

BREAKING BACKS AND BOILING FROGS: WARNINGS FROM A DIALOGUE BETWEEN FEDERAL WATER LAW AND ENVIRONMENTAL LAW

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Law has long struggled to address cumulative environmental threats, as activities interact and aggregate to cause larger problems, from global climate change to water over-exploitation in the Murray-Darling Basin. Using two well-known proverbs – the straw that breaks the camel’s back, and the frog in a pot of water coming to the boil – this article critically examines how key elements of Australia’s most significant federal environmental and natural resources legislation treat cumulative environmental effects. Promising regulatory approaches are emerging. However, the structure and implementation of these linked federal legislative regimes ultimately permit metaphorical camels’ backs to be broken and frogs to be boiled. They risk insidious environmental degradation even in the absence of a conspicuous crisis. Judicial and policy development of key statutory concepts could guide a more effective response to incremental environmental change, and should be informed by experience of domestic, comparative and international legal approaches to controlling cumulative environmental effects.

I INTRODUCTION

‘The straw that breaks the camel’s back’. ‘Death by a thousand cuts’. The unsuspecting frog, boiled in water of steadily increasing temperature. More positively, ‘every little bit counts’. Our language is rich in proverbs that describe the cumulative negative – and sometimes, the positive – effects of numerous, individually minor activities. Each implies a particular view of ‘baseline’

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conditions that serve as a reference point for these effects: a ‘normal’ burden of straw, level of health or water temperature.

Many different statutes and areas of private law address the legal implications of multiple, cumulatively significant doses of some harm – social, environmental or financial, for example – as well as harm delivered in a single large dose, relative to some implicit background condition. Tort law, refugee law and criminal law provide diverse illustrative contexts. Tort law allocates responsibility between multiple tortfeasors who each contribute some harm to a cumulatively significant aggregate level, a topic of central and frequent interest to the insurance and construction industries.¹ Under refugee laws, a decision-maker may conclude that the cumulative effect of multiple ‘lesser’ harms, which ‘of themselves do not constitute persecution, may [in combination be] ... sufficiently serious to constitute persecution’.² Criminal laws consider the cumulative effects of anthropogenic and ‘natural’ harms – say, responsibility for administering poison to a ‘man debilitated by numerous diseases’.³

All of these laws deal with cumulative harms, caused by multiple activities or factors, after the harm is felt. They often benefit from well-developed scholarship and sustained analysis.⁴ Far fewer laws attempt explicitly to assess the cumulative effects of harms, relative to background conditions, in order to prevent them being felt in the first place. Yet, this is particularly important for laws that deal with the environment, natural resources, and allied areas. Statutes in these areas of law often attempt to protect public goods from multiple sources of harm that can be expensive or impossible to remedy.⁵ Laws that assess cumulative effects in these contexts provide for assessing the likely environmental effects of potentially harmful activities, often in the context of approval or licensing processes for these activities, for example, a licence to discharge pollution into the air or withdraw water from a stream.⁶

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- 1 *Wrongs Act 1958* (Vic) Part IVAA; Andrew Stephenson, ‘Proportional Liability in Australia: The Death of Certainty in Risk Allocation in Contract’ (2005) *International Construction Law Review* 64; Justice Robert McDougall, ‘Proportionate Liability in Construction Litigation’ (2006) 22 *Building and Construction Law* 394; Reginald M Jones, ‘Lost Productivity: Claims for the Cumulative Impact of Multiple Change Orders’ (2001) 31(1) *Public Contract Law Journal* 1, 1–6. Indeed, problems of cumulative effects get at the ‘fundamental common law question ... of causation’, which has been described as no less than ‘the cement of the universe’: James Edelman, ‘Unnecessary Causation’ (2015) 89 *Australian Law Journal* 20, 20, citing JL Mackie, *The Cement of the Universe: A Study of Causation* (Oxford University Press, 1980). Similar to the tort situation, in dealing with financial harms to investors, financial services statutes apportion responsibility between wrongdoers. See generally Alister Abadee, ‘Investor Claims and the Reach of Proportionate Liability’ (2015) 89 *Australian Law Journal* 260.
 - 2 Administrative Appeals Tribunal, ‘A Guide to Refugee Law in Australia’ (Guide, Migration and Refugee Division Legal Services, June 2018) ch 4, 20. See also *S1891 of 2003 v Minister for Immigration and Multicultural and Indigenous Affairs* [2005] FMCA 1069, [29] (Smith FM).
 - 3 Edelman (n 1) 21, citing Scalia J in *Burrage v United States* 571 US 204, 211 (2014).
 - 4 See above nn 1–3.
 - 5 Gerry Bates, *Environmental Law in Australia* (LexisNexis Butterworths, 8th ed, 2013) 9 [1.14], 68 [3.19].
 - 6 As a corresponding example in allied areas, some land use planning or liquor licensing laws require the consideration of the incremental effect of one more licensed establishment in the context of cumulative harms related to alcohol consumption. See, eg, Department of Environment, Land, Water and Planning (Vic), ‘Licensed Premises: Assessing Cumulative Impact’ (Planning Practice Note 61, June 2015);

Laws that deal with cumulative environmental effects (for brevity, ‘cumulative effects’)⁷ are also crucial to environmental protection in practice. Individual developments and sometimes deceptively small activities, in combination, can have serious environmental consequences in diverse contexts – some long established over decades, others only coming recently to scientists’ attention. Pastoral wells have proliferated across the Great Artesian Basin, drying up ancient desert springs and, together with multiple other types of threats, put at risk their unique species.⁸ Multiple patches of land clearance, together, fragment native vegetation and threaten their dependent species.⁹ Toxic chemicals accumulate in the marine life forms that ingest billions of tiny pieces of the world’s burgeoning plastic marine debris.¹⁰ An individual well, cleared tree, or plastic bag may not have readily appreciable effects, but collectively, small effects can accumulate in complex, non-linear ways, with catastrophic consequences.¹¹

Globally, cumulative effects erode the resilience of the environmental systems on which humanity relies. Countless individual emissions of greenhouse gases lead to global climate change; countless human activities, from changes in wildfire regimes to the expansion of agriculture into virgin territory, accelerate the rate of species extinctions that threatens ecosystems on which we depend.¹² Locally, cumulative effects threaten iconic Australian natural assets. Polluted run-off from many farms harms the Great Barrier Reef, and that harm will be exacerbated and perhaps dwarfed by climate change.¹³ Multiple longwall coal mines literally undermine Sydney’s water catchments, causing permanent land subsidence, cracking the base of rivers, and redirecting water away from reservoirs to

Swancom Pty Ltd v Yarra City Council [2009] VCAT 923; *Bambou Restaurant v Stonnington City Council* [2010] VCAT 1758; *Valles v Mornington Peninsula Shire Council* [2017] VCAT 1738.

- 7 Note that some writers refer to ‘cumulative effects’ and others refer to ‘cumulative impacts’: see, eg, Jessica T Dales, ‘Death by a Thousand Cuts: Incorporating Cumulative Effects in Australia’s *Environment Protection and Biodiversity Conservation Act*’ (2011) 20(1) *Pacific Rim Law and Policy Journal* 149; Kim Glassborow, ‘Cumulative Environmental Impacts’ (2009) 24(9) *Australian Environment Review* 9. This article uses the terms interchangeably.
- 8 RJ Fensham and RJ Fairfax, ‘Spring Wetlands of the Great Artesian Basin, Queensland, Australia’ (2003) 11(5) *Wetlands Ecology and Management* 343, 348.
- 9 Megan C Evans et al, ‘The Spatial Distribution of Threats to Species in Australia’ (2011) 61(4) *BioScience* 281, 285 (Figure 2); Ayesha IT Tulloch et al, ‘Understanding the Importance of Small Patches of Habitat for Conservation’ (2016) 53 *Journal of Applied Ecology* 418, 419.
- 10 Nate Seltnerich, ‘New Link in the Food Chain: Marine Plastic Pollution and Seafood Safety’ (2015) 123(2) *Environmental Health Perspectives* A34, A37–8.
- 11 For example, effects may be multiplicative or mitigative across a variety of habitat types: Karen Evans, Nicholas Bax and David C Smith, *Australia State of the Environment 2016: Marine Environment* (Report, 2017) 148–9; Rebecca Nelson, ‘Broadening Regulatory Concepts and Responses to Cumulative Impacts: Considering the Trajectory and Future of Groundwater Law and Policy’ (2016) 33(4) *Environmental and Planning Law Journal* 356, 358 (‘Broadening Regulatory Concepts’).
- 12 Johan Rockström et al, ‘Planetary Boundaries: Exploring the Safe Operating Space for Humanity’ (2009) 14(2) *Ecology and Society* 32; Will Steffen et al, ‘Planetary Boundaries: Guiding Human Development on a Changing Planet’ (2015) 347(6223) *Science* 1259855.
- 13 Robert G Coles et al, ‘The Great Barrier Reef World Heritage Area Seagrasses: Managing This Iconic Australian Ecosystem Resource for the Future’ (2015) 153 *Estuarine, Coastal and Shelf Science* A1, A2, A7, A9.

underground voids.¹⁴ Proliferating urban developments in major Australian cities destroy important habitat and incrementally fragment remnant native vegetation.¹⁵ Cumulative effects such as these can be ecologically catastrophic, calling for the regulation of cumulative effects to manage them to acceptable levels using well-designed laws, supported by good implementation in practice.

Legal responses to cumulative effects in Australia, and scholarly analysis of current responses, are strikingly underdeveloped, particularly in comparison to the degree to which legal scholars¹⁶ and scientists¹⁷ in other jurisdictions engage with these issues. Controlling adverse cumulative effects, and the implications of attempting to do so, are ‘unfinished business’¹⁸ in environmental and natural resources laws in Australia. Current ecological threats, like those identified above, ‘tend to be complex, cumulative and intractable, resisting earlier types of legal solutions’.¹⁹

Cumulative effects have not been the subject of substantial explicit consideration in a major Australian legal publication and are relatively rarely considered even in specialist environmental law publications.²⁰ Yet, the subject is fast becoming critical for Australian environmental and natural resources law. Academics and NGOs,²¹ and even some recent legislation and policy, refer to

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- 14 Chief Scientist and Engineer, NSW Government, *On Measuring the Cumulative Impacts of Activities Which Impact Ground and Surface Water in the Sydney Water Catchment* (Report, May 2014) A19–A21; Alluvium Consulting Australia, *2016 Audit of Sydney Drinking Water Catchment* (Report, June 2017) vol 1, 17–19, 20–1.
 - 15 Ian Cresswell and Helen Murphy, Department of the Environment and Energy (Cth), *Australia State of the Environment 2016: Biodiversity* (Report, 2017) 24–7.
 - 16 For some recent examples, see Martin ZP Olszynski, ‘Ancient Maxim, Modern Problems: De Minimis, Cumulative Environmental Effects and Risk-Based Regulation’ (2015) 40(2) *Queen’s Law Journal* 705; Sanne H Knudsen, ‘The Flip Side of *Michigan v EPA*: Are Cumulative Impacts Centrally Relevant?’ (2018) *Utah Law Review* 1; Michael P Gillingham et al (eds), *The Integration Imperative: Cumulative Environmental, Community and Health Effects of Multiple Natural Resource Developments* (Springer, 2016).
 - 17 Scientific journals often devote entire issues to dealing with the management of cumulative effects. See, eg, Larry Canter, Samuel Atkinson and Barry Sadler, ‘Special Issue on Cumulative Effects Assessment and Management’ (2011) 31(5) *Environmental Impact Assessment Review* 451.
 - 18 I have previously used this description in relation to regulating non-point source pollution impacts, which is one type of cumulative environmental effect: Rebecca Nelson, ‘Regulating Nonpoint Source Pollution in the US: A Regulatory Theory Approach to Lessons and Research Paths for Australia’ (2011) 35 *University of Western Australia Law Review* 340, 341.
 - 19 Australian Panel of Experts on Environmental Law, ‘The Future of Australian Environmental Laws’ (Overview Paper, April 2017) 3 (‘The Future of Australian Environmental Laws’).
 - 20 For exceptions to this statement see, eg, Sally Audeyev and Penny Ivery, ‘Browse LNG Precinct: A Test for Strategic Assessment’ (2012) 27(9) *Australian Environment Review* 284, 288; Laura Schuijers, ‘Environmental Decision-Making in the Anthropocene: Challenges for Ecologically Sustainable Development and the Case for Systems Thinking’ (2017) 34 *Environmental and Planning Law Journal* 179, 191; Sally Audeyev and Angela Zhao, ‘Cumulative Impact Assessment under the *EPBC Act*’ (2015) 34(3) *Australian Resources and Energy Law Journal* 223; Ralf Buckley, ‘Cumulative Environmental Impacts: Problems, Policy and Planning Law’ (1994) 11(4) *Environmental and Planning Law Journal* 344; Dales (n 7); Nelson, ‘Broadening Regulatory Concepts’ (n 11); Jon Nevill, ‘Managing the Cumulative Effects of Incremental Development in Freshwater Resources’ (2003) 20(2) *Environmental and Planning Law Journal* 85.
 - 21 The Future of Australian Environmental Laws (n 19) 3.

cumulative effects, or otherwise indirectly respond to them.²² Calls from varied groups are mounting for major revisions to, or a complete overhaul of, federal environmental law, as the 2019 deadline for the next statutory review of the operation of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (*EPBC Act*) nears.²³ This presents an opportunity to rethink our approach to cumulative effects.

This article starts to deal with the ‘unfinished business’ of cumulative effects in Australian environmental and natural resources laws by analysing prominent current federal responses to cumulative effects with reference to broad concepts that resonate across diverse areas of law, both within and outside the environmental and natural resources fields. Using common, if slightly gruesome, proverbs, I analyse the way that the two major, interconnected Australian federal environmental and natural resources laws – the *EPBC Act* and the *Water Act 2007* (Cth) (*Water Act*) – express two basic, interconnected foundations of a legal response to cumulative effects.²⁴ These two foundations²⁵ are first, the consideration of individually minor effects together (in other words, multiple effects that do not, by themselves, reach typical legal thresholds of significance),

22 See, eg, *Environment Protection Amendment Act 2018* (Vic) s 7 inserting *Environment Protection Act 2017* (Vic) ss 4–5: definition of ‘harm’ including ‘harm may arise as a result of the cumulative effect of harm arising from an activity combined with harm arising from other activities or factors’, with analogous inclusion in the definition of ‘material harm’; Productivity Commission (Cth), *National Water Reform* (Inquiry Report No 87, 19 December 2017) 87: describing announcement of the Northern Territory Government to remove current water licensing exemptions for the mining and petroleum industries.

