, supported by the fact that the principle is embedded into s 136. Ministerial decision-makers should thus not be able to argue that a precautionary approach cannot be applied consistently with the other provisions of the *EPBC Act* if what they want to do is effectively give greater weight to (for example) positive economic factors over adverse environmental factors.

3 *Application Is Capable of Demonstration*

(a) *Identifying Failure to Take a Precautionary Approach*

The precautionary principle does not dictate a course of action which then must be taken to the exclusion of all others.[69] In some contexts, as we have seen, the statutory expression of the principle might provide that decision-making should involve an evaluation to avoid damage, and an assessment of risk-weighted consequences for the options available. As to what other more specific actions or outcomes might constitute a precautionary approach, or whether these actions need to be taken if not specified, this is typically a question for the decision-maker tasked with applying the principle, and not one for which answers can be found in statute. This reflects a need for flexibility depending on the circumstances.

Reviewing courts contemplating whether the precautionary principle was adequately considered or applied have found that although these institutions are not in a position to suggest what should have been done, courts can conclude that what was in fact done was not consistent with the precautionary principle. In *Bridgetown/Greenbushes Friends of the Forest Inc v Executive Director of Conservation and Land Management*, the Federal Court noted that what is required by the precautionary principle will differ from case to case. Wheeler J said, reflecting a proportionality point Preston CJ made in *Telstra*, that at the less onerous end of the spectrum, a precautionary approach might mean doing research and study, while at the other end,

> [w]here endangered species are concerned for example, one can see that where readily accessible and unambiguous research material pointed to a serious risk that numbers of the species would be dramatically reduced by a course of action, then the adopting of that course of action, in the absence of any evidence of consideration of alternatives, would seem to point inevitably to a finding that there had been no relevant 'caution'.[70]

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[68] *Masked Owl* (n 4) 366–73 [33]–[54].

[69] *Bridgetown/Greenbushes Friends of the Forest Inc v Executive Director of Conservation and Land Management* (1997) 18 WAR 102, 118–19.

[70] Ibid 119.

In *Brown Mountain*, Osborn J accepted the submission of VicForests that it is 'not possible to readily postulate a generalized failure to give effect to the precautionary principle' in respect of the proposal to log at Brown Mountain.[71] He nonetheless held that proposed logging was unlawful as it was set to go ahead before surveys to determine the location of endangered species were undertaken.[72] In that case, the lack of adequate research was evidence that a precautionary approach had not been taken. In *WOTCH Inc v VicForests [No 5]*, an injunction hearing, Keogh J noted that whether VicForests' adaptive management measures for proposed logging in the Victorian Central Highlands was a proportionate response to the plight of the greater glider possum (*Petauroides volans*) after the 2019–20 bushfires may be a question at trial.[73] Closing submissions concluded in March 2023 and at the time of writing, judgment was pending. Courts can and should inform themselves of a spectrum of appropriate responses — a flexible standard below which the precautionary principle cannot be said to have been applied — through expert scientific opinion.

(b) *Leadbeater's* Case

The argument that the precautionary principle is capable of demonstration is most strongly supported by *Leadbeater's* case. So, and since it has not been discussed in depth in the literature, I will provide some background.[74] The plaintiff, Friends of Leadbeater's Possum Inc, sought an injunction to halt logging in the critical habitat of two endangered possum species: the Leadbeater's possum (*Gymnobelideus leadbeateri*), and the greater glider (*Petauroides volans*). The defendant, VicForests, proposed to log 66 coupes where the possums lived. Both species are deemed threatened with extinction, and the area proposed to be logged is recognised as habitat important to each species' survival. The legal basis on which the plaintiffs objected to the logging was that VicForests had not complied with its obligations to apply the precautionary principle, and was not likely to in the case of future operations. VicForests argued that it did consider the principle and was taking precautionary measures, but both at first instance and on appeal, the court found that what VicForests was doing was insufficient. Accordingly, *Leadbeater's* case suggests that it is not enough that the precautionary principle be paid only 'lip service'.[75] Because bushfire was a critical part of the context informing the nature of the threat to the possum species from forestry, the case also suggests that cumulative impacts are relevant to the precautionary principle, which I discuss in Part III below.

Over 375 paragraphs of the *Leadbeater's* original judgment were devoted to the precautionary principle. The expression of the principle relevant to the case was that in the *Code of Practice for Timber Production 2014* (Vic). Clause 2.2.2.2 of the

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71 *Brown Mountain* (n 39) [182].

72 Ibid [184].

73 *WOTCH Inc v VicForests [No 5]* [2020] VSC 528 [35].

74 See, additionally, Laura Schuijers and Lee Godden, 'Law and Litigation for the Conservation of Forest Communities' (2022) 9(2) *Griffith Journal of Law and Human Dignity* 71.

