CRC for
Water Sensitive Cities

Legal Duties for Restoration of Waterways & Wetlands

A Western Australian Analysis and Case Study

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Australian Government
Department of Industry, Innovation and Science

Business Cooperative Research Centres Programme

Legal Duties for Restoration of Waterways & Wetlands
A Western Australian Analysis and Case Study
Better Regulatory Frameworks for Water Sensitive Cities (Project A3.2)

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Publisher

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Date of publication: December 2016

An appropriate citation for this document is:

Jeanette Jensen and Alex Gardner (2016) Legal Duties for Restoration of Waterways & Wetlands: A Western Australian Analysis and Case Study, Perth, Australia: Cooperative Research Centre for Water Sensitive Cities

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Glossary of Abbreviations

ARL	Aquatic Research Laboratory
BOM	Bureau of Meteorology
CALM	Department of Conservation and Land Management (WA)
CALM Act	*Conservation and Land Management Act 1984* (WA)
CAWS Act	*Country Areas Water Supply Act 1947* (WA)
CEO	Chief Executive Officer of the Department of Environment (WA)
COP	Conference of the Contracting Parties (Ramsar Convention)
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DoW	Department of Water (WA)
DSCPPPR	Draft Strategic Conservation Plan for the Perth and Peel Regions – Perth and Peel Green Growth Plan for 3.5 million
EIA	Environmental Impact Assessment
EMP	Environmental Management Plan
EPA	Environmental Protection Authority (WA)
EP Act	*Environmental Protection Act 1986* (WA)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cth)
EPBC Regulations 2000 (Cth)	Environment Protection and Biodiversity Conservation Regulations
EPP	Environmental Protection Policy
ERMP	Environmental Review and Management Programme
EWA	Environmental Water Allocation
EWP	Environmental Water Provision (same as EWA)
EWR	Environmental Water Requirement
FoI Act	*Freedom of Information Act 1992* (WA)
GL	Giga litre
IPCC	Intergovernmental Panel on Climate Change
MWSSD Act	*Metropolitan Water Supply, Sewerage and Drainage Act 1909* (WA)
ML	Mega litre

PHCC	Peel-Harvey Catchment Council
PYS	Peel-Yalgorup System
RiWI Act	*Rights in Water and Irrigation Act 1914* (WA)
TEC	Threatened Ecological Community
WA	Western Australia
WQIP	Peel-Harvey Water Quality Improvement Plan

Executive summary

Report aims

In the context of the Western Australian Government preparing water resources law reform, this project aims to:

- Examine how to provide for restoration of environmental water flows to our wetlands and waterways in a way that meets national water policy principles and fulfils our Ramsar Convention obligations;
- Test the operation of the current legal framework in order to determine its deficiencies with regard to achieving such restoration and propose appropriate amendments to this effect; and
- Consider how the Commonwealth Government can exercise its authority to fulfil the Convention obligations.

Research questions

Our three key research questions also constitute the structural basis for our analysis:

1. Is there a legislated duty to maintain and/or restore waterways and natural wetlands by ensuring adequate water flow?
2. If so, what is the legal effect of decisions or instruments made in fulfilment of this duty; i.e. are they binding on government agencies and all other persons?
3. Is there a duty on the responsible agencies to monitor and report on the implementation of the duty to restore?

We apply these three questions to the current relevant regulatory framework applicable in Western Australia, including the Commonwealth and State legislation.

Our research

Our research uses several methodologies, including literature reviews, regulatory and legal analyses, as well as case studies.

In Chapter 2, we examine the history and condition of our overall case study, the Peel-Harvey Estuary, on the basis of a literature review. To the best of our ability, we, as non-scientists, explore the scientific status of the Peel-Harvey Estuary. Chapter 3 briefly analyses the legal status of policies, plans, and guidelines. This analysis develops an argument for a legally binding framework for restoration. Chapter 4 is the central chapter of this report in which we address and answer the three research questions. To answer the first question, we apply a regulatory analysis to the current framework relevant to restoration of waterways and wetlands. The second question is examined on the basis of a legal analysis of the relevant instruments identified by research question 1 as well as the implementation and operation of these instruments in the context of our case studies. Research question 3 is again answered by a regulatory analysis of the framework in question and its outcome on our case studies. We were not able to discuss in detail how the drying south-western Australian climate may affect this regulatory analysis. In Chapter 5, we summarise and discuss the key points drawn from the above. On the basis of these findings, we present our proposals for amendments to better achieve restoration of waterways and wetlands in Chapter 6.

Conclusions

In contrast to the position at international law, we conclude that there is no legislated duty to maintain and/or restore Western Australian waterways and wetlands under national or Western Australian law and that there is a need for a stronger framework to achieve such maintenance and restoration. Statutory public duties may be an effective regulatory tool for these purposes.