23 *Environment Protection and Biodiversity Conservation Act 1999* (Cth) s 522A (*EPBC Act*); Australian Panel of Experts on Environmental Law, *Blueprint for the Next Generation of Australian Environmental Law* (Report, 2017) 8–9; Lachlan Wilkinson, ‘Don’t Panic, the System Works’, *The Australian* (online, 7 October 2018) <<https://www.theaustralian.com.au/opinion/public-concern-no-justification-for-tighter-uranium-mining-regulation/news-story/66b4a3ecc8adee507f79706bbe12d12d>>; Lisa Cox, ‘Australia Has 1,800 Threatened Species but Has Not Listed Critical Habitat in 10 Years’, *The Guardian* (online, 6 March 2018) <<https://www.theguardian.com/environment/2018/mar/06/australia-has-1800-threatened-species-but-has-not-listed-critical-habitat-in-10-years>>; Lisa Cox, ‘Australia’s Native Species’ Future Remains Vulnerable, Law Council Says’, *The Guardian* (online, 25 September 2018) <<https://www.theguardian.com/environment/2018/sep/25/australias-native-species-future-remains-vulnerable-law-council-says>>.

24 For completeness, note that cumulative effects are also dealt with, with varying degrees of statutory and policy prominence, in other areas of federal resources-related law. For example, in relation to fisheries, cumulative effects arise under policy frameworks that derive from the use of principles of ecologically sustainable development in the *Fisheries Management Act 1991* (Cth) and *Fisheries Administration Act 1991* (Cth) (*FAA*). The *FAA* requires the Australian Fisheries Management Authority to ensure that fisheries are exploited consistently with principles of ecologically sustainable development (s 6(1)(b)), an obligation that is delivered using an ‘Ecological Risk Management Framework’ policy that takes into account cumulative risks faced by fish stocks: Australian Fisheries Management Authority, ‘Guide to AFMA’s Ecological Risk Management’ (Guide, June 2017) 35–6, 72–3. The scope of this article is restricted to the *EPBC Act* and the *Water Act 2007* (Cth) (*Water Act*) on the basis of their connected operation in relation to freshwater resources (hence the ‘dialogue’ of this article’s title) and their similar constitutional bases (relying largely on the external affairs power), as discussed below. Further federal contexts are the subject of a future research agenda (see below Part V).

25 Melissa M Foley et al, ‘The Challenges and Opportunities in Cumulative Effects Assessment’ (2017) 62 *Environmental Impacts Assessment Review* 122, 124 (describing how approaches to scoping questions like types of impacts included in a cumulative effects assessment and baselines fundamentally affect the rest of the analysis).

and secondly, legal reference points for the consideration of effects, or ‘baselines’, which are often conceived as ‘background’ conditions. The second is inextricably linked to the first, since, among other things, one can only discern an ‘effect’ relative to some reference state; and a failure to consider cumulative effects contributes to gradually changing background conditions.

Two common proverbs encapsulate these foundations. The first proverb is the straw that breaks the camel’s back. The proverbial camel must carry continually more straw until the cumulative effect of this increasing burden, triggered by one last straw, is to break its back. The camel proverb warns us to be alert to the fact that individually minor effects, which would typically escape the attention of the law, have the potential to cause cumulatively significant environmental harm.²⁶

The second proverb refers to the frog that is unaware of the gradually increasing temperature of the pot in which it is placed, until it is ultimately boiled alive. Had the frog immediately been placed into boiling water, it would have been aware of the danger and jumped out. The boiling frog proverb warns us about creeping baselines: applied to an environmental context, it is a warning that we might be accepting gradually increasing levels of environmental damage as normal without even being aware of it. If many individually minor, but cumulatively significant harms occur without scrutiny, they will accumulate and continually ‘reset’ our environmental reference points (‘creeping baselines’).

Together, the *EPBC Act* and the *Water Act* constitute the most significant, interconnected federal legislative forays into environmental and natural resources issues and a key way that federal statutes grapple with cumulative effects. The provisions of these statutes are also linked through the ‘water trigger’ provisions introduced in the 2013 amendments to the *EPBC Act*,²⁷ creating a ‘federal dialogue’ on environmental management. These laws are a useful starting point for investigating Australian legal responses to cumulative effects, since they apply to significant areas of Australia and also either explicitly or implicitly deal with cumulative effects. Although dealing with cumulative effects is by no means exclusively a federal issue, it has become prominent in this sphere due to recent changes to both these statutes. I outline how the water trigger provisions of the *EPBC Act* and the *Water Act* show an encouraging initial response to cumulative effects, but how emerging practice and recent implementation should act as a warning about their likely effectiveness.

After briefly describing the development of federal environmental and water laws (Part II), I reflect on how the structure and implementation of the *EPBC Act* water trigger and the *Water Act* permit metaphorical camels’ backs to be broken (Part III) and frogs to be boiled (Part IV) causing insidious environmental difficulties, even in the absence of a conspicuous crisis.

I conclude that the problem of cumulative effects is far from a marginal issue or mere desirable adjunct to the basic structure of environmental and natural

26 Note that in practice, cumulative effects may aggregate in more complex ways than are necessarily captured by this metaphor: see above n 11 and accompanying text. For a scientific discussion of this phenomenon, see Marten Scheffer, *Critical Transitions in Nature and Society* (Princeton University Press, 2009). However, I maintain the metaphor for clarity and simplicity.

27 *Environment Protection and Biodiversity Conservation Amendment Act 2013* (Cth).

resources law. Rather, it lies at the conceptual heart of these laws, as well as being at the centre of ‘the current generation of ecological problems’.²⁸ My hope is that this article will spur wider consideration of cumulative effects in the federal jurisdiction, as cycles of legislative reviews of federal environmental and water laws progress,²⁹ as well as consideration outside environmental and natural resources laws. The discussion also speaks to some state jurisdictions in which decision-makers consider cumulative effects in the absence of accompanying detailed policy guidance.³⁰

II CUMULATIVE ENVIRONMENTAL EFFECTS AND THE DEVELOPMENT OF FEDERAL ENVIRONMENTAL AND WATER LAWS

It is becoming increasingly clear that many of the most important environmental problems in Australia are brought about by the aggregate effect of interacting activities, many of them relatively small, and some unregulated. While concerns about cumulative effects are now emerging more strongly, both in relation to the environment generally³¹ and in relation to the impact of extractive industries on water in particular,³² this was not the reality surrounding the enactment of most of Australia’s environmental and natural resources laws. The catalyst and focus of these laws have often been environmentally significant developments, often considered in isolation and, with some exceptions,³³ a

28 The Future of Australian Environmental Laws (n 19) 3.

29 *EPBC Act* s 522A; *Water Act* ss 50, 253.

30 See, eg, *Western Australian Land Authority (Landcorp) v Minister for Sustainability, Environment, Water, Population and Communities* (2012) 291 ALR 52, 73 [120] (Gilmour J); Department of Sustainability and Environment (Vic), ‘Ministerial Guidelines for Assessment of Environmental Effects under the *Environment Effects Act 1978*’ (Guidelines No 7, June 2006) 18. Note that there is also developing policy interest in relation to cumulative environmental effects at the state level, for example, through New South Wales’ ongoing environmental impact assessment improvement project – ‘[a]dditional improvements, not included in the draft guidelines, are also being developed. These will give further guidance on an approach to cumulative impact assessment ... for those undertaking [environmental impact assessments]’: Department of Planning and Environment (NSW), ‘Improving Environmental Impact Assessment’, *Environmental Impact Assessment Improvement Project* (Web Page, 11 May 2018) <<http://www.planning.nsw.gov.au/Policy-and-Legislation/Under-review-and-new-Policy-and-Legislation/Environmental-Impact-Assessment-Improvement-Project>>.

31 WJ Jackson et al, *Australia State of the Environment 2016: Overview* (Report, 2017) 3, 20–1, 58, 66, 68–9.

32 Productivity Commission (Cth) (n 22) 81–9; Department of Planning and Environment (NSW), ‘Independent Panel on Mining in Sydney’s Drinking Water Catchment’ (Media Release, 2 March 2018); Chief Scientist and Engineer (NSW), ‘Independent Expert Panel for Mining in the Catchment’, *Reports and Reviews* (Web Page, 26 April 2018) <<http://www.chiefscientist.nsw.gov.au/reports/independent-expert-panel-for-mining-in-the-catchment>>.

33 Laws that regulate the use of natural resources typically ignore small uses, for example, pumping river water or groundwater for agriculture usually requires a water licence under state water laws, whereas pumping the same water for typically smaller volumes of household use rarely does: Alex Gardner et al, *Water Resources Law* (LexisNexis Butterworths, 2nd ed, 2017) 232–6. While there are some laws that do traditionally regulate small impacts, littering and household burn-off being everyday examples, these tend to be exceptional: see, eg, *Protection of the Environment Operations Act 1997* (NSW) pt 5.6A; *Protection of the Environment Operations (Clean Air) Regulation 2010* (NSW) pt 3.

tendency to ignore individually minor effects and interactions between effects. Interstate approaches to water sharing arguably evolved a more comprehensive approach, though one that traditionally focused most strongly on managing quantities of water, rather than its ecological context. As a foreground to more detailed discussion of legal responses to cumulative effects, this section presents a brief summary of how these areas of law have developed, making particular reference to the relationship between conceptual-level reckoning with cumulative effects in a broad sense and Commonwealth-State relations.³⁴ Federal reluctance comprehensively to deal with environmental problems on account of traditional federal-state relations provides important background and context for analysing current federal legal responses to controlling incremental environmental change.

A Development of Federal Environmental Law

Globally, modern environmental legislation developed in response to ‘concerns raised about environmental pollution and the environmental effects of projects during the 1950s and 1960s’.³⁵ This emphasis on ‘projects’ is expressed through laws that regulate activities that are major or significant in some way. An important category of environmental law provides for assessing the likely ‘significant’ effects of ‘actions’ on a valued part of the environment (environmental impact assessment laws, or ‘EIA’ laws).³⁶ This information then informs decisions about whether the actions that are caught by the legislation can proceed, and on what conditions. Rather than attempting to retell existing accounts of the development of Australia’s federal environmental laws,³⁷ this section briefly summarises this development, contrasting its relatively narrow approach (and its federalist drivers) with the broad view of potentially adverse impacts inherently required to address cumulative effects.

Historically, environmental issues such as pollution, and natural resources regulation of, for example, minerals or water, were considered the regulatory domains of the states, rather than the federal Parliament.³⁸ The latter may exercise legislative powers only over the explicit subject matters outlined in section 51 of the *Australian Constitution*, which makes no mention of the environment or natural resources in a general sense.³⁹ These were therefore traditionally considered to be

34 For a fuller exposition of constitutional issues in water management, see Gardner et al (n 33) 93–123.

35 Mandy Elliot, *Environmental Impact Assessment in Australia: Theory and Practice* (Federation Press, 6th ed, 2014) 11.

36 The Future of Australian Environmental Laws (n 19) 3.

37 See, eg, Bates (n 5) 3–20; Elliot (n 35) 1–10; Senate Standing Committee on Environment, Communications, Information Technology and the Arts, Parliament of Australia, *Environment Protection and Biodiversity Conservation Bill 1998 & Environmental Reform (Consequential Provisions) Bill 1998 (1999)* (Final Report, 27 April 1999) ch 2 <https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Environment_and_Communications/Completed_inquiries/1999-02/bio/report/c02> (‘*Senate Standing Committee Report*’).

38 See generally James Crawford, ‘The Constitution and the Environment’ (1991) 13(1) *Sydney Law Review* 11.

39 Note that there is explicit mention of marine fisheries in Australian waters beyond territorial limits: *Australian Constitution* s 51(x).

subject matters of the ‘unexpressed residue’ of legislative power, over which the states are predominant.⁴⁰

Federal environmental intervention became a political reality only in the 1970s, when, consistently with expectations of a relatively limited federal role, the Australian Parliament introduced relatively confined environmental legislation. Imposing the first federal legislative requirement for EIA in Australia, it provided for the environmental assessment of proposals that involved the Commonwealth,⁴¹ for example by granting a permit to export minerals from a mine.⁴² It established protections for perhaps the country’s most iconic ecosystem, the Great Barrier Reef,⁴³ and national parks in general.⁴⁴ It also established an institution to identify nationally important heritage.⁴⁵ These laws necessarily relied on a range of constitutional heads of power, ‘with respect to’ which the Commonwealth could legislate. These included the trade and commerce power, the external affairs power, and the corporations power.⁴⁶ Other, later pieces of legislation from this early era similarly regulated narrow suites of activities, leading to a motley collection of environmental laws based on different suites of legislative powers.⁴⁷ From its initiation, then, federal intervention in the environmental realm placed narrow constraints on concepts of the environment that were relevant for federal purposes, and intervened using separate pieces of legislation that inherently resulted in a conceptually fragmented view of the environment.

These early legislative overtures gave way to an era of ‘cooperative federalism’ in the 1990s, triggered by the increasing judicial recognition that the Commonwealth’s legislative powers in relation to the environment were extensive, but that a joint Commonwealth-State approach to controversial issues would avoid conflict and recognise the states’ superior institutional structures for environmental management.⁴⁸ A wide range of mainly incentive-based strategies and policies ensued, dealing separately with many individual environmental elements and challenges. They included such disparate subjects as forests, weeds, coastal acid

40 Hayden Opie, ‘Commonwealth Power to Regulate Industrial Pollution’ (1976) 10 *Melbourne University Law Review* 577, 578.

41 *Environment Protection (Impact of Proposals) Act 1974* (Cth); Justice Brian J Preston, ‘Environmental Law 1927–2007: Retrospect and Prospect’ (2007) 81(8) *Australian Law Journal* 616, 629.