75 In *Lawyers for Forests* (n 58), Tracey J noted that there may be cases where a decision-maker has only paid 'lip service' to an obligation to have regard to a matter such as the precautionary principle, but they will be rare: at 220 [38].

Code requires that the precautionary principle be applied to the conservation of biodiversity values. The version relevant in the case provided in the definition of 'precautionary principle' that

> when contemplating decisions that will affect the environment, careful evaluation of management options be undertaken to wherever practical avoid serious or irreversible damage to the environment; and to properly assess the risk-weighted consequences of various options. When dealing with threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.[76]

At first instance, Mortimer J applied this definition to the effect that

> if the circumstances of VicForests' forestry operations mean it is 'dealing', objectively, with circumstances where there are likely to be threats of serious environmental damage, or threats of irreversible environmental damage, then in undertaking its evaluation and assessment of how (and if) those forestry operations should be conducted, VicForests cannot justify its lack of measures to prevent environmental degradation by relying on a lack of scientific certainty about what it needs to do.[77]

After establishing that there was a threat of serious damage to the greater glider, and that 'there is still much that is not known about how the Greater Glider is able to cope with the impacts of forestry operations in and around its habitat'[78] she concluded, in relation to the threat, that 'VicForests must "deal" with it'.[79] A lack of research, evidence or data could not be relied on as a reason for not adopting effective measures, and VicForests could not 'do nothing or procrastinate … take half-hearted or minor measures' pending better research or data.[80] Mortimer J found that drawing up an interim strategy focusing on the protection of the greater glider, once it became clear it would be adversely affected by forestry operations, was a 'poor compromise in the face of the need to be seen to be doing something', and not a careful evaluation of management options.[81] She also noted that VicForests' 'defensive and negative approach' towards conservation, which, she found, it treated as an inconvenience, was not consistent with cl 2.2.2.2.[82]

Additionally, VicForests' suggestion that it was implementing a new policy which might reduce adverse impacts for coupes not yet logged, was dismissed as being a course of action undertaken for the purpose of deriving a commercial benefit from an environmental certification, 'such as getting its products into places like

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[76] *Leadbeater's* original decision (n 2) 145 [138]. Note the new definition in *Code of Practice for Timber Production 2014* (n 43) (as amended 2022) Glossary: 'precautionary principle' means that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, decisions by managing authorities, harvesting entities and operators must be guided by: (i) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and (ii) an assessment of the risk-weighted consequences of various options.'

[77] *Leadbeater's* original decision (n 2) 303 [845].

[78] Ibid 301 [829].

[79] Ibid 304 [849].

[80] Ibid 304 [849].

[81] Ibid 323 [937].

[82] Ibid 344 [1009].

Bunnings'.[83] Noting that '[c]onscientious and careful engagement in a process designed to be attentive to the protection and conservation of threatened fauna and flora is likely to comply' with the principle,[84] Mortimer J specifically rejected VicForests' argument that cl 2.2.2.2 concerns matters of degree and judgment in a way that renders it not susceptible to clear application in a given factual situation.[85] This aspect of the judgment paves the way for further development of precautionary principle jurisprudence. Future case law may eventually contribute to the evolution of a de facto (but necessarily flexible) precautionary standard, if it can be determined that in a given case the principle was not applied as required, and these cases accumulate to form a body of law.

On appeal, VicForests alleged 29 grounds. The ground of appeal that succeeded was that Mortimer J as primary judge erred in finding that VicForests' conduct needed to comply with the Regional Forest Agreement ('RFA') applicable to VicForests' operations, in order to secure the benefit of an exemption in the *EPBC Act* that carves out forestry operations conducted in accordance with an applicable RFA.[86] In other words, the Full Federal Court found that where an RFA applies, the *EPBC Act* does not — even if the RFA is not complied with. The case had relied on the *EPBC Act* applying to VicForests' conduct, because that was the basis on which the plaintiff could bring its action.

VicForests failed on all grounds of appeal relating to the precautionary principle. Relevantly, the appeal court rejected the notion that the precautionary principle (as articulated in the Code of Practice) does not direct a particular outcome and so is merely exhortatory, as the primary judge had. Instead, their Honours noted that courts can judge conduct by a standard that has an evaluative or qualitative element and are used to doing so, for example when considering whether 'reasonable care' was taken,[87] and that vagueness or uncertainty in the law does not render it incapable of application.[88]

The appeal court also rejected VicForests' argument objecting to Mortimer J's construction of the principle as requiring that measures be taken to arrest and reverse a decline in threatened species because that 'elevates a purpose of environmental protection above timber production'.[89] Their Honours similarly rejected all of VicForests' arguments that various aspects of the evidence drawn on in the case did not support a conclusion that it had not applied and would not apply the precautionary principle to its timber harvesting operations.[90]

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83 Ibid 379 [1157].
84 Ibid 305 [853].
85 Ibid 301 [833].
86 The exemption is found in s 38(1) of the *EPBC Act*: 'Part 3 does not apply to an RFA Forestry Operation conducted in accordance with an RFA'.
87 *Leadbeater's* appeal decision (n 3) 106 [137]–[139].
88 Ibid 107 [143] citing *Brown v Tasmania* (2017) 261 CLR 328.
89 *Leadbeater's* original decision (n 2) 263 [630]; *Leadbeater's* appeal decision (n 3) 115–16 [187]–[190].
90 *Leadbeater's* appeal decision (n 3) 116–25 [192]–[243].