42 Preston (n 41) 629 citing *Murphyores Incorporated Pty Ltd v The Commonwealth* (1976) 136 CLR 1.

43 *Great Barrier Reef Marine Park Act 1975* (Cth); RJ Fowler, ‘Environmental Law and Its Administration in Australia’ (1984) 1 *Environmental Planning and Law Journal* 10, 28–9; Marcus Lane, Tony Corbett and Geoff McDonald, ‘Not All World Heritage Areas Are Created Equal: World Heritage Area Management in Australia’ (1996) 13 *Environmental Planning and Law Journal* 461, 468–9.

44 *National Parks and Wildlife Conservation Act 1975* (Cth).

45 *Australian Heritage Commission Act 1975* (Cth).

46 *Australian Constitution* ss 51(i) (trade and commerce), 51(xx) (corporations), 51(xxix) (external affairs). For a concise discussion of these powers and their application to environmental law, see Lee Godden and Jacqueline Peel, *Environmental Law: Scientific, Policy and Regulatory Dimensions* (Oxford University Press, 1st ed, 2010) 129–33, and Bates (n 5) 130–55.

47 See also *Environment Protection (Nuclear Codes) Act 1978* (Cth); *World Heritage Properties Conservation Act 1983* (Cth); *Ozone Protection and Synthetic Greenhouse Gas Management Act 1989* (Cth); *Hazardous Waste (Regulation of Exports and Imports) Act 1989* (Cth); *Antarctic Mining Prohibition Act 1991* (Cth).

48 Bates (n 5) 164–5.

sulphate soils, energy efficiency, and the role of botanic gardens in adapting to climate change.⁴⁹

The overarching political framework for these strategies was the 1992 Intergovernmental Agreement on the Environment ('IGAE') between the Commonwealth, states, territories and local governments.⁵⁰ It represented a political agreement on the appropriate scope of the Commonwealth's and states' roles in environmental regulation. Importantly, for present purposes, the Commonwealth was seen as responsible for 'safeguarding and accommodating national environmental matters', including 'ensuring that international obligations relating to the environment are met by Australia'.⁵¹ Each state had responsibility for 'the development and implementation of policy in relation to environmental matters which have no significant effects on matters which are the responsibility of the Commonwealth or any other State', and 'responsibility for the policy, legislative and administrative framework within which living and non-living resources are managed within the State'.⁵²

In terms of its substance, the IGAE foreshadowed a comprehensive approach to environmental protection guided by the principle of 'ecologically sustainable development' to be 'integrated into Government decision-making processes at all levels'.⁵³ This included 'ensuring that there is a proper examination of matters which significantly affect the environment'.⁵⁴ With specific reference to 'policy, legislative and administrative frameworks to determine the permissibility of land use, resource use or development proposals should provide for ... the assessment of the regional *cumulative impacts* of a series of developments and not simply the consideration of individual development proposals in isolation [and] consideration of all significant impacts'.⁵⁵ It did not elaborate on the relationship between 'cumulative impacts' and 'significant impacts', and apparently did not countenance that individually minor activities (clearly the states' responsibilities in this schema) might accumulate to cause significant harm to national environmental matters in the Commonwealth's bailiwick. Nor did the IGAE explain the benchmark relative to which impacts were to be considered, though it did consider that assessing authorities should provide guidance on this point.⁵⁶

The main legislative progeny of the IGAE was the *EPBC Act*, the first focal piece of legislation addressed here for the purposes of a cumulative effect

49 Ibid 166.

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

51 Ibid cl 2.2.1.

52 Ibid cls 2.3. –2.3.2.

53 Ibid cls 3.2, 3.4.

54 Ibid cl 3.4(ii).

55 Ibid sch 2 cl 3(ii) (emphasis added).

56 Ibid sch 3 cl 3(iii):

The parties agree that all levels of Government will ensure that their environmental impact assessment processes are based on the following: ... assessing authorities will provide all participants in the process with guidance on the criteria for environmental acceptability of potential impacts including the concept of ecologically sustainable development, maintenance of human health, relevant local and national standards and guidelines, protocols, codes of practice and regulations

analysis.⁵⁷ As described above, early Commonwealth environmental legislation took an ad hoc approach to a narrow range of subjects deemed to be of Commonwealth concern. Reacting against this, Parliamentary consideration that preceded the passage of the *EPBC Act* cast reforms as justified on the basis of ‘taking a more holistic approach to biodiversity conservation in general’,⁵⁸ with closer integration with state legislation. It adopted the broad, overarching principle of ‘ecologically sustainable development’ outlined in the IGAE.⁵⁹ While these aspirations might have sparked attention to a broad range of interacting effects, a continued view of the Commonwealth as constrained in its role militated against this.

The core of the *EPBC Act* was, and is, centred on requiring a public or private ‘action’ that is likely to have a ‘significant impact’ on an enumerated ‘matter of national environmental significance’ (‘MNES’) to be assessed and approved by the Commonwealth before it may be undertaken.⁶⁰ The initial MNES mirrored prior legislation (covering, for example, World Heritage, the Great Barrier Reef Marine Park, and nuclear actions), but also expanded to more recent (wetlands of international importance) and wider-ranging (listed threatened species) concerns compared to the earlier era.⁶¹

Despite the IGAE’s specific reference to cumulative impacts, the *EPBC Act*, as passed, did not use the term. However, in the decade that followed its passage, commentators cautiously argued that ‘on the most robust reading’, judicial attitudes tended to support interpreting *EPBC Act* standards as covering cumulative impacts, signalling ‘the emergence of a new standard of “significant impact” that is intolerant of very low levels of biodiversity risk’.⁶² Others perceived that the *EPBC Act* did not extend to the cumulative impacts of projects on MNES, and criticised it on this basis.⁶³

57 For completeness, note that before the IGAE, there was an effort to allocate powers related to natural resources between governments under the 1979 Offshore Constitutional Settlement, which considered the marine context: see Michael White and Nick Gaskell, ‘Australia’s Offshore Constitutional Law: Time for Revision?’ (2011) 85 *Australian Law Journal* 504, 506–8. Also note that prior to the *EPBC Act*, some resource-specific legislation sought to pursue principles of ecological sustainability and imposed limits on resource extraction that inherently attempted to deal with cumulative effects, though the legislation may not specifically mention cumulative effects. In relation to fisheries, see, eg, *Fisheries Management Act 1991* (Cth) s 3A; Michael Bennett, ‘Adjusting Collective Limits on the Use of Natural Resources: Approaches in Australian Fisheries and Water Law’ (2015) 34(1) *University of Tasmania Law Review* 68, 68. In relation to forestry, see *Regional Forest Agreements Act 2002* (Cth) s 4 (definition of ‘Regional Forest Agreement’); Australian Forestry Council and Australian and New Zealand Environment and Conservation Council, *National Forest Policy Statement: A New Focus for Australia’s Forests* (Policy Statement, December 1992) 20.

58 *Senate Standing Committee Report* (n 37) ch 2 [2.20].

59 *National Environment Protection Council Act 1994* (Cth) sch Intergovernmental Agreement on the Environment cls 3.2–3.

60 See especially *EPBC Act* chs 2 (‘Protecting the Environment’), 4 (‘Environmental Assessments and Approvals’).

61 But note the former *Endangered Species Act 1992* (Cth), which was passed after the early era.

62 Lee Godden and Jacqueline Peel, ‘The *Environment Protection and Biodiversity Conservation Act 1999* (Cth): Dark Sides of Virtue’ (2007) 31 *Melbourne University Law Review* 106, 131.

63 Andrew Macintosh and Debra Wilkinson, ‘*EPBC Act*: The Case for Reform’ (2005) 10(1) *Australasian Journal of Natural Resources Law and Policy* 139, 164; Chris McGrath, ‘Key Concepts of the *Environment Protection and Biodiversity Conservation Act 1999* (Cth)’ (2004) 22 *Environmental and*

For completeness, it should be noted that many scholars criticise project-based EIA – the *EPBC Act*'s dominant approach – as being inherently unsuited to responding to cumulative effects.⁶⁴ They urge a calculated shift to 'strategic environmental assessment', which involves environmental assessment of 'higher order decision making', such as 'policies, plans and programs'.⁶⁵ This approach inherently seeks to assess cumulative effects on a regional, rather than a project-by-project, basis to ensure 'an alignment of objectives at all levels of government decision making'.⁶⁶ The *EPBC Act* does provide for strategic assessment of a policy, plan or program.⁶⁷ However, relatively few assessments have been undertaken – only 26 as compared with around 5,000 referrals under the project-based provisions.⁶⁸ Only four of these strategic assessments are related to the actions of a private entity, being actions relating to programs of mining and an urban development.⁶⁹ The remainder have generally dealt with programs of state governments, usually those relating to urban growth boundaries and the biodiversity impacts of related residential developments.⁷⁰ It is also notable that reviews of these mechanisms as currently used in Australia suggest they are tokenistic and ineffective, or more focused on regulatory burden-cutting than sustainability.⁷¹

Planning Law Journal 20, 37. See nn 122–131 below for a discussion of the current state of this issue in relation to MNES in general, noting that Part III(A) focuses on the water trigger MNES.

- 64 Dales (n 7) 155–6; Andrew Macintosh, 'Strategic Environmental Assessment: A Solution to the Problems Associated with Project-Based Environmental Impact Assessment?' (2013) 28(4) *Australian Environment Review* 541, 543; Manfred Lenzen et al, 'Environmental Impact Assessment Including Indirect Effects: A Case Study Using Input-Output Analysis' (2003) 23 *Environmental Impact Assessment Review* 263, 265–7; Anne Shepherd and Leonard Ortolano, 'Strategic Environmental Assessment for Sustainable Urban Development' (1996) 16 *Environmental Impact Assessment Review* 321, 321–2, 324.
- 65 Macintosh (n 64) 543.
- 66 Ibid.
- 67 *EPBC Act* pt 10.
- 68 Department of Environment and Energy (Cth), 'Strategic Assessments' (Web Page) <<http://www.environment.gov.au/protection/assessments/strategic>>; Department of Environment and Energy (Cth), 'Referrals List', *EPBC Act: Public Notices* (Web Page) <<http://epbcnotices.environment.gov.au/referralslist/>>.
- 69 BHP Billiton, *BHP Billiton Iron Ore Pilbara Strategic Assessment* (Program Report, 4 May 2017); 'Agreement to Undertake a Strategic Assessment of the Impacts of a Plan for Mining and Transporting Iron Ore and Developing and Maintaining Related Infrastructure in the Pilbara Region, Western Australia between the Minister for Sustainability, Environment, Water, Population and Communities and Hamersley Iron Pty Ltd' (Section 146 Agreement, 18 December 2012); 'Agreement Relating to the Assessment of the Impacts of Urban Development at Solomon Heights, Sunshine North, Victoria, on Matters Protected under part 3 of the *EPBC Act* between the Commonwealth Minister for the Environment and Energy and Glen Ora Estate Pty Ltd' (Section 146 Agreement, 5 June 2017); 'Assessment of the Impacts of Developing Heathcote Ridge, West Menai, NSW, under the *Environment Protection and Biodiversity Conservation Act 1999* between the Commonwealth of Australia and Gandangara Local Aboriginal Land Council' (Section 146 Agreement, 16 November 2011).
- 70 Department of Planning and Community Development (Vic), *Delivering Melbourne's Newest Sustainable Communities* (Program Report, December 2009) 4; Department of Planning (NSW), *Sydney Growth Centres Strategic Assessment* (Program Report, November 2010).
- 71 Macintosh (n 64) 545; Simon Marsden, 'Strategic Environmental Assessment of Australian Offshore Oil and Gas Development: Ecologically Sustainable Development or Deregulation?' (2016) 33 *Environment and Planning Law Journal* 21, 30.

One recent, potential departure from this bleak assessment is the strategic assessment endorsed in 2014 in relation to the management of the Great Barrier Reef.⁷² The decision endorsed a management program of the Great Barrier Reef Marine Park Authority ('GBRMPA'), which found that addressing cumulative impacts was critically in need of improvement.⁷³ Under the endorsed program, GBRMPA committed to developing 'cumulative impact assessment guidelines' and 'promoting' their application in national and state-level assessment processes,⁷⁴ including by ensuring cumulative impacts are considered in its own procedures for considering applications to undertake particular activities in certain zones of the Marine Park, and in relation to assessing an action that is likely to have a significant impact on a MNES within the Marine Park.⁷⁵ No action referred under the *EPBC Act* since the release of the guideline in July 2018⁷⁶ has been found to require assessment of potential impacts on the GBRMPA,⁷⁷ so its effect in practice is as yet unknown, but will arise for future consideration.

Strategic environmental assessment seems unlikely to disturb the primacy of project-based EIA in Australia in the short term (at least at the federal level),⁷⁸ and is, therefore, unlikely to provide a generally applicable avenue for considering cumulative effects. The focus of this article in relation to the *EPBC Act* remains with its project-based provisions.

B Development of Federal Water Law

Whereas the Commonwealth asserted its legislative role in relation to the environment broadly in the 1970s, it took three decades more for this to occur in relation to water. The Commonwealth Parliament passed the *Water Act 2007* (Cth)

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- 72 Greg Hunt, 'Decision to Endorse the Great Barrier Reef Marine Park Authority's Program to Protect the Environment, Biodiversity and Heritage Values of the Great Barrier Reef Region' (Notification of Decision, Department of the Environment, 11 August 2014).
- 73 Great Barrier Reef Marine Park Authority (Cth), *Great Barrier Reef Region Strategic Assessment Program Report* (Report, 2014) 11–12 <http://elibrary.gbrmpa.gov.au/jspui/bitstream/11017/2860/1/GBR%20Region%20SA_Program%20Report_FINAL.pdf> ('*Strategic Assessment Program Report*').
- 74 Ibid 29–30.
- 75 Ibid 57, 61.
- 76 Great Barrier Reef Marine Park Authority (Cth), *Reef 2050 Plan: Cumulative Impact Management Policy* (Policy Document, July 2018) ('*Reef 2050 Plan*').
- 77 This is based on the list of actions referred as at 22 March 2019: Department of the Environment and Energy (Cth), 'Referrals List', *EPBC Act: Public Notices* (Web Page, 22 March 2019) <<http://epbcnotices.environment.gov.au/referralslist/>>.
- 78 Note that some state legislative frameworks also provide for strategic environmental assessment under environmental impact assessment legislation: see, eg, *Environmental Protection Act 1986* (WA) s 37B(2). Analysis of these is beyond the scope of this article, but note that previous work has reached mixed conclusions: see, eg, Alan Bond et al, 'Impact Assessment: Eroding Benefits through Streamlining?' (2014) 45 *Environmental Impact Assessment Review* 46, 49; BR Jenkins, 'From Mitigation to Sustainability: The Evolution of Incorporating Environmental Factors into Development Decisions in Australasia' (2016) 11(6) *International Journal of Sustainable Development Planning* 920, 922. State legislative frameworks also provide for a form of strategic environmental assessment that considers cumulative impacts in relation to marine areas, for example the *Marine Estate Management Act 2014* (NSW); however, scholars tend to consider that these frameworks also require substantially improved attention to cumulative impacts in practice: see generally David C Smith et al, 'Implementing Marine Ecosystem-Based Management: Lessons from Australia' (2017) 74(7) *ICES Journal of Marine Science* 1990.

in response to the ecologically and socio-economically catastrophic effects of the Millennium Drought, which ravaged the Murray-Darling Basin ('MDB') from 2001 to 2009.⁷⁹ Constitutionally, the basis of the *Water Act* is a variety of powers, namely, those related to corporations, trade and commerce, external affairs, meteorological observations, weights and measures, and statistics, and a referral of state powers.⁸⁰ The *Water Act* was controversial, particularly because it was cast politically as a Commonwealth 'takeover' and a rebuke of over 90 years of cooperative arrangements,⁸¹ although it was based on fundamental concepts agreed in policy by all Australian governments⁸² and does not challenge the states' exclusive role to regulate individual activities.

Like environmental law, earlier arrangements for managing the MDB had proceeded through a number of phases, with each demonstrating an expanding view of the Basin. The intergovernmental River Murray Waters Agreement 1914 reflected the dominant need to share water resources between the MDB jurisdictions and construct and maintain works for doing so.⁸³ The successor MDB Agreement of 1992 expanded its conceptual focus to water quality, environmental issues and the construction of 'environmental works and measures' – which came together as the 'natural resources management' arm of the central intergovernmental institution, the MDB Commission.⁸⁴ A central measure of the MDB Agreement was the 'Cap', which limited surface water extractions to 1993–4 levels.⁸⁵ This early attempt to deal with cumulative effects by limiting aggregate extraction was flawed in not attempting to determine a sustainable level of extraction (but rather, imposing a limit based on prior use), nor covering groundwater extractions (which skyrocketed when irrigators lost access to additional surface water under the Cap) and other 'risks' to shared water resources.⁸⁶ Unprecedented dry conditions during the Millennium Drought triggered the introduction of the *Water Act*, justified on, among other grounds, better management of interconnected surface water and groundwater, adaptation to water scarcity, and management of the MDB in the national interest rather than to the 'lowest common denominator'.⁸⁷ The *Water Act* continues the concept of an

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- 79 Albert IJM van Dijk et al, 'The Millennium Drought in Southeast Australia (2001–2009): Natural and Human Causes and Implications for Water Resources, Ecosystems, Economy, and Society' (2013) 49(2) *Water Resources Research* 1040, 1040. For a fuller discussion of Commonwealth authority in relation to water, and the development of Commonwealth water institutions, see Gardner et al (n 33) 101–23, 142–4.
- 80 *Water Act* ss 9, 9A; Paul Kildea and George Williams, 'The Constitution and the Management of Water in Australia's Rivers' (2010) 32 *Sydney Law Review* 595, 605.
- 81 Kildea and Williams (n 80) 596, 597–603. As to these earlier arrangements, see generally Sandford Clark, 'The River Murray Question: Part II – Federation, Agreement and Future Alternatives' (1971) 8 *Melbourne University Law Review* 215.
- 82 Council of Australian Governments, 'Intergovernmental Agreement on a National Water Initiative' (Intergovernmental Agreement, 25 June 2004).
- 83 Clark (n 81) 238–40.
- 84 John Scanlon, 'A Hundred Years of Negotiations with No End in Sight: Where is the Murray Darling Basin Initiative Leading Us?' (2006) 23 *Environmental and Planning Law Journal* 386, 388–91, 394.
- 85 Ibid 391.
- 86 Ibid 401–2.
- 87 Commonwealth, *Parliamentary Debates*, House of Representatives, 14 August 2007, 111–12 (Malcolm Turnbull).

aggregate cap on water extraction, but extends it to cover both surface water and groundwater, and provides for it to be set by reference to objective scientific determinations of environmental sustainability.⁸⁸ Apparently deferring to traditional Commonwealth-State divisions of legislative responsibility, the *Water Act* deals with water quality and land use issues with much greater regulatory restraint.⁸⁹

It is worth briefly reflecting on these developmental paths by comparing and contrasting key elements of these two pieces of legislation before proceeding to analyse how they deal with cumulative effects. Both are heavily influenced and constrained by their constitutional context. Neither the *EPBC Act* nor the *Water Act* is supported by plenary Commonwealth legislative power, but rather by a collection of powers, among the most prominent being the external affairs power, with reference to implementing environmental treaties ratified by Australia. This is relevant to cumulative effects and baselines, since the approaches of the relevant treaties should colour the approaches to these issues. Among the seven and eight treaties cited by the *EPBC Act* and *Water Act* respectively, there are five in common.⁹⁰ I will return to this international law foundation below when discussing different potential approaches to cumulative effects and baselines.

88 See further Part III(B).

89 See, eg, *Water Act*. 'A provision of the Basin Plan has no effect to the extent to which the provision directly regulates ... land use ... the management of natural resources (other than water resources); or the control of pollution': at s 22(10). Section 25 refers to 'targets' rather than regulatory requirements in the 'water quality and salinity management plan'.

90 The *EPBC Act* has as an object 'to assist in the co-operative implementation of Australia's international environmental responsibilities': at s 3(1)(e). The *EPBC Act* makes explicit reference to the *Convention on Wetlands of International Importance Especially as Waterfowl Habitat*, opened for signature 2 February 1971, 996 UNTS 245 (entered into force 21 December 1975) (referred to in the *EPBC Act* as '*Ramsar Convention*'), *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) (referred to in the *EPBC Act* as '*World Heritage Convention*'), *Convention on the Conservation of Migratory Species of Wild Animals*, opened for signature 23 June 1979, 1651 UNTS 333 (entered into force 1 November 1983) (referred to in the *EPBC Act* as '*Bonn Convention*'), *Agreement between the Government of Australia and the Government of the People's Republic of China for the Protection of Migratory Birds and their Environment*, signed 20 October 1986, [1988] ATS 22 (entered into force 1 September 1988) (referred to in the *EPBC Act* as '*CAMBA*'), *Agreement between the Government of Australia and the Government of Japan for the Protection of Migratory Birds in Danger of Extinction and their Environment*, signed 6 February 1974, [1981] ATS 6 (entered into force 30 April 1981) (referred to in the *EPBC Act* as '*JAMBA*'), *Convention on International Trade in Endangered Species of Wild Fauna and Flora*, opened for signature 3 March 1973, 27 UST 1087 (entered into force 1 July 1975) (referred to in the *EPBC Act* as '*CITES*'), and the *Convention on Biological Diversity*, opened for signature 5 June 1992, 1760 UNTS 79 (entered into force 29 December 1993) (referred to in the *EPBC Act* as '*Biodiversity Convention*'). The *Water Act* in s 4(1) cites relevant international agreements as being the *Ramsar Convention*, *Bonn Convention*, *CAMBA*, *JAMBA*, *Biodiversity Convention*, *United Nations Convention to Combat Desertification in Countries Experiencing Serious Drought and/or Desertification, Particularly in Africa*, open for signature 17 June 1994, 1954 UNTS 3 (entered into force 26 December 1996) (referred to in the *Water Act* as '*Desertification Convention*'), *Agreement between the Government of Australia and the Government of the Republic of Korea on the Protection of Migratory Birds*, signed 6 December 2006, [2007] ATS 24 (entered into force 13 July 2007) (referred to in the *Water Act* as '*ROKAMBA*'), and the *United Nations Framework Convention on Climate Change*, opened for signature 9 May 1992, 1771 UNTS 107 (entered into force 21 May 1994) (referred to in the *Water Act* as '*Climate Change Convention*').

Mirroring this constitutional situation, the *EPBC Act* and *Water Act* each explicitly pursues the national interest,⁹¹ but does so in relatively narrow and broad ways, respectively. The *EPBC Act* effectively sifts environmental concerns, isolating ‘matters of national environmental significance’, to which it applies direct assessment and approval requirements. These requirements only apply if an effect is likely to be ‘significant’. By contrast, the *Water Act* adopts a more cooperative framework of overarching federal requirements met by state-formulated plans,⁹² influenced by decades of interstate water sharing. However, it defines ‘water resource’ broadly to include ‘all aspects’ of the water resource that contribute to its environmental value.⁹³ This provides a broad foundation for management, which is inherently comparatively better suited to considering cumulative effects, though with water withdrawals and quantity concerns as the dominant regulatory focus.

III BREAKING CAMELS’ BACKS, OR THE CUMULATIVE EFFECT PROBLEM

Having briefly traced the development and principles underlying the general approaches adopted in the *EPBC Act* and *Water Act*, with their broad implications for addressing cumulative effects, I turn now to the cumulative effect context in more detail, first to the proverbial camel carrying an ever-greater burden of straw. Each individual straw is very light and unlikely to cause a particular chiropractic problem for the camel, but many straws are very heavy, may interact in unexpected ways, and may pose a problem.

A Cumulative Effects under the EPBC Act

The challenge of addressing many individually minor, but collectively significant, effects is a long-running and well-known one in environmental law. Foreign legal systems explicitly recognised cumulative effects in statute almost 50 years ago, with the US *National Environmental Policy Act* (‘NEPA’),⁹⁴ the world’s first EIA law. Legal frameworks for managing cumulative effects now arise around the globe, including at the international, national, and sub-national levels.⁹⁵ Compared to other global examples, Australian legislation requiring consideration

91 *Water Act* s 3(a); *EPBC Act* s 3(1)(a).

92 See below n 153 and accompanying text.

93 Under the *Water Act 2007* (Cth) s 4(1): ‘water resource means: (a) surface water or ground water; or (b) a watercourse, lake, wetland or aquifer (whether or not it currently has water in it); and includes all aspects of the water resource (including water, organisms and other components and ecosystems that contribute to the physical state and environmental value of the water resource)’.

94 National Environmental Policy Act, 42 USC § 4321 (1998).

95 See, eg, Foley et al (n 25); Nelson, ‘Broadening Regulatory Concepts’ (n 11); Daniel M Franks, David Brereton and Chris J Moran, ‘The Cumulative Dimensions of Impact in Resource Regions’ (2013) 38 *Resources Policy* 640; Benjamin S Halpern et al, ‘Spatial and Temporal Changes in Cumulative Human Impacts on the World’s Ocean’ (2015) 6 *Nature Communications* 7615.

of cumulative effects is relatively recent and uncommon, comparatively poorly developed, and usually lacking in detailed policy guidance.⁹⁶

The issue of cumulative effects has only recently come to federal prominence as a result of the 2013 water trigger amendments to the *EPBC Act*, which set out that Act's first overt requirement to consider cumulative effects, albeit a narrow one.⁹⁷ The amendments were driven by a profound and reasonably widespread lack of community confidence in the state-level regulation of coal seam gas ('CSG') developments.⁹⁸

The major effect of the water trigger amendment is to prohibit a person from taking an action that involves CSG development or 'large coal mining development' if the action will have, or is likely to have, a 'significant' impact on a water resource⁹⁹ unless it is assessed and approved under chapter 4. In other words, it adds a new MNES to those that trigger assessments under chapter 4 of the *EPBC Act*, like a significant impact on the world heritage values of a declared World Heritage property or a significant impact on a listed threatened species.¹⁰⁰ Unlike the vast majority of the other MNES,¹⁰¹ the water trigger MNES is defined with reference to a narrow kind of activity rather than a narrow kind of ecological asset, for example a Ramsar listed wetland or a listed threatened species.¹⁰²

Cumulative effects arise in the legal context of the water trigger because of the way in which 'coal seam gas development' and 'large coal mining development' are defined. Section 528 defines each type of action as an activity that has, or is likely to have, a significant impact on a water resource either '(a) in its own right; or (b) when considered with other developments, whether past, present or reasonably foreseeable developments'.¹⁰³ The phrase 'when considered with other developments, whether past, present or reasonably foreseeable developments' requires considering cumulative effects, almost precisely replicating the definition

96 For examples of comparative international policy guidance on cumulative effects accompanying federal environmental impact assessment legislation, see Council on Environmental Quality (US), *Considering Cumulative Effects under the National Environmental Policy Act* (Report, January 1997) ('*Considering Cumulative Effects under the NEPA*'); Canadian Environmental Assessment Agency, *Assessing Cumulative Environmental Effects under the Canadian Environmental Assessment Act, 2012: Interim Technical Guidance* (Guidance, March 2018). For an example of largely marine-specific Australian approaches to cumulative effects that include policy guidance, see *Reef 2050 Plan* (n 76); Queensland Government, *Cumulative Impact Management Policy: Queensland's Implementation Plan* (Policy Implementation Statement).

97 *Environment Protection and Biodiversity Conservation Amendment Act 2013* (Cth) s 24D.

98 Stephen Hunter, *Independent Review of the Water Trigger Legislation* (Report, April 2017) 24. For discussion of other federal-state elements of the water trigger legislation, see Janice Gray, 'Trans-Jurisdictional Water Law and Governance in the Context of Unconventional Gas Mining: The Australian Experience' in Janice Gray, Cameron Holley and Rosemary Rayfuse (eds), *Trans-Jurisdictional Water Law and Governance* (Routledge, 2016) 214, 227–8.