(c) *Tree Geebung* Case

The *Tree Geebung* case also concerned timber harvesting operations conducted by VicForests in the Central Highlands region of Victoria, a region to which the tree geebung (*Persoonia arborea*) is endemic. Unlike *Leadbeater's* case, *Tree Geebung* did not involve an argument as to the application of the *EPBC Act*, instead being directed to the requirements relating to the precautionary principle expressed in the *Flora and Fauna Guarantee Act 1979* (Vic), under which the tree geebung was recognised as endangered, and the *Code of Practice for Timber Production 2014* (Vic), amended after *Leadbeater's* case. The plaintiff, Warburton Environment Inc, alleged that, with respect to the tree geebung, VicForests had not complied with the Code or the standards embodied therein, and that it would not in future unless injunctions or declarations were granted.

Garde J relied on expert witness' opinion, as well as on the Victorian government's Threatened Species Assessment, to conclude there was a serious and irreversible threat to the species from logging. The evidence showed that, given the context of wild and planned (regeneration) fire impacting the tree geebung, timber harvesting intervals were too short, and it could take centuries to reverse losses. Garde J felt there was 'every reason to expect that significant losses of mature Tree Geebungs will continue in coupes harvested by VicForests in the future unless adequate precautions and controls are put in place'.[91] He also considered that there was 'very substantial' uncertainty associated with the threat of harm to the tree geebung from timber harvesting operations, due to unknown factors relating to the abundance, distribution and behaviour of the species.[92]

As a result of the precautionary principle therefore being enlivened, Garde J said, '[i]t follows that the lack of scientific certainty on the matters I have discussed should not be used as a reason for postponing measures to prevent environmental degradation'.[93] His next step was to determine what was the minimum practicable response that needed to be taken to protect the tree geebung,[94] a step dependent on expert scientific opinion.[95] The purpose of this was to then be able to say whether VicForests' proposed adaptive management plan was sufficient, or whether the injunctions sought by Warburton were required.

Given the extent of the uncertainty, Garde J first determined that the minimum conduct necessary to identify and therefore protect mature tree geebungs in wet forest coupes was to conduct 30m transect surveys in these coupes:

> I conclude that 30m transect surveys are likely to be highly effective in locating mature Tree Geebungs, whether or not in flower, and that the conduct of surveys of this type will significantly reduce the risk and threat to mature Tree Geebungs caused by the use of mechanical equipment and regeneration burning. Protective measures cannot be taken until it is known where mature Tree Geebungs are located. This information should be known prior to the completion of coupe planning so that appropriate exclusion areas and buffers

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91 *Tree Geebung* (n 1) [343].
92 Ibid [360].
93 Ibid [361].
94 Ibid [364].
95 Ibid [404].

> can be established, and operational maps endorsed with the necessary information and instructions.[96]

Then, he considered the need for a vegetation buffer to protect the tree geebung species during harvesting, and concluded that

> a minimum 50m buffer radius, with each mature Tree Geebung at least 15m from the perimeter of the buffer, is essential if Tree Geebungs are to be protected from destruction or damage during harvesting and by exposure and windthrow subsequent to harvesting.[97]

This, Garde J found, was 'reasonably practicable having regard to the area required for harvesting and buffers and the area of State forest available'.[98] Additionally, he found based on the available evidence that a 10m fire break was needed to prevent trees from destruction or scorching during regeneration burning.[99] Having so found, he then concluded that VicForests' planned adaptive management was insufficient, and issued injunctions preventing VicForests from harvesting in any wet forest coupes without complying with the minimum standards he set out. However, because the precautionary principle was qualified in the Code of Practice as requiring action to avoid serious or irreversible environmental damage 'wherever practicable,' the injunction was conditional, meaning VicForests did not have to comply if it was not reasonably practicable to do so.[100] In such cases, though, VicForests needed to record the destruction or damage of every tree geebung in a logbook, state why compliance was not reasonably practicable, have it signed off, and then report it, with a copy sent to Warburton as beneficiary of the injunctions.[101]