99 *EPBC Act* s 24D. Note that the application of this provision is limited to actions undertaken by constitutional corporations, the Commonwealth, a Commonwealth agency, actions undertaken for the purposes of international or interstate trade or commerce, or actions undertaken in a Commonwealth area or Territory.

100 *Ibid* ss 12, 18.

101 *Ibid* pt 3 div 1. Note that an exception to this statement, which also refers to a narrow set of actions, is the protection of the environment from nuclear actions: at s 21.

102 *Ibid* ss 16, 18.

103 *Ibid* s 528 (definition of 'coal seam gas development' and 'large coal mining development').

of ‘cumulative impact’ under the US *NEPA*.¹⁰⁴ Under this formulation, cumulative impacts are directly relevant to determining whether an action has or is likely to have a significant impact on this MNES.

Returning to the camel analogy, under the water trigger, a coal mine developer is a person proposing to place a bundle of straws on the ‘camel’ that is a water resource. The water trigger requires the Minister to consider whether that bundle, *together with the other straws on the camel and future foreseeable bundles of straw*, represents a significant burden. However, the effectiveness of the water trigger in protecting this metaphorical camel (or, at least, fairly assessing its cumulative back pain) is impeded by the scant policy guidance available to proponents and regulators on how to consider cumulative effects.

A comparison with the guidance available in the US in relation to *NEPA* is illuminating. A Handbook issued by the President’s Council on Environmental Quality amounts to 122 pages of detailed policy guidance.¹⁰⁵ The guidance deals with general concepts, assessment methods and data sources. Judicial guidance is also abundant in the *NEPA* context: the definition of cumulative impact and exactly what assessing such impacts requires has been the subject of 397 instances of judicial consideration (as at 31 July 2019).¹⁰⁶ Many of those are challenges to the adequacy of cumulative impacts analysis and deal with detailed implementation requirements, for example, how to deal with uncertainty,¹⁰⁷ the scope of future activities that are considered reasonably foreseeable and therefore must be included in the cumulative effect assessment process,¹⁰⁸ and the degree to which an assessment of cumulative effects must include quantified and detailed environmental information.¹⁰⁹

In Australia, by comparison, proponents and regulators have barely a handful of pages of policy guidance in the form of guidelines on the meaning of ‘significant impact’,¹¹⁰ some guidance on information requirements from the statutory Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development (‘IESC’),¹¹¹ and an attempt to fill the gaping void of public policy by a private attempt to explore cumulative effects by the Minerals Council

104 ‘Cumulative impact is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time’: 40 CFR § 1508.7 (2019).

105 *Considering Cumulative Effects under the NEPA* (n 96).

106 Thomson Reuters Westlaw, ‘Notes of Decisions’, 40 CFR § 1508.7 *Culminative Impact* (Database Page, 2019).

107 See, eg, *Robertson v Methow Valley Citizens Council*, 490 US 332, 354 (1989) (Stevens J).

108 See, eg, *Colorado River Indian Tribes v Marsh*, 605 F Supp 1425, 1434 (CD Cal, 1985) (Takasugi J).

109 See, eg, *Ocean Advocates v US Army Corps of Engineers*, 402 F 3d 846, 868 (9th Cir, 2005) (Nelson J) quoting *Neighbors of Cuddy Mountain v US Forest Service*, 137 F 3d 1372, 1379–80 (9th Cir, 1998).

110 Department of Environment (Cth), ‘Significant Impact Guidelines 1.3: Coal Seam Gas and Large Coal Mining Developments: Impacts on Water Resources’ (Guidelines, December 2013) (‘Significant Impact Guidelines 1.3’).

111 Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, ‘Information Guidelines for the Independent Expert Scientific Committee Advice on Coal Seam Gas and Large Coal Mining Development Proposals’ (Guidelines, October 2015) (‘IESC Information Guidelines’).

of Australia.¹¹² Judicial guidance relating to the water trigger is also scant, amounting to mere mention in the context of judicial review of project approvals on other grounds, where the water trigger also applied to the project (notably the Adani coal mine).¹¹³ The novelty of the water trigger provisions and ambiguity as to their precise meaning, as well as overseas experience, point to an area of potential future litigation in Australia.

One prominent and substantial area lacking clarity is the meaning of ‘other developments’ in *EPBC Act* section 528. This is a fundamental aspect of considering cumulative effects, as it defines the scope of the figurative ‘straws’ that are subject to assessment. The numerous other challenges that arise in the context of assessing cumulative effects, from defining impact and determining baselines (see below Part IV), to modelling ecological systems and determining significance, depend on appropriately scoping relevant effects.¹¹⁴ One interpretive possibility is that the phrase ‘other developments’ encompasses all the straws on the camel’s back, that is, all the different activities that may affect a water resource, from mining, to irrigated agriculture, to land use change. The formal policy guidelines for the water trigger support that interpretation,¹¹⁵ but the guidelines are only ministerial policy, which courts do not consider in interpreting a statute.¹¹⁶ This broad interpretation of ‘other developments’ mirrors that adopted under *NEPA*, which focuses on actions that have similar effects, rather being restricted to actions that are similar in nature.¹¹⁷

An alternative, narrower interpretation is that the ‘other developments’ that must be considered along with a proposed development caught by section 24D are only other CSG and coal mine developments, that is, that the minister need consider only some of the other straws on the camel’s back, and can ignore the rest, even if they constitute a similar burden. The choice of the word ‘development’, mirroring ‘CSG development’, for example, might suggest this interpretation. The way that the Department words its requests for scientific advice about cumulative effects suggests that, in practice, it takes this much narrower approach,¹¹⁸ apparently conflicting with its own policy guidance.

112 Tom Kaveney, Ailsa Kerswell and Andrew Buick, *Cumulative Environmental Impact Assessment Industry Guide* (Guide, Minerals Council of Australia, July 2015).

113 *Australian Conservation Foundation Incorporated v Minister for the Environment* (2016) 251 FCR 308, 323 [45].

114 Foley et al (n 25) 128–9; Bryan R Jenkins, ‘Challenges in Cumulative Impact Assessment: Case Studies from Canterbury, New Zealand’ in J Casares, G Passerini and G Perillo (eds), *WIT Transactions on Ecology and Environment: Environmental Impact IV* (WIT Press, 2018) vol 215, 25, 26–8.

115 Significant Impact Guidelines 1.3 (n 110) 20 [5.5.1].

116 *Drake v Minister for Immigration and Ethnic Affairs* (1979) 46 FLR 409, 419–21 (Brennan J).

117 *Considering Cumulative Effects under the NEPA* (n 96) 13: ‘Do other activities (whether governmental or private) in the region have environmental effects similar to those of the proposed action? Example: release of oxidising pollutants to a river by a municipality, an industry, or individual septic systems’.

118 See, eg, phrasing of request for advice in relation to the Ironbark No 1 Project, ‘Question 4: Can the Committee provide discussion on whether the assessment gives adequate consideration of the project’s contribution to cumulative impacts associated with other mining activities and coal seam gas production in the area?’: Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, ‘Advice to Decision Maker on Coal Mining Project: Ironbark No 1 Project (EPBC 2007/3643)’ (Advice No 2017-090, 15 December 2017) 7 (‘Ironbark Advice’).

Regardless of which interpretation of ‘other developments’ is correct, emerging practice in cumulative assessment under the water trigger suggests that some proponents are either ignoring or paying lip-service to cumulative effects. Scientific peer reviews of notable recent assessments observe that they either failed to analyse important types of effects in light of other existing mines with similar effects¹¹⁹ – let alone reasonably foreseeable mines – or, failed entirely to discuss cumulative effects.¹²⁰ Inadequate guidance on assessing cumulative effects and an apparently weak state of practice in actually doing the assessments suggest that the water trigger is not significantly assisting the camel with its burden of straw. Fundamentally, ignoring elements of the existing burden – the effect of non-mine water users on water resources – means underestimating the cumulative effect and, thereby, significance of a proposed mining or CSG development on water resources.

The novelty of these issues emerges when the water trigger provisions are considered in light of the other MNES. Current judicial reasoning is broadly that cumulative effects are not to be considered in the context of these other matters, although some avenues for their consideration remain open. The full Federal Court decision of *Tarkine National Coalition v Minister for the Environment* (*‘Tarkine’*)¹²¹ in 2015, which dealt with listed threatened species,¹²² held that cumulative effects were not relevant to the factors that the Minister was obliged to consider under section 136 of the *EPBC Act*.¹²³ That section lists the considerations that the Minister must consider ‘in deciding whether or not to approve the taking of an action, and what conditions to attach to an approval’¹²⁴ in relation to broader MNES. Focusing on the terms ‘impacts of the action’ for the purposes of section 136(2)(e),¹²⁵ Jessup J found that the Minister ‘was under no obligation to take account of the consequences of any other action, present or anticipated’, other than the proposed action referred for assessment.¹²⁶ Jessup J concluded that the relevant provision contemplated only the ‘consequences of the proposal’ itself.¹²⁷ Since section 136(5) provides that ‘[i]n deciding whether or not to approve the taking of an action, and what conditions to attach to an approval, the Minister must not consider any matters that the Minister is not required or permitted by this Division

119 See, eg, Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, ‘Advice to Decision Maker on Coal Mining Project: Moolarben Coal Project (EPBC 2017/7974)’ (Advice No 2017-092, 15 December 2017) 1; Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, ‘Advice to Decision Maker on Coal Seam Gas Project: Narrabri Gas Project (EPBC 2014/7376; SSD 6456)’ (Advice No 2017-086, 8 August 2017) 10; Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, ‘Advice to Decision Maker on Coal Seam Gas Project: Arrow Energy Bowen Gas Project (EPBC 2012/6377)’ (Advice No 2014-051, 18 July 2014) 10.

120 Ironbark Advice (n 118) 7.

121 (2015) 233 FCR 254 (*‘Tarkine’*).

122 See *EPBC Act* s 18.

123 *Tarkine* (2015) 233 FCR 254, 254–5.

124 *EPBC Act* s 136(1).

125 *EPBC Act* s 136(2)(e); *Tarkine* (2015) 233 FCR 254, 268 [39] (Jessup J, Kenny J agreeing at 256 [1], Middleton J agreeing at 278 [70]).

126 *Tarkine* (2015) 233 FCR 254, 269 [43].

127 *Ibid.*

to consider', the outcome would appear to be not only that the Minister was not *required* to consider cumulative effects, but that the Minister would be *prohibited* from doing so for the purposes of considering the 'impacts' under section 136(2)(e) of the action in determining whether to approve the taking of an action. This finding, which focused on the 'impacts of the action' was nonetheless accompanied by acknowledgement that considering the consequences of an action requires considering the existing circumstances of the species, which is the product of natural events and human activities.¹²⁸

There also appears to be an alternative argument available about the relevance of cumulative effects that was not explicitly considered in the *Tarkine* case. This involves considering other actions that have similar effects as part of the 'context and intensity' of the proposed action, where 'context and intensity' are key determinants of whether an action is likely to have a 'significant' impact on a MNES.¹²⁹ A determination of the gravity of an impact is conceptually different to attempting to encompass the effects of other actions within the 'impacts' of the action in question. This alternative approach is adopted in the US,¹³⁰ has been suggested in Australian scholarship¹³¹ and (conceived more narrowly) in litigation,¹³² and is a more explicit rendering of the reasoning apparently used in *Brown v Forestry Tasmania [No 4]* ('*Brown*').¹³³ In *Brown*, Marshall J concluded that the 'cumulative effect of logging ... taking into account the endangered status of the parrot *and all other threats to it*, is likely to have a significant impact on the species'.¹³⁴ That reasoning did not arise for consideration in the subsequent appeal decision,¹³⁵ nor was it considered in the *Tarkine* case. *Brown* involved an allegation of a contravention of section 18(3) of the *EPBC Act* (within part 3 of the Act), which states that a person must not take an action 'that has or will have a significant impact on a listed threatened species included in the endangered category' without approval. Although this involves considering the significance of an impact in the context of a different statutory provision to that under discussion in the *Tarkine* case (which primarily concerned section 136(2)(e) of the *EPBC Act*), this reasoning about the relevance of cumulative effects to a finding of *significance* is also relevant to a decision about whether to approve the taking of an action under section 136. Under section 136(1), the Minister must consider 'matters relevant to any matter protected by a provision of part 3 that the Minister has decided is a controlling provision for the action'. Factors that lead to a finding that an impact

128 Ibid 268 [41]. This point is taken up further in Part IV(A) below.

129 *Booth v Bosworth* (2001) 114 FCR 39, 65 [99] (Branson J).

130 40 CFR §1508.27 (2019); *National Parks and Conservation Association v Babbitt*, 241 F 3d 722, 731 (9th Cir, 2001) (Reihardt J).

131 Schuijers (n 20) 191–5.

132 *Anvil Hill Project Watch Association v Minister for the Environment and Water Resources* (2007) 243 ALR 784, 794–5 [41] (Stone J) ('*Anvil Hill*'): referring to an assessment of significance in terms of context and intensity 'in comparison to other actions that might reasonably be assessed under the *EPBC Act*'.

133 *Brown v Forestry Tasmania and Others [No 4]* (2006) 157 FCR 1, 14 [91], 15 [95], 16 [102], 17 [111], 22 [146].

134 Ibid 22 [146] (emphasis added).

135 *Forestry Tasmania v Brown* (2007) 167 FCR 34.

is likely to be significant would appear to be a ‘relevant matter’, and indeed, a centrally relevant matter, rather than one that would ‘[oblige] or [entitle] [the Minister] to undertake additional research or investigations’.¹³⁶ While there appears to be potential for cumulative effects to be considered in a finding of significance, and for this to be a ‘relevant matter’ for the purposes of approving or applying conditions to an action, these issues are presently unresolved.

The foregoing evaluation suggests that in relation to cumulative effects, the water trigger is not only narrow in its limited application to large coal mines and CSG developments, but potentially even narrower in its implementation (based on the practice of considering only other similar developments), and certainly ambiguous. Perhaps this low level of legal development is unsurprising, given that issues of cumulative effects need not be considered in the context of the other MNES, based on the *Tarkine* case (noting that other avenues for consideration may still be open). However, it should act as a warning about the need for greater clarity in the interpretation and scope of cumulative effect assessment requirements in environmental legislation, both under the *EPBC Act* and – given the wider interpretive influence of key *EPBC Act* provisions on state legislation¹³⁷ – more generally.

B Cumulative Effects under the Water Act

The narrow and policy-light context of cumulative effect assessment under the *EPBC Act* contrasts strongly with unique and emerging legal mechanisms for dealing with cumulative effects under the federal *Water Act*. Before discussing the latter approach in detail, it is important to review the significant differences in how the *Water Act* and the *EPBC Act* approach their ecological goals. The *EPBC Act* (insofar as I discuss it here) deals with environmental assessments and approvals of *individual* actions, and can lead to measures to stop an individual action from significantly worsening environmental conditions. By contrast, the *Water Act* does not deal directly with licensing *individual* extractions of water.¹³⁸ Constitutionally, that is the province of state water legislation, which may include environmental considerations at the licensing stage (roughly analogous to a scaled-down EIA

136 *Tarkine* (2015) 233 FCR 254, 265 [27]. Jessup J suggested that the Minister could not be obliged to take into account matters that would require the Minister to ‘undertake additional research or investigations’. Note that in an earlier case, Stone J suggested that considering ‘other, hypothetical, proposed actions’ would be permissible in determining the significance of an action having regard to its context and intensity, but that a determination of significance need not be constrained to solely this comparison: *Anvil Hill* (2007) 243 ALR 784, 795 [44].

137 See, eg, *Bates v Southern Rural Water* [2004] VCAT 2045, [27] (Presiding Member Martin, Member Mainwaring); *Australian Conservation Foundation v Minister for Planning* [2004] VCAT 2029, [42] (Morris J).

138 Note that my focus in this article in relation to the *Water Act* relates to water extractions, which have been the subject of heated controversy and will likely be the focus for future reviews of the *Water Act*. Interstate arrangements for the MDB also deal with salinity in a way that addresses the cumulative effects on water quality of irrigation developments, however, dealing with this context is beyond the scope of this article. For further information on the arrangements related to salinity, see Murray-Darling Basin Ministerial Council, *Basin Salinity Management 2030* (Strategy Paper, November 2015); Jenkins (n 78) 927–8.

analysis), as well as through regional water allocation plans.¹³⁹ Rather, the *Water Act* provides for a Basin Plan for the MDB, which is prepared by the federal MDB Authority and adopted by the federal Minister.¹⁴⁰ The Basin Plan, in turn, sets legally binding limits on how much water can be diverted *in the aggregate* from catchments, where that limit must reflect an ‘environmentally sustainable level of take’.¹⁴¹ Like the precursor Cap under the MDB Agreement, these sustainable diversion limits (‘SDLs’) are inherently cumulative impact management tools. They cap water take in the aggregate, regardless of whether a particular withdrawal of water needs to be licensed under state law.¹⁴² The SDLs cover all of the straws on the camel’s back.

Dealing with many small withdrawals of water that states have not generally closely scrutinised or regulated before¹⁴³ presents a challenge that the Basin Plan deals with in an interesting way. It speaks to federal regulatory restraint in favour of state flexibility in a way that also meets the *Water Act*’s environmental goals by considering cumulative effects. In water law and policy, the term ‘interception activities’ describes these typically unscrutinised withdrawals.¹⁴⁴ Common interception activities are withdrawals of water for livestock and domestic purposes, commercial tree plantations, and water that runs off into catchment dams or ‘farm dams’.¹⁴⁵ These can constitute cumulatively very significant volumes of water. For example, in the Lachlan area west of Sydney, the volume of water captured by runoff dams has been estimated at 287 gigalitres per year, which happens to be the exact same volume of water that may be taken from rivers under regular water access licences.¹⁴⁶ There is no doubt that that is a cumulatively significant number. If the *Water Act* and Basin Plan were to ignore these ‘straws’, it would assess the relevant ‘burden’ at only half of its real severity.

Under the *Water Act*, interception activities that are individually *or cumulatively* ‘significant’ must be addressed,¹⁴⁷ though they need not necessarily be subject to a licensing requirement.¹⁴⁸ The Basin Plan contains specific requirements in relation to interception activities. Most significantly, the Basin Plan sets specific quantitative limits on the amount of water that can be taken from surface waters by certain kinds of interception activities – stock and domestic uses, runoff dams, and commercial plantations.¹⁴⁹ While the provisions allow for altering these limits between different forms of ‘take’, assuming compliance,¹⁵⁰ the basic

139 Gardner et al (n 33) 376–90, 488–9.

140 *Water Act* s 41.

141 Ibid s 23(1).

142 Nelson, ‘Broadening Regulatory Concepts’ (n 11) 362, 364–5.

143 I have described the national policy forerunner to these regulatory arrangements in: ibid 362–3.

144 Note that the definition under s 4(1) of the *Water Act* is very broad: ‘interception activity means the interception of surface water or ground water that would otherwise flow, directly or indirectly, into a watercourse, lake, wetland, aquifer, dam or reservoir that is a Basin water resource’.

145 *Basin Plan 2012* (Cth). see especially s 10.23 (‘*Basin Plan*’).

146 Ibid sch 3, notes to paras (a), (d), (e) of item 13.

147 *Water Act* ss 22(3)(d), 22(7).

148 Ibid s 22(7)(b).

149 *Basin Plan* s 10.13.

150 This article analyses laws and policies as they are expressed, but note that cumulative effects may also arise through non-compliance with legal rules. Serious questions have been raised in relation to

integrity of the mechanism remains because interception activities must not result in the relevant SDL being exceeded.¹⁵¹

Other requirements apply to the other kinds of interception activities that are not covered by these limits, for example, mining activities and floodplain harvesting, which are potentially relevant.¹⁵² Water resources plans ('WRPs') that are prepared by the states must comply with the Basin Plan, and must specify whether any type of interception activity in the WRP area has the potential to have a significant impact on the relevant water resources either on an 'activity-by-activity basis, or cumulatively', taking into account not only their current threat, but also their projected growth.¹⁵³ WRPs must set out a process for monitoring those impacts,¹⁵⁴ and for identifying 'actions' that will be taken if monitoring suggests that the activity will compromise environmental water requirements or if the quantity of water being intercepted increases after the WRP commences.¹⁵⁵

So, what does all this mean for the camel? It is not difficult to point out inconsistencies in the *Water Act* regime for interception activities. The numerical limits on interception activities apply only to impacts to surface waters, not groundwater, and they only apply to some kinds of interception. But this, at least, limits the number of straws that certain types of activities can cumulatively place on the camel's back. The monitoring and 'action' provisions support this. There are, at least, scrutineers watching the camel and theoretically making sure that straws deposited by other activities do not accumulate to back-breaking proportions. This is quite significant in light of the challenges of water politics, in which some interception activities – particularly stock and domestic use of water – are generally seen as unassailable by water regulatory systems, despite accounting for significant aggregate withdrawals.¹⁵⁶

This approach to interception activities is also notable in light of the contrasting situation under the *EPBC Act*, where the current implementation of the 'other developments' aspect of the water trigger provisions appears to exclude potentially significant activities. Precisely how the state WRPs implement these Basin Plan requirements is not yet known, since only by the end of 2019 will all the WRPs be due to be submitted and assessed for accreditation as complying with

compliance with the terms of water licences and other authorisations to take water issued by state jurisdictions in the Murray-Darling Basin: see generally Ken Matthews, *Independent Investigation into NSW Water Management and Compliance: Advice on Implementation* (Final Report, 24 November 2017).

151 *Basin Plan* s 10.13(2)(c).

152 See especially *ibid* s 10.23.

153 *Ibid* s 10.23. In a formal position statement on interception activities, the Murray-Darling Basin Authority states that it expects states to be guided by formal risk assessments in determining whether there is likely to be a significant impact on water resources from interception activities: Murray-Darling Basin Authority, 'Basin Plan Water Resource Plan Requirements Position Statement 5A: Interceptions' (Position Statement, 23 March 2017).

154 *Basin Plan* s 10.24.

155 *Ibid* s 10.25(1).

156 Sinclair Knight Merz, CSIRO and Bureau of Rural Sciences, National Water Commission (Cth), *Surface and/or Groundwater Interception Activities: Initial Estimates* (Waterlines Report No 30, June 2010) 42–3, 58.

the Basin Plan.¹⁵⁷ When they are available, WRPs may provide a useful point of reference for considering how conditions on environmental approvals under environmental laws, for example, might take account of the cumulative effects of other activities.

IV BOILING FROGS, OR THE DANGER OF CREEPING BASELINES

The second proverb of the boiling frog and the issue of creeping baselines are related to the proverb of the breaking camel because if cumulative effects are ignored and allowed to proliferate, ‘background’ environmental conditions degrade in an unscrutinised and uncontrolled way, which even experts with long experience cannot necessarily perceive.¹⁵⁸ This then paves the way to creeping baselines. In both environmental law and water law, the issue of legal baselines is fundamental.

To paraphrase a dictionary definition of the term in its original context, a baseline is a *benchmark from which something can be measured and compared*.¹⁵⁹ For present purposes, I use the term ‘legal baseline’ or ‘baseline’ as synonyms for ‘benchmark’; both terms refer to the *environmental conditions against which a decision-maker determines if an activity with adverse environmental effects is legally acceptable*. This is not necessarily or even desirably synonymous with ‘current conditions’, nor even necessarily past conditions, as explained below. As elaborated here, legal baselines are structured very differently in federal environmental and water law.¹⁶⁰ However, in both cases, the figurative frog is in dangerous waters. That danger stems from either uncritically accepting current conditions as a baseline, or making decisions in the absence of sufficient baseline information.

A Creeping Baselines under the EPBC Act

EIA laws typically attach legal consequences to activities that may have a *significant* environmental impact, relative to some reference or baseline condition.¹⁶¹ To determine if something is likely to be significant, a decision-maker must compare a set of predicted conditions, which would arise if a proposal proceeds, against something else. In a theoretical sense, several potential

157 Murray-Darling Basin Authority, ‘Draft Sustainable Diversion Limit Reporting and Compliance Framework: Summary’ (No 21/18, July 2018) 2; Murray-Darling Basin Authority, *Water Resource Plans: Quarterly Report* (Report No 48/19, September 2019) 1–2.

158 See generally SK Papworth et al, ‘Evidence for Shifting Baseline Syndrome in Conservation’ (2009) 2(2) *Conservation Letters* 93.

159 *A Dictionary of Construction, Surveying and Civil Engineering* (Oxford University Press, 1st ed, 2012) ‘baseline’.

160 Note that in discussing the concept of legal baselines, I focus on the legal function of setting a benchmark against which activities are compared, rather than focusing on terminology. Accordingly, while the term ‘baseline’ appears in a variety of ways in environmental and water laws, my focus is on how the concept functions.

161 Foley et al (n 25) 122.

comparators are available. One could make a comparison to *current* ecological conditions, before the development of a proposed project; *past* ecological conditions, at a time of lower human impact;¹⁶² future anticipated environmental conditions, say, considering predicted climatic shifts; or, perhaps, ‘a time when ecosystem conditions were consistent with management goals’.¹⁶³ Globally, published surveys have shown that EIA practitioners select a variety of these options, not always consistently, even within a single jurisdiction.¹⁶⁴

The implications of selecting a legal benchmark are substantial. A regulatory environment that does not address cumulative effects (see Part III) allows current ecological conditions continually to degrade, so that this benchmark will continually shift (‘baseline creep’). Comparing a project’s predicted effects to more degraded (less valuable) ecological conditions may mean allowing greater impacts before they are considered significant,¹⁶⁵ or, at best, allowing the effects of the project that fall below the significance threshold to accumulate with other cumulative effects. A decision maker may be loath to refuse a development, or approve a development with conditions to protect values that have been lost, due to past cumulative effects. The temperature of the saucepan quietly increases.

For completeness, it should be noted that this assumed shift to a more degraded future state does not recognise the role of environmentally beneficial actions. However, it seems unlikely that beneficial actions could outweigh the combined effect of shifting baselines and accepting growing cumulative effects.¹⁶⁶ Present economic incentives for environmentally beneficial actions – for example, in the form of tax concessions (in the case of private action) or political benefits (in the case of government action) – seem unlikely to achieve sufficient scale to match the economic incentives to use environmental resources.¹⁶⁷ To the extent that beneficial actions arise, their effects are at least somewhat neutralised by unregulated cumulative effects and correspondingly shifting baselines.

Exactly what the *EPBC Act* requires as benchmark conditions in its chapter 4 assessment provisions is not precisely clear. The statute itself is silent. The

162 For a review of challenges associated with using historical baselines, see generally Peter S Alagona, John Sandlos and Yolanda F Wiersma, ‘Past Imperfect: Using Historical Ecology and Baseline Data for Conservation and Restoration Projects in North America’ (2012) 9(1) *Environmental Philosophy* 49.

163 Foley et al (n 25) 129 (citations omitted).

164 Ibid 126.

165 This may occur because more degraded ecosystems (which support, for example, fewer uses by third parties) are considered less valuable, or because more ecological change is considered acceptable in environments that are already more influenced by humans. Both situations tend to correspond to a higher degree of change being required before a finding of significance is made in the EIA context: see, eg, Significant Impact Guidelines 1.3 (n 110) 16–17 [5.2.1]; Sam Briggs and Malcolm D Hudson, ‘Determination of Significance in Ecological Impact Assessment: Past Change, Current Practice and Future Improvements’ (2013) 38 *Environmental Impact Assessment Review* 16, 17; F Bulleri, AJ Underwood and L Benedetti-Cecchi, ‘The Assessment and Interpretation of Ecological Impacts in Human-Dominated Environments’ (2007) 34(3) *Environmental Conservation* 181, 181.