III Cumulative Impacts and the State of the Environment

A *The Importance of Context*

Another particularly pertinent way in which *Leadbeater's* case is significant is in its acknowledgement of the cumulative nature of environmental impacts. Cumulative impacts and cumulative effects are terms used to describe additive and synergistic contributions to adverse environmental outcomes, when considered together. All of the major Earth system-scale environmental problems — including climate change and biodiversity loss — have resulted from many contributions over time. From the small-scale perspective of one threatened species or critical habitat place, multiple different threats will invariably operate cumulatively, influencing the likelihood of an outcome such as habitat degradation or species extinction. It may seem obvious that environmental impacts are cumulatively caused, but cumulative causation is tricky for the law to deal with, and so the concept has been met with some reticence, as evinced by early case law. *Leadbeater's* case recognised that cumulative impacts and the precautionary principle are interrelated — among other things, a lack of full

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96 Ibid [411].
97 Ibid [425].
98 Ibid.
99 Ibid [429].
100 Ibid [463].
101 Ibid.

scientific certainty is more likely where there is a complex, multi-factorial causal relationship.

The *EPBC Act* does not specifically address cumulative impacts, yet the way in which it operates — project by project — is a key reason why cumulative impacts are such a problem in Australia. As Professor Graeme Samuel noted in his statutory review of the *EPBC Act*, the project-by-project nature of the Act means cumulative impacts are not systemically considered, and the overall result is environmental decline.[102] The reforms flagged in the federal government's response to the review indicate that it will address cumulative impacts via regional planning,[103] but it is not clear at this stage whether there will be any significant statutory changes that will impact the way individual projects are assessed in context under the Act.

If a particular harm is a manifestation of many contributions, some of which do not fall within the purview of the *EPBC Act* — for example, because they are too small or causally remote to meet the definition of significant impact, or because they are not caused by human action, or not by human action regulated by the *EPBC Act* — then it may not be a type of harm which the *EPBC Act*, or impact assessment law more generally, is well-equipped to prevent. This is a difficult conundrum where the harm is exactly what the law explicitly sets out to avoid, such as the loss of threatened species and their habitat.

The *EPBC Act* is concerned with managing likely, significant impacts to nine 'matters of national environmental significance' ('MNES').[104] Broadly, these are protected species and places with a designated status under international agreements to which Australia is a party, such as the *Convention on Biodiversity* and the *World Heritage Convention*.[105] A 'significant' impact under the *EPBC Act* is an impact which is important, notable or of consequence, having regard to its context or intensity.[106] Significance depends upon the sensitivity, value and quality of the environment which is impacted, and upon the intensity, duration, magnitude and geographic extent of the impact.[107]

The Explanatory Memorandum to the Environmental Protection and Biodiversity Conservation Bill 1999 (Cth) expressed the view that cumulative impacts were not intended to be considered under the significance test. The Memorandum stated that an action not likely to have a significant impact will not require approval *even if* the overall impact would be significant, on the basis that cumulative impacts should be assessed through state planning and land management

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102 Graeme Samuel AC, *Independent Review of the EPBC Act: Final Report* (October 2020) 39, 42.

103 Department of Climate Change, Energy, the Environment and Water (Cth), *Nature Positive Plan: Better for the Environment, Better for Business* (December 2022).

104 The MNES are the matters protected under *EPBC Act* (n 21) pt 3: see the list at n 23.

105 *Convention concerning the Protection of the World Cultural and Natural Heritage*, opened for signature 16 November 1972, 1037 UNTS 151 (entered into force 17 December 1975).

106 *Booth v Bosworth* (2001) 114 FCR 39; Department of the Environment (Cth), *Matters of National Environmental Significance* (Significant Impact Guidelines 1.1, 2013) 2; *Tasmanian Aboriginal Heritage Centre Inc v Secretary, Department of Primary Industries, Parks, Water and Environment [No 2]* (2016) 215 LGERA 1, 63–4 [240]; *Northern Inland Council for the Environment Inc v Minister for the Environment* (2013) 218 FCR 491.

107 Department of the Environment (Cth) (n 106) 2.

legislation and recovery plans.[108] The Memorandum was released prior to the guidelines and case law which have established that context and intensity are relevant to the consideration of significance under the *EPBC Act*. It may be that the drafters of the Explanatory Memorandum had in mind a definition of cumulative impacts focused on potential other projects, rather than other contributing factors such as unexpected extreme weather events as well.[109]

Through having regard to context, the significance enquiry is an appropriate place to consider the state or condition of the environment with respect to the MNES concerned. A degraded or threatened environment will be more sensitive to any given impact, thus increasing the intensity of the impact attributable to the proposal under consideration.[110] A similar enquiry into significance for the purpose of establishing whether there is a controlled action is made when considering whether there is a threat of serious or irreversible harm under the precautionary principle. In other words, when determining the first condition precedent to the enlivenment of the precautionary principle, whether or not there is serious or irreversible harm should be determined with reference to the state of the relevant environment at the time in question. This is a moving status. The greater glider, for example, was once an abundant species throughout eastern Australia. It was listed as vulnerable in the mid to late 2010s, and as endangered on 5 July 2022, with 'frequent and intense bushfires, inappropriate prescribed burning, climate change, land clearing and timber harvesting' cited as principal threats.[111] Clearly, a contribution to the decline of the species prior to the 2010s would be perceived differently than would a timber operation now, and the risk then was not as significant or serious as it is now.