166 See, eg, above n 12 and accompanying text for a view of serious aggregate environmental risks at the global scale.

167 Brett A Bryan, ‘Incentives, Land Use, and Ecosystem Services: Synthesizing Complex Linkages’ (2013) 27 *Environmental Science & Policy* 124, 124–6; Fiona Smith et al, ‘Reforms Required to the Australian Tax System to Improve Biodiversity Conservation on Private Land’ (2016) 33 *Environmental and Planning Law Journal* 443, 445.

regulations that set out what the Minister must include in project-specific assessment requirements (for example, a preliminary environment report or an environmental impact statement)¹⁶⁸ are also silent on the issue, as are the significant impact policy guidelines.¹⁶⁹ The text of the guidelines in relation to particular MNES (for example, endangered species or Ramsar-listed wetlands) *seem* to imply current conditions as a reference point but, again, this is not clear.¹⁷⁰

The water trigger policy guidelines recommend that a proponent include in its referral of an action to the Minister the available ‘baseline’ information about the water resource and existing third party uses.¹⁷¹ They do not define the term ‘baseline’. In a process related to the water trigger, the Australian Government has formulated ‘bioregional assessments’¹⁷² intended to collect ‘baseline information’ to help assess projects under the water trigger. This information also appears to focus on current conditions, though the methodology is expressed to be aspirational rather than mandatory,¹⁷³ and underlying assumptions may vary between individual assessments.

Recent judicial consideration and a sample of recent project-specific requirements seem to suggest a general practice of using a benchmark of current conditions. In the *Tarkine* case, Jessup J said in obiter that

for an endangered species, consideration of the consequences of some action would normally proceed from a base line constituted by the *existing circumstances* of that species, whether they had been brought about by the natural course of events, by previous human actions which had their own ‘impacts’, or a combination of the two.¹⁷⁴

The Terms of Reference issued for the Carmichael Coal and Rail Project (which, if it is built, will be one of the largest open-cut coal mines in the world) required ‘baseline’ information but did not define the term.¹⁷⁵ However, it did refer to undertaking contemporary species surveys to obtain baseline data,¹⁷⁶ which would suggest that reference to current conditions was intended. Similarly, the IESC does not fully define baseline, but suggests that a current condition approach is appropriate with the recommendation for at least two years of monitoring to establish a baseline.¹⁷⁷

168 *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) r 5.04, sch 4.

169 Department of Environment (Cth), ‘Significant Impact Guidelines 1.1: Matters of National Environmental Significance’ (Policy Statement, 2013).

170 For example, in relation to Ramsar wetlands, the ‘significant impact criteria’ include ‘the habitat or lifecycle of native species, including invertebrate fauna and fish species, dependent upon the wetland being seriously affected’, where it would be difficult to say that a fish depended on wetland habitat if that habitat was only historically, but not currently, present: *ibid* 13.

171 Significant Impact Guidelines 1.3 (n 110) 21.

172 *EPBC Act* s 528 (definition of ‘bioregional assessment’).

173 See, eg, Damian Barrett et al, *Methodology for Bioregional Assessments of the Impacts of Coal Seam Gas and Coal Mining Development on Water Resources: A Report Prepared for the Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development through the Department of the Environment* (Report, October 2013) iii, 9, 24.

174 *Tarkine* (2015) 233 FCR 254, 268 [41] (Jessup J) (emphasis added).

175 Coordinator-General, Queensland Government, *Carmichael Coal Mine and Rail Project: Final Terms of Reference for the Environmental Impact Statement* (Report, May 2011) 80.

176 *Ibid* 87.

177 ‘IESC Information Guidelines’ (n 111) 6.

Different legally appropriate benchmarks for determining the significance of effects might apply to different MNES, deriving from the different statutory language used in relation to each. For example, ‘a significant impact on the World Heritage values of the World Heritage property’¹⁷⁸ is ultimately defined with reference to the *World Heritage Convention* (‘the *Convention*’).¹⁷⁹ Although the *Convention* is silent on the issue,¹⁸⁰ the most logical benchmark would not be current conditions, but the conditions at the time that a party to the *Convention* nominates the property for inscription to the World Heritage List, since this is what leads the property to meet the required criteria of ‘Outstanding Universal Value’.¹⁸¹

It seems possible that the statutory and policy silence surrounding the *EPBC Act*’s conception of a benchmark may be a deliberate strategy to ensure policy flexibility to produce the ‘best’ reference point to suit particular circumstances. However, regulatory theorists caution that regulatory flexibility, when combined with scientific uncertainty and powerful commercial interest groups, can result in unsustainable outcomes.¹⁸² In any case, significant regulatory flexibility – to the extent of appropriate definitions – is undesirable in this case, given the central place of baselines in the *EPBC Act*’s legislative scheme. Insofar as it is discussed here, this scheme revolves around the concept of ‘significant impact’ – a concept that lacks coherence without a comparator to determine significance. Given the legal centrality of the implied concept of a baseline, and the incremental damage that could arise by accepting current conditions as a baseline in the presence of uncontrolled cumulative effects, law or policy should at least elaborate on the circumstances in which particular approaches to baselines are appropriate.

Even more concerning than uncritically adopting current conditions as a legal benchmark for a determination of significance, or allowing inconsistent approaches to defining the benchmark in the absence of policy guidance, it appears that significant decisions are being made in the absence of robust baseline information. Warnings about insufficient baseline information are a frequent feature of advice given by the independent statutory IESC to the Minister in the context of scientific assessments under the water trigger.¹⁸³ Insufficient baseline

178 *EPBC Act* s 12(1).

179 *Ibid* s 12(3).

180 *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) arts 1, 2.

181 Intergovernmental Committee for the Protection of the World Cultural and Natural Heritage, *Operational Guidelines for the Implementation of the World Heritage Convention* (Guideline No 17/01, United Nations Educational Scientific and Cultural Organisation, 12 July 2017) 36. It is not clear the extent to which this reasoning is used in practice. For example, although policy documents relating to the Great Barrier Reef World Heritage area emphasise the protection of its universal outstanding values (see generally *Strategic Assessment Program Report* (n 73)), a cumulative impact management policy for the Reef, to which that same policy document committed, encourages using ‘current conditions’ as ‘the reference point and context for assessing and managing cumulative impacts’: *Reef 2050 Plan* (n 76) 8.

182 Eric Biber and Josh Eagle, ‘When Does Legal Flexibility Work in Environmental Law?’ (2016) 42(4) *Ecology Law Quarterly* 787, 827–8.

183 For the Spring Gully and Western Surat Gas projects, the IESC concluded that the baseline information provided by both projects was insufficient for a proper assessment and recommended more monitoring data be provided: Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, ‘Advice to Decision Maker on Coal Seam Gas Project: IESC 2017-088: Spring Gully North-West and North-East CSG Project (EPBC 2017/7881)–Expansion’ (Advice, 19 October 2017) 1;

information frequently arose as a challenge in a survey of 100 groundwater practitioners undertaken by the author in late 2016.¹⁸⁴ Lack of sufficient baseline information tends to be dealt with by approval conditions that require a proponent to collect further information.¹⁸⁵ Yet, as described above, it is not clear how one can determine whether an action will have a significant impact without something against which to compare the predicted conditions. This is also the conclusion of US case law under *NEPA*, which has explicitly dealt with this issue of missing baseline information. That case law has held that no determination of significance can be made without baseline data, and that the data required must derive from site-specific field observations¹⁸⁶ of the kind that have been found lacking in some Australian assessments under the water trigger.¹⁸⁷

It is important to recognise that technical challenges may inhere in selecting a baseline, and that various technical approaches can deal with a lack of baseline information, ranging from extrapolating shorter data sets to stochastic modelling strategies.¹⁸⁸ The more basic, underlying legal question is the degree to which a proponent, or a government, must invest resources in constructing a robust baseline, regardless of the basis for setting it. The *Water Act*, discussed below, provides one approach to answering this question.

Returning, then, to the warming frog, the *EPBC Act* does not presently provide a clear statutory framework for preventing creeping baselines, and current practice seems to confirm the danger of this creep.

Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, 'Advice to Decision Maker on Coal Seam Gas Project: IESC 2017-087: Western Surat Gas Project (EPBC 2015/7469)–New Development' (Advice, 1 September 2017) 1.

- 184 Rebecca Nelson, 'Water Data and the Legitimacy Deficit: A Regulatory Review and Nationwide Survey of Challenges Considering Cumulative Environmental Effects of Coal and Coal Seam Gas Developments' (2019) 23(1) *Australasian Journal of Water Resources* 24 ('Water Data and the Legitimacy Deficit').
- 185 Hunter (n 98); Department of Environment (Cth), 'Development of New Natural Gas Acreage in Surat Basin, Queensland (EPBC 2013/7074)' (Notification of Approval, 17 December 2014) 5–7 [23]–[27]; Department of Environment (Cth), 'Santos GLNG Gas Field Development Project (EPBC 2012/6615)' (Notification of Approval, 22 March 2016) 5–6 [20]–[24].
- 186 *Kettle Range Conservation Group v United States Forest Service*, 148 F Supp 2d 1107, 1125–7 (Quackenbush J) (ED Wash, 2001).
- 187 For example, noting that '[t]he assessment of the height of the subsidence fracture zone above longwall mining was not based on local site data nor with due consideration of multi-seam mining': Independent Expert Scientific Committee on Coal Seam Gas and Large Coal Mining Development, 'Advice to Decision Maker on Coal Mining Project: Proposed Action: Carmichael Coal Mine and Rail Project, Queensland (EPBC 2010/5736)–New Development' (Advice, 16 December 2013) 3.
- 188 Examples include estimating stream base flows, which usually lack specific flow data as well as a concrete definition of base flow; estimating climate temperature baselines, which usually lack a sufficiently long data set and contain difficult-to-define long-term cycle fluctuations; and estimating ocean acidity and temperature baselines to determine the effects of climate change on aquatic environments, which are difficult to measure and are based on short data sets: TA McMahon and BL Finlayson, 'Drought and Anti-Droughts: The Low Flow Hydrology of Australian Rivers' (2003) 48(7) *Freshwater Biology* 1147, 1149–50; Linda J Beaumont et al, 'Impacts of Climate Change on the World's Most Exceptional Ecoregions' (2011) 108(6) *Proceedings of the National Academy of Sciences of the United States of America* 2306, 2607; Alistair J Hobday and Janice M Lough, 'Projected Climate Change in Australian Marine and Freshwater Environments' (2011) 62 *Marine and Freshwater Research* 1000, 1001–2.

B Creeping Baselines under the Water Act

The *Water Act* provides a very different view of what a legal baseline or environmental benchmark is, and food for thought in the context of the *EPBC Act*. However, emerging experience of implementing the *Water Act*'s more positive view of a baseline shows that it is not free of problems either.

The *Water Act* provides for an 'environmentally sustainable level of take' of water, effected through SDLs.¹⁸⁹ These are the legal benchmark. They are not necessarily current conditions, but a set of desired conditions of ecological sustainability. In some cases, they are future conditions, since the *Water Act* states clearly that some water resources are 'overallocated or overused', such that current levels of water take must be reduced to be sustainable.¹⁹⁰

Whereas the *EPBC Act* does not make entirely clear the benchmark against which a significant impact should be conceived, the *Water Act*'s benchmark of 'an environmentally sustainable level of take' is elaborated in quite some detail to require certain 'key' things be protected. It means the level of take of water from a water resource which,

if exceeded, would compromise:

- (a) key environmental assets of the water resource; or
- (b) key ecosystem functions of the water resource; or
- (c) the productive base of the water resource; or
- (d) key environmental outcomes for the water resource.¹⁹¹

Some of those terms are subsequently defined, and some are not.¹⁹² Though the definition of 'water resource' is broad, this focus on 'key' things arguably constitutes a narrower approach than considering significant effects on a broadly defined 'water resource' under the *EPBC Act* water trigger (since the *EPBC Act* adopts the *Water Act*'s definition of 'water resource', but does not use the qualifier 'key').¹⁹³

The SDLs take effect as benchmarks through the states' WRPs, which must limit the take of water in the relevant areas to comply with the SDLs.¹⁹⁴ Subsequently, when a state agency considers an individual application to take water under its state legislation,¹⁹⁵ it must not grant an application that would result in a SDL being exceeded.¹⁹⁶

Conceptually this marks a significant difference from the *EPBC Act*, which appears to allow current conditions as a baseline and allow incremental environmental degradation. The federal *Water Act*, in combination with state water licensing laws, ultimately produces a process of assessing whether a withdrawal is

189 *Water Act* s 23(1).

190 *Ibid* s 3(d)(i).

191 *Ibid* s 4(1) (definition of 'environmentally sustainable level of take').

192 *Ibid* s 4(1) (definition of 'environmental assets' and 'environmental outcomes').

193 *EPBC Act* s 528. See above n 93 and accompanying text.

194 *Water Act* s 55(2).

195 See, eg, *Water Act 1989* (Vic) s 51.

196 *Water Act* s 59.

acceptable by comparison with a limit that is intended to guarantee defined ecological benefits.

On its face, the *Water Act*'s inverted approach to achieving environmental benefits – seeking specific 'benchmark' environmental outcomes in a positive sense, rather than seeking to avoid an unspecified degree of adverse outcome – would seem to avoid the problem of creeping baselines by using a legally determinate standard of protection. It would seem to be protective of the proverbial frog. Unfortunately, the history and continuing evolution of this baseline suggests the frog faces a more overt form of danger.

SDLs have been controversial, particularly where complying with them requires reducing the current aggregate take of water. In the aggregate, relative to withdrawals of water at the time the Basin Plan commenced, 2,075 gigalitres of water must be returned to the environment to meet SDLs for surface water systems.¹⁹⁷ That means some irrigators must either irrigate less or not at all relative to their behaviour at that time. In relation to the practical implementation of SDLs, baselines have crept in a variety of ways, some in preliminary and policy contexts,¹⁹⁸ others in ways that we see clearly in law. For brevity, I focus on the latter.

The *Water Act* does not facilitate the compulsory acquisition of water entitlements.¹⁹⁹ It has always been envisaged that the main way in which over-allocated water systems would meet SDLs is by the Commonwealth Environmental Water Holder 'buying back' water entitlements from willing sellers to devote to environmental purposes.²⁰⁰ Baseline creep in SDLs has come about with a series of legislative and regulatory amendments affecting how SDLs can be changed and how they can be met. These changes have sought to move away from buybacks, and their perceived socio-economic impacts, and towards other methods.