Australian State of the Environment reporting offers an opportunity to scientifically inform an enquiry as to how the environment is being affected and will in future be affected by multiple compounding threats, paired with relevant conservation advice documents and action statements prepared by the Commonwealth and state-level governments from time to time. The most recent State of the Environment Report was published in July 2022.[112]

Concepts of fragility and resilience, popular as they are in environmental science, are typically not explicitly addressed at all by the law. This, in my view, is an important problem, because it is impossible to adequately conclude on significance, seriousness, or irreversibility without acknowledging the context of environmental fragility and the expected resilience of the environment (its ability to buffer threats). The state of the environment (including the state of a species and its

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[108] Explanatory Memorandum, Environmental Protection and Biodiversity Conservation Bill 1999 (Cth) 28 [51], 30 [61], 33 [79].

[109] This is consistent with Jessup J's judgment in *Tarkine National Coalition Inc v Minister for the Environment* (2015) 233 FCR 254 ('*Tarkine*') which failed to find that cumulative impacts should be considered under s 136 (the approval provision) of the *EPBC Act* (n 21).

[110] See *EPBC Act* (n 21) s 572E (definition of 'impact').

[111] Department of Climate Change, Energy, the Environment and Water (Cth), *Conservation Advice for Petauroides Volans (Greater Glider (Southern and Central))* (in effect under the *Environment Protection and Biodiversity Conservation Act 1999* from 5 July 2022) 9 <http://www.environment.gov.au/biodiversity/threatened>.

[112] Department of Climate Change, Energy, the Environment and Water (Cth), Australia: *State of the Environment — 2021* (Web Page, July 2022) <https://soe.dcceew.gov.au>.

habitat) can — by referencing context — and must inform a conclusion on whether there is a risk of serious harm and therefore whether (and how) the precautionary principle is to be applied.

B *When Cumulative Impacts Are Relevant to Decision-Making*

1 *Reconciling* Tarkine National Coalition v Minister

Tarkine National Coalition Inc v Minister for the Environment[113] is one of the few decisions prior to *Leadbeater's* case to address cumulative impacts. It is not a case on the precautionary principle, but is considered here because the *EPBC Act*'s treatment of cumulative impacts is relevant to the argument that cumulative impacts can be considered under the precautionary principle, especially for *EPBC Act* precautionary principle cases. Arguably, the precautionary principle can be interpreted in a way that accommodates cumulative impacts regardless of what case law suggests about cumulative impacts otherwise being relevant or not to decision-making under the *EPBC Act* (as *Leadbeater's* case shows). However, it will be useful to examine the reasoning.

Tarkine concerned the approval of a hematite mine in the *takanya*/Tarkine area of north-western Tasmania. The decision was challenged over concerns about, inter alia, impacts to the habitat of the Tasmanian devil, wedge-tailed eagle, and spotted-tail quoll. A principal issue was whether cumulative impacts were required to be considered under s 136 of the *EPBC Act*:[114]

> It was the submission of the appellant that [the Minister] was obliged to look at how that habitat had been affected by existing actions, how it would be, or would be likely to be, affected by the proposal itself, and how it would be, or would be likely to be, affected by other actions of which the Minister was aware but which, at the time of his decision, lay only in the future.[115]

Jessup J expressed the opinion that as a matter of 'common sense' the impact of a proposal would normally be considered against a baseline 'constituted by the existing circumstances for that species'.[116] He stated that past natural and human-induced effects would have created that baseline circumstance, but it was the circumstance rather than the specific events that required consideration as part of forecasting impacts related to the proposal. He distinguished past impacts from present and future impacts, finding that the Minister was under no obligation to take account of the consequence of any other proposed action. The particular proposed actions in question in the case were two other mines, about which the Minister would have been aware, based on their inclusion in the documentation to which he had to have regard pursuant to s 136(2). Although Jessup J found that the Minister did not have to consider the impacts of those mines just because he knew about them, he said

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113 *Tarkine* (n 109).

114 Section 136 of the *EPBC Act* (n 21) sets out the matters and factors that the Environment Minister needs to consider when making an approval decision or a decision not to approve a proposal referred under the Act (including the precautionary principle).

115 *Tarkine* (n 109) 268 [40].

116 Ibid 268 [41].

> the question would be whether the Minister was possessed of information that showed that the operations of these other mines would contribute, or were likely to contribute, to the consequences that the proposal would have, or was likely to have, on the [MNES] in relation to the proposal.[117]

If so, he would 'have then come under an obligation to take account of the consequences referred to'.[118]

It is, arguably, equally a matter of common sense that present and future impacts constitute the existing circumstance for a threatened species, in addition to past impacts; past impacts change the 'likelihood and significance', as well as the 'seriousness or irreversibility' of future risk. Many environmental impacts are associated with a degree of latency, so it may be that effects do not manifest at all for some time.[119] More commonly, small changes to a species' 'circumstance' are happening constantly, due to cumulative factors. Environmental systems tend to buffer or assimilate impacts until a threshold or tipping point is reached, after which a significant, serious or irreversible effect comes to light (this is the concept of resiliency in complex systems). To suggest that cumulative impacts, including not only those that constitute a baseline but also the effects of present and future threats, are relevant to a species' circumstance is not necessarily inconsistent with the *Tarkine* judgment. In *Tarkine* the Minister did not have to decide whether actions he knew about contributed to the circumstance of the threatened species in question, and thus whether they increased potential sensitivity of the species to the proposal under consideration. However, those actions were specific mine proposals. If the focus is on general impacts such as bushfire, or a class of ongoing activity such as forestry operations, *Tarkine* may be distinguishable on the basis that those future risks constitute a present circumstance.

Additionally, the judgment left room for a cumulative impact to be relevant to approval decisions if the nature of the impact is set out in the documentation provided to the decision-maker. The future circumstance of threatened species is often set out in conservation advices, which are government-led documents that must be considered under *EPBC Act* decision-making where there is likely to be a significant impact on a threatened species.[120] A conservation advice will not likely evaluate impacts of specific proposals, but it will lay out threats from general issues. The advice for Leadbeater's possum, for example, lists the collapse of hollow-bearing trees, extensive wildfire, and logging as 'known current' threats; climate change as a 'suspected future' threat; and predation by feral cats and competition for nest hollows with sugar gliders as 'suspected current' threats.[121] These categories demonstrate the way in which uncertainty ('suspected') and future threats are part of the picture describing the circumstances of Leadbeater's possum. This holistically represents the 'state of the environment', and to exclude future threats from a

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117 Ibid 273 [53].

118 Ibid.

119 For an analysis in the coal seam gas context, see Rebecca Nelson, 'Big Time: An Empirical Analysis of Regulating the Cumulative Environmental Effects of Coal Seam Gas Extraction under Australian Federal Environmental Law' (2019) 36(5) *Environment and Planning Law Journal* 531.

120 *EPBC Act* (n 21) s 139(2).

121 Threatened Species Scientific Committee, *Conservation Advice: Gymnobelideus Leadbeateri — Leadbeater's Possum* (2019) <http://www.environment.gov.au/biodiversity/threatened>.

consideration of a proposed future impact would be somewhat artificial, potentially facilitating an unwanted or unexpected outcome. A second (related) basis upon which *Tarkine* might be distinguished, then, is where there is information on future threats and the effect of those threats on a particular species available to the decision-maker at the time s 136 of the *EPBC Act* is engaged.

2 Leadbeater's *Case and Cumulative Impacts*

The concept that the circumstance of a species will depend on cumulative contributions to its key threats is, as alluded to, one of the significant points picked up in *Leadbeater's* case. The stage was set some 10 years earlier by *Brown v Forestry Tasmania [No 4]*, where Marshall J considered that 'present and likely future forestry operations' would have a significant impact on the threatened Tasmanian wedge-tailed eagle (*Aquila audax fleayi*), on the basis of Forestry Tasmania's operations forming 'part of the well-established cumulative impact of native forest harvesting in Tasmania on the eagle'.[122] Here, Marshall J effectively considered the contribution of the logging operation under question with respect to the context of cumulative forestry impacts on the eagle population. He also found that forestry operations were likely to have a significant impact on the broad-toothed stag beetle (*Lissotes latidens*), as well as the swift parrot (*Lathamus discolor*), due to 'all' of the threats to these species.[123]

In *Leadbeater's* case, wildfire was a critical cumulative impact relevant to 'seriousness' under the precautionary principle. Mortimer J found that fire is relevant to forestry 'as a matter of logic and common sense' because fire risk increases the value of the remaining habitat of a threatened species, therefore increasing the damage that would be caused by destruction of that habitat from forestry operations.[124] She also said:

> All threats to the species can be considered in deciding if, objectively, there are threats of 'serious' damage to the species. For a listed threatened species, this is not a very difficult threshold to meet. In substance, it is inherent in the listing of a species that there are threats of serious damage to it: that is the purpose of the listing criteria.[125]

Mortimer J specifically noted that this 'wider view' of threats of damage is important to understand; VicForests' expert had assumed that the relevant question was whether *forestry operations in the logged coupes*, in a narrow sense, posed the threat of serious or irreversible damage. She found that, in the context of the precautionary principle, only serious *or* irreversible harm need be established in a case, and that both could arise from sources other than the action under consideration, in conjunction with the action. She was persuaded on the balance of probabilities that there were risks of serious *and* irreversible threats to the possum species, from timber harvesting and wildfire combined.