In 2012, amendments to the *Water Act* and the final version of the Basin Plan confirmed the ability of the Murray-Darling Basin Authority to adjust SDLs by as much as 5% either up or down to accommodate measures that avoided buying back water, including on-farm efficiency projects that would aim to produce the same environmental outcomes as returning water to rivers.²⁰¹ The adjustment mechanism reflected a view that the initial water recovery targets should be viewed as a

197 *Basin Plan*, see especially s 6.04(2). This number has been amended several times. Changes to, and components of, the water recovery figure are given at: 'Progress on Water Recovery', *Murray-Darling Basin Authority* (Web Page, 1 July 2019) <<https://www.mdba.gov.au/progress-water-recovery>>.

198 For example, note criticism associated with the difference between higher levels of water recovery initially modelled as necessary, compared to significantly lower levels modelled and adopted after public outcry at the former: Murray-Darling Basin Authority, 'Guide to the Proposed Basin Plan: Overview' (Publication No 60/10, 2010) vol 1, 125–9 ('Guide to the Proposed Basin Plan'); Senate Standing Committee for Rural and Regional Affairs and Transport, Parliament of Australia, *The Management of the Murray-Darling Basin* (Report, March 2013) 7 [1.23]–[1.24], 10–11 [1.35], 21–2 [2.31]–[2.34] <https://www.aph.gov.au/~media/wopapub/senate/committee/rtrat_ctte/completed_inquiries/2010-13/mdb/report/report.ashx> ('*Management of the Murray-Darling Basin*').

199 *Water Act* s 255.

200 Guide to the Proposed Basin Plan (n 198) vol 1, 151.

201 *Water Amendment (Long-Term Average Sustainable Diversion Limit Adjustment) Act 2012* (Cth); *Management of the Murray-Darling Basin* (n 198) 10–11 [1.35].

‘starting point’ and that ‘future flexibility was required’.²⁰² In 2015, further amendments formally capped how much water could be bought back for the environment at 1,500 gigalitres out of the total 2,075 gigalitres, also in favour of using more expensive infrastructure methods of achieving environmental outcomes in more restricted geographic locations.²⁰³ These developments constitute baseline creep to the extent that building many site-specific efficiency infrastructure works may not achieve the same environmental outcomes as buying water from willing sellers and putting it back into rivers – a key concern of scientists and the public alike in relation to these developments.²⁰⁴ The potential result of this system is that the ecologically sustainable veneer of the SDL remains intact, but the method of delivering it threatens its substance. Baselines creep.

A notable recent development bucked this trend, at least temporarily. On 14 February 2018, the Australian Senate disallowed amendments to the Basin Plan that would have further reduced targets for water recovery in the northern MDB.²⁰⁵ A later motion to disallow a further amendment to the Basin Plan affecting the southern MDB was ultimately unsuccessful.²⁰⁶ The effect of that amendment was to remove the need for any further water recovery in the southern basin.²⁰⁷ The February disallowance suggested some degree of questioning the baseline creep that has, for some years, underlain debates over the MDB, though a later amendment to the Water Act ultimately brought about the reduction in the water recovery target that had previously been disallowed.²⁰⁸ These outcomes suggest the strength of strongly established irrigation communities in lobbying for reductions to buybacks that would have supported a strong environmental baseline.

Creeping baselines are a problem in both federal environmental law and water law. The *EPBC Act* allows for creeping baselines through its silence and lack of clarity on exactly what an appropriate baseline is, and allowing current conditions to be used, which embraces baseline creep. There is also evidence of a practice of making approval decisions in the absence of sufficient baseline information. In such circumstances there is no benchmark, and the figurative frog truly is oblivious to the temperature of the water. The *Water Act* allows for creeping baselines through serial changes to SDLs, which are, at least, more transparent than the baseline creep that is evident under the *EPBC Act*.

202 *Management of the Murray-Darling Basin* (n 198) 16 [2.16].

203 *Water Act* s 85C, as amended by *Water Amendment Act 2015* (Cth).

204 See, eg, Peter Cosier et al, Wentworth Group of Concerned Scientists, Submission to MDBA, *Sustainable Diversion Limited Adjustment Mechanism: Draft Determination Report* (3 November 2017) annex 1, 7; Murray-Darling Basin Authority, *Summary of Public Feedback Sustainable Diversion Limit Adjustment Mechanism: Draft Determination* (Summary Report, 8 December 2017) 3.

205 See Basin Plan Amendment Instrument 2017 (No 1) [F2017L01462]: ‘Disallowance Alert 2018’ *Parliament of Australia* (Web Page, 2018) <https://www.aph.gov.au/Parliamentary_Business/Committees/Senate/Regulations_and_Ordinances/Alerts/alert2018>.

206 See Basin Plan Amendment (SDL Adjustments) Instrument 2017 [F2018L00040]: *ibid*.

207 Murray-Darling Basin Authority, ‘Adjustment to Sustainable Diversion Limits in Southern Basin Recommended to Commonwealth Water Minister’ (Media Release, 8 December 2017).

208 *Water Amendment Act 2018* (Cth); *Basin Plan Amendment Instrument (No 1) 2018* (Cth). For an explanation of how the various instruments interact and how the previous disallowance led to them, see Department of Parliamentary Services (Cth), *Bills Digest* (Digest No 118 of 2017–18, 18 June 2018).

V CONCLUSION AND RESEARCH AGENDA

Contrary to the emphasis on EIA laws of much cumulative effects-related scholarship, this article has demonstrated that environmental and water laws both face the difficult issues of cumulative effects (the straws on the camel's back) and creeping baselines (the boiling frog). Both problems tend to undermine the achievement of the fundamental environmental purposes of these legislative schemes in a systemic and serious way. These issues can arise both because of weaknesses in the law that allow adverse cumulative effects by excluding consideration of cumulative effects in a variety of ways (as in cumulative effects in *Tarkine* in relation to the *EPBC Act*) and at the level of implementation (as in inadequate guidance on assessing cumulative effects under the *EPBC Act* water trigger). These dangers are arguably exacerbated by the traditional view of federal environmental responsibilities as applying only to narrowly defined environmental subject matters – an inherent challenge to a comprehensive approach to cumulative effects.

Environmentally harmful cumulative effects threaten environmental conditions in a way that flies under the radar of typical environmental and water laws. The water trigger under the *EPBC Act* and the interception activity provisions of the *Water Act* attempt to address cumulative effects. Addressing certain sources of straws deposited on the camel – prominent activities like coal mines and CSG under the limited scope of the water trigger, for example – is naturally better than not doing so. A recent high-level recommendation to expand the scope of the water trigger to include all types of unconventional gas would marginally improve this. But it would not quiet the broader equity issues that arise in relation to other industries. Omitting other 'depositors of straws' implausibly suggests that they bear no responsibility for their actions and deserve no regulatory scrutiny in relation to water impacts under the *EPBC Act*. A politically palatable solution may be to install a camel scrutineer, who could at least monitor cumulative effects and plan triggers and regulatory responses in a structured way, using similar structures to those employed under the *Water Act*'s interception activity provisions. Despite the traditional reluctance of federal legislators to deal comprehensively with environmental problems due to traditional divisions of responsibility between the federal and state legislatures, these interception activity mechanisms and a potential reinterpretation of methods of evaluating the 'context and intensity' of an action under the *EPBC Act* provide scope for more effective federal legal responses to cumulative effects.

Creeping baselines may result from unscrutinised cumulative effects. Creeping baselines are not consistent with the objects of environmental laws or water laws. Those laws should clearly state appropriate baselines or processes for arriving at them. This would ensure that the metaphorical frog bathes comfortably in water of a reasonable temperature, or is at least adequately warned of the need to jump as the temperature increases. If federal water and environmental laws allow creeping baselines in a hidden way, they risk deceiving the public about the degree of protection from which nationally significant aspects of the Australian environment actually benefit.

This article's exploration of the linked issues of cumulative effects and creeping baselines in federal law makes a preliminary foray into issues that deserve much greater scholarly consideration across environmental and natural resources laws, and more broadly. It has highlighted some promising avenues for further research, which I have briefly sketched out here.

Beyond the foundational issues canvassed here, future efforts to elaborate more detailed policy or legal requirements for assessing and considering cumulative effects should be cognisant of significant associated normative and practical challenges. Further research should consider how best to deal with these challenges in the broader framework of established environmental law principles. As an example, the polluter pays principle speaks to the appropriateness of 'grandfathering' existing activities, such that new proposals alone bear the brunt of producing information for cumulative effect assessments and corresponding management and mitigation requirements. The precautionary principle deals with data scarcity, which is often exacerbated in the context of assessing cumulative effects, relative to 'regular' EIA.²⁰⁹ Some of these challenges have been the subject of scholarly work overseas and an Australian survey undertaken by the author, and are also addressed by industry proposals in relation to assessing cumulative effects.²¹⁰ Research could also usefully consider whether principles used in analogous circumstances in the very different areas of law mentioned at the outset of this article, and in other areas of federal environment and resources laws (particularly in the marine context), might contribute to the broader environmental and natural resources fields.²¹¹ In addition to considering the substantive aspects of laws that take account of cumulative effects, researchers could profitably consider procedural aspects, for example, ways in which public participation or collaborative governance mechanisms may be adapted for use where cumulative effects involve very large numbers of small effects from currently unregulated activities, or where they render environmental problems particularly scientifically complex.

Opportunities for broader application and development of theory arise particularly at the interdisciplinary intersection of cumulative effects and associated effects on human communities, raising concepts such as environmental justice and social-ecological systems.²¹² Recent developments in relation to granting 'legal personhood' to elements of the environment (for example, a river)

209 Nelson, 'Water Data and the Legitimacy Deficit' (n 184).

210 Foley et al (n 25); Kaveney, Kerswell and Buick (n 112); Zhao Ma, Dennis R Becker and Michael A Kilgore, 'Barriers to and Opportunities for Effective Cumulative Impact Assessment within State-Level Environmental Review Frameworks in the United States' (2012) 55(7) *Journal of Environmental Planning and Management* 961. For references to other Commonwealth contexts, see above nn 24, 57, 72–7 and accompanying text.

211 See above nn 1–3 and accompanying text.

212 See, eg, Marian Weber, Naomi Krogman and Terry Antoniuk, 'Cumulative Effects Assessment: Linking Social, Ecological, and Governance Dimensions' (2012) 17(2) *Ecology and Society* 22; James L Sadd et al, 'Playing It Safe: Assessing Cumulative Impact and Social Vulnerability through an Environmental Justice Screening Method in the South Coast Air Basin, California' (2011) 8(5) *International Journal of Environmental Research and Public Health* 1441.

either directly or indirectly²¹³ also raise interesting theoretical questions in relation to cumulative effects: should legal responses to cumulative effects be modified where environmental legal 'personhood' exists, informed, say, by approaches to cumulative harms that have arisen where natural persons are concerned?

More established engagement with legal issues associated with cumulative effects in other jurisdictions points to promising opportunities across a range of natural resource and environmental contexts. The US, Canada, New Zealand and the EU may each offer useful lessons.²¹⁴ Other federal and supranational arrangements could provide comparative insights into effective ways to deal with cumulative effects in systems that wrestle with how to divide environmental regulatory responsibility between different jurisdictions. International legal regimes dealing with EIA and strategic environmental assessment also arise as targets for investigation, for example, in the context of trans-boundary effects and developments in areas beyond national jurisdiction.²¹⁵ Research could also usefully examine initiatives of the private sector to consider and manage cumulative effects, in particular, from global finance institutions²¹⁶ to local industry initiatives addressing cumulative effect issues in contexts as varied as odour produced by egg farms to pollution caused by freight trucks in cities.²¹⁷ Empirical investigations of experiences implementing these mechanisms would contribute usefully to these inquiries. It is to be hoped that further research in this area might start to answer the frequent calls of scientists, regulators and industry to develop comprehensive and practical guidance to improve legal responses to cumulative effects.

Beyond the legal academy and reform-directed inquiries, current federal laws and emerging practices offer warnings for practitioners, but also some cause for optimism. Practitioners can be alert to the requirement to assess or consider cumulative effects in the developments in which they are involved (as under the water trigger) or the potential to do so. They can be alert to the danger of uncritically using current conditions as a baseline for determining whether a development is likely to have a significant impact. They might consider whether there is another appropriate reference point, noting that some legal frameworks use

213 Erin L O'Donnell, 'At the Intersection of the Sacred and the Legal: Rights for Nature in Uttarakhand, India' (2018) 30 *Journal of Environmental Law* 135; Erin O'Donnell, *Legal Rights for Rivers: Competition, Collaboration and Water Governance* (Routledge, 2018) 37–60.

214 See, eg, above nn 16–17 and accompanying text.

215 See, eg, Robin Warner, 'Environmental Assessment in Marine Areas Beyond National Jurisdiction: Practice and Prospects' (2017) 111 *Proceedings of the ASIL Annual Meeting* 252; Barry Sadler and Jiri Dusik (eds), *European and International Experiences of Strategic Environmental Assessment: Recent Progress and Future Prospects* (Routledge, 2016); Simon Marsden, *Strategic Environmental Assessment in International & European Law: A Practitioner's Guide* (Earthscan, 2008).

216 See, eg, International Finance Corporation and ESSA Technologies, 'Cumulative Impact Assessment and Management: Guidance for the Private Sector in Emerging Markets' (Handbook, August 2013); Food and Agriculture Organisation of the United Nations, 'Environmental Impact Assessment: Guidelines for FAO Field Projects' (Guidelines, 2012) <<http://www.fao.org/docrep/016/i2802e/i2802e.pdf>>.

217 See, eg, Timna Jacks, 'Radical Truck Plan for Melbourne's Inner-West Unites Rivals', *The Age* (online at 12 September 2018) <<https://www.theage.com.au/national/victoria/radical-truck-plan-for-melbourne-s-inner-west-unites-rivals-20180912-p503a9.html>>; Kaveney, Kerswell and Buick (n 112); EJ McGahan, SG Wiedemann and N Gould, 'Egg Industry Environmental Guidelines' (Guideline No IPS7001IAA, Integrity Ag Services, May 2018) 10–11, apps A1–A6.

ecologically desirable reference points, as SDLs are intended to be under the *Water Act*. We can hope that this concerted awareness and facilitated action has the potential to slow the simmering pot for our frog, and lighten the burden on our camel.