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122 *Brown v Forestry Tasmania [No 4]* [2006] 157 FCR 1, 16 [102]. See also *Queensland Conservation Council Inc v Minister for the Environment and Heritage* [2003] FCA 1463 (Kiefel J).

123 *Brown v Forestry Tasmania [No 4]* (n 122) 20 [137], 24 [162].

124 *Leadbeater's* original decision (n 2) 272 [674].

125 Ibid 303–4 [847].

Leadbeater's case advanced a much-needed clarification that cumulative impacts are relevant to decision-making concerning threatened species and their habitat. To the extent that this might provoke fears of a dramatically expanded scope for environmental impact assessment, *Tarkine* can be called upon as a guide: the Minister does not need to actively engage in fact-finding about all other relevant possible threats. The Minister will already be aware of the key threats on account of the conservation advices required to be considered under the *EPBC Act* (although it must be noted that these are not always complete or available for all species), as well as other material elicited from environmental surveys, reports and public submissions.

Mortimer J's judgment also helps us to appreciate that cumulative impacts are inherently related to the precautionary principle. Cumulative impacts are almost always associated with at least a degree of uncertainty by reason of interacting, non-linear causal relationships. In complex systems there is a synergistic element to cumulative impacts in that threats may be interrelated — the manifestation of one contributing to or worsening another. In the Conservation Advice on Leadbeater's possum, for example, the collapse of hollow-bearing trees is explicitly recognised as 'also influenced by the other main threats listed here, fire and logging'.[126] The previous neglect of cumulative impacts by the law governing environmental management and decision-making is an omission that needs remedying; cumulative impacts have always underpinned environmental problems, yet two things have changed: knowledge of cumulative impacts and of the way in which complex environmental systems work has advanced, and environmental problems have worsened. The law is necessarily going to have to evolve to deal with decision-making in the face of uncertainty due to cumulative impacts, and the precautionary principle is an important tool that can aid in this evolution.

IV The Next Phase of the Precautionary Principle

On 8 July 2022, the Environment Council of Central Queensland Inc wrote to Australia's newly appointed Environment Minister, the Hon Tanya Plibersek, asking her to reconsider the suite of coal and gas projects pending approval under the *EPBC Act*.[127] Relying on s 78A of the Act,[128] they argued that substantial new information about the impacts of climate change on the environment that was not before her predecessors warranted a revocation of the decision in each case that there was not likely to be a significant impact on threatened species and protected places. The Minister stated in early November 2022 that she will reconsider 18 projects.[129] In

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126 Threatened Species Scientific Committee (n 121).

127 For an explanation of the case and the evidence being relied upon, see 'About These Climate Cases', *Living Wonders* (Web Page, 2023) <https://livingwonders.org.au/about-this-action>.

128 Section 78A of the *EPBC Act* (n 21) allows a person to request the Minister to reconsider a decision that an action (eg, a coal extraction project) is a 'controlled' action under the Act (per s 75(1)), meaning a finding that there is likely to be a significant impact to one or more of the MNES in pt 3 of the Act.

129 Michael Slezak, 'Coal and Gas Projects To Be Reassessed after Conservation Group Wins Legal Bid on Climate Change Impacts', *ABC News* (online, 4 November 2022) <https://www.abc.net.au/news/2022-11-04/coal-projects-reassessed-after-legal-bid/101617118>.

making new decisions on significant impact, the Minister is required to consider the precautionary principle.[130] At the time of writing, the Minister had reconsidered three coal projects. In doing so, she determined that climate change will likely have a significant impact on essentially all of the *EPBC Act* protected species and places. As alluded to in Part II(B)(2), however, she concluded that the three projects, each considered separately, were not likely to have a significant impact on the matters protected by the *EPBC Act*, because the coal projects were not sufficiently causally connected to the impacts of climate change. A potential challenge to this decision or to an approval decision might offer an opportunity to clarify the relationship between individual coal projects and climate-related impacts on protected species and places. Future climate litigation could also further our understanding of whether and how the precautionary principle can be employed to help navigate a response to the intersecting biodiversity and climate crises.

As we continue through the decade of the 2020s and beyond, the natural world will continue to be adversely impacted by climate change. In many cases, climate change will increase the likelihood or disturbance pattern of other threats, such as with Australian forest habitats and bushfire, Australian coastal habitats and sea level rise, and Australian riverine habitats and flooding. [131] This inevitably changes the context in which human development activities will take place, and changes the circumstances for Australia's threatened flora, fauna and ecological communities.

There is much that we do not know about the future that could be characterised as scientific uncertainty. Even if threats could be faithfully anticipated, the question of how habitats and in turn the species that live in them (including humans) are likely to respond to this are relevant types of uncertainty as well.[132] National Geographic reported that the 2019–20 bushfires 'laid bare just how little is known about populations of even iconic species … as well as how little protection conservation laws have provided vulnerable wildlife amid rampant deforestation, development, and climate change' citing a 'lack of fundamental data' as a key concern.[133]

The federal *EPBC Act* was independently reviewed in 2020. The report by the chair of the review, Professor Samuel, concluded that the precautionary principle is not being given sufficient weight or prominence in approval decisions.[134] One of the recommendations the review offered was the introduction of national environmental standards to serve as a reference point against which approval decisions should be made. Specifically, the review proposed that actions, decisions,

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130 *EPBC Act* (n 21) s 391.

131 See Intergovernmental Panel on Climate Change ('IPCC'), *Climate Change 2022: Impacts, Adaptation and Vulnerability* (Working Group II Contribution to the IPCC Sixth Assessment Report) <https://www.ipcc.ch/report/ar6/wg2>.

132 *Leadbeater's* original decision (n 2). For a general summary of types of scientific uncertainties relevant to law, see Lee Godden, Jacqueline Peel and Jan McDonald, *Environmental Law* (Oxford University Press, 2nd ed, 2019) 364.

133 Todd Woody, 'Koalas and Other Marsupials Struggle to Recover from Australia's Bushfires' *National Geographic* (online, 17 July 2020) <https://www.nationalgeographic.com/animals/2020/07/australia-marsupials-struggling-after-fires>.

134 Samuel (n 102) 43.

plans and policies that relate to the environmental matters protected by the *EPBC Act* should be consistent with the precautionary principle, and reflect a principle of non-regression.[135] The new Labor government issued a response to the review in December 2022, confirming that it will introduce national standards.[136] Whether the incorporation of environmental standards in this way will be enough to change decision-making behaviour to better align with the precautionary principle remains to be seen. Assuming the *EPBC Act*'s architecture remains broadly the same — in the sense that decisions made under its auspices are reviewable via judicial review and not on their merits, which appears to be the present intention[137] — courts will still be deferential to ministerial decision-making to a degree, but new standards might help direct courts with respect to reviewing application of the precautionary principle as well as approval decisions more generally.

In this article, I have argued that both consideration and application of the precautionary principle must be taken more seriously — as a legislative requirement as well as a scientifically-supported imperative — if we are to avoid catastrophic ecological loss and the worst impacts of climate change. *Leadbeater's* case offers guidance on how this might be done, although, as I have shown, it is not the only relevant case to support the contentions made in this article. First, application of the principle should not be trumped by other considerations. Second, if (or because) application is capable of demonstration, conduct taken while under an obligation to apply the principle can be judged, including under judicial review. Third, application and consideration of the principle as we move further down the path of climate change will necessarily involve a consideration of context that takes into account the state of the environment with respect to the manifest and projected impacts of climate change. This may mean that activities which might have been considered acceptable two or three decades ago can no longer be tolerated by the changed environment, and therefore will have much more significant impacts than they once would have. Both the executive and the courts have a role to play in advancing the practical impact of the precautionary principle.

In particular, to see real change as we enter the fourth decade of the precautionary principle, courts must take earnestly their role in adjudicating the precautionary principle when reviewing the actions of the executive. There will not always be an opportunity. *Leadbeater's* case invited the Federal Court to assess the conduct of a forestry operator bound by the precautionary principle under code. However, the effect of the appeal decision is that this review avenue is closed off. Despite the wording of s 38 potentially implying that the *EPBC Act* is a safety net where forestry operations are not conducted in accordance with relevant forestry agreements, the view of the Full Federal Court was that it does not operate this way. In other cases, application of the precautionary principle may similarly not be easily reviewable by courts, if there are barriers such as standing or if the requirements surrounding the principle are heavily qualified and therefore application is difficult to challenge. For precautionary principle jurisprudence to advance, courts need to have an opportunity to review the application of or failure to apply the principle.

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135 Ibid 203.
136 Department of Energy, Climate Change, the Environment and Water (Cth) (n 103).
137 Ibid 5.

This will present at judicial review where a ground of review is that the precautionary principle was a relevant consideration to executive decision-making. In these cases, courts should carefully conceptualise their role in reviewing executive decision-making where the precautionary principle is involved. Recent case law suggests that courts *can* recognise a failure to apply the precautionary principle, and as *Leadbeater's* case and *Tree Geebung* each show, can embrace science as a means of informing this adjudication.

The past half-century of human activity has resulted in rapid planetary destruction, including extreme biodiversity loss and dramatic climatic change that has already scarred the Australian landscape.[138] Human activity will have to change in response if worse impacts are to be avoided. That this should be reflected in the result of environmental decision-making even if we do not know exactly how grave the result will be otherwise, should not be controversial. A contemporary interpretation of the precautionary principle that demands the consideration of and response to cumulative context and which is associated with a basic degree of accountability, therefore, is only common sense.

[138] See Department of Climate Change, Energy, the Environment and Water (Cth) (n 112); IPCC (n 131).