1. Introduction

In Australia, waterways and wetlands are mostly public resources, their beds and banks and flow of water vested in the Crown in the rights of the States. Private rights in respect of water resources are regulated by public authorities under broad legislative powers. Yet many of these waterways and wetlands require significant ecological restoration. In this report, 'restoration' refers to the level or environmental baseline of water flow prior to human alterations in terms of dams and weirs for consumptive use. This baseline is subject to climatic changes causing a drier climate. We acknowledge the extensive discussion on the meaning of restoration – that is whether the environmental baseline should be pre-European settlement or a more flexible, contemporary baseline – such discussion is, however, outside the scope of this report. We argue that there will be better prospects of achieving ecological restoration aspirations if there are binding public legal duties on relevant public authorities to undertake and demonstrate the restoration.

Public legal duties create political expectations that can influence executive government action. If those legal duties are effectively expressed, then they will create the legal effect of justiciable obligations that can be enforced by proceedings for judicial review in a court of law. Judicial review typically offers one or more remedies as the outcome of finding that a public body or government officer has not acted according to law: (i) an order that quashes a decision that has been made;[1] (ii) an order that prohibits a decision being made or acted on; or (iii) an order that mandates government action. Our argument here is addressing the third and most delicate of these remedies – orders that mandate executive government action. Such orders may take either of two forms:

(a) An order that a decision about some application or function be made without the court saying what the outcome of that decision should be; and

(b) An order that directs not only that a decision be made or function be performed but says also what should be the outcome of the decision or function.

An order in the second form is more contentious judicial action because courts are wary of directing public authorities about how they should perform their function lest they enter the political fray. A court will only give such an order if the legislation is very clear that a function should not only be performed, but that it should be performed in a particular manner to result in a specified outcome.[2] To use a simple example, an applicant for a driver's licence generally has a right to the issue of the licence if the standard criteria are satisfied and the applicant suffers no disqualifying attributes. Consequently, we form our legal analysis with attention to the following three questions for ascertaining an enforceable scheme of duties for restoration action.

1. Is there a legislated duty to maintain and/or restore waterways and wetlands by ensuring adequate water flow?
2. If so, what is the legal effect of decisions or instruments made in fulfilment of this duty; i.e. are they binding on government agencies and all other persons?
3. Is there a duty on the responsible agencies to monitor and report on the implementation of the duty to restore?

The water resources context for this legal analysis focuses on the quantity of water flows and the water-dependent ecosystem values, especially as the habitat of waterfowl. The need to preserve wetlands as waterfowl habitats was formally recognised internationally with the adoption of the *Convention on Wetlands of International Importance especially as Waterfowl*

* The authors would like to thank the Department of Water, Government of Western Australia, the Water Corporation, Harvey Water, Peel-Harvey Catchment Council, and Keith Bradby for invaluable information, comments, and feedback. Any errors in the report remain the responsibility of the authors.

[1] See e.g., *Coastal Waters Alliance of Western Australia (Inc) v Environmental Protection Authority* [1996] LGERA 136 and *Save Beeliar Wetlands (Inc) v Minister for Environment* [2015] WASC 482, discussed below in Section 3.

[2] See e.g., *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, discussed below in Section 3.2.

Habitat (Ramsar Convention), which entered into force in 1975.[3] Since then, dams, diversions and river management for human consumptive use have further reduced such flows significantly.[4] In southern Australia and south-western Australia, the effects of those reduced water flows are being exacerbated by climate change induced reductions in rainfall and streamflow.[5] The global replication of these patterns led to the Ramsar Strategic Plan 2009-2015 identifying 'the inadequate availability of water to wetlands' as the first of a number of issues causing continued deterioration and loss of wetlands.[6] On the other hand, we see that wetlands may play a vital role in climate change mitigation by their capacity to sequester and store carbon.[7]

The restoration of water flows for environmental purposes has been founded on the concept of 'environmental water allocations' (EWAs) or 'environmental water provisions' (EWPs).[8] EWPs are 'the water regimes that are *provided* as a result of the water allocation decision-making process taking into account ecological, social and economic impacts',[9] as separate from environmental water requirements (EWRs), which are 'descriptions of the water regimes *needed* to sustain the ecological values of aquatic ecosystems at a low level of risk (emphasis added)'.[10]

Their purpose is to secure '*adequate* natural flows of water (…) to sustain streams, rivers, aquifers and estuaries and their dependent ecosystems'.[11] National water policy has recognised from 1996 that the goal of EWPs is to both 'sustain and where necessary *restore* ecological processes and biodiversity of water dependent ecosystems (emphasis added)'.[12] It also declares that EWPs should be given statutory recognition, have the same degree of security as water access entitlements for consumptive use and be fully accounted for.[13]

The current law of WA does not comply with national water policy and there is a history of breaching such EWPs as are provided in order to supply water for human consumptive use.[14] As the WA Government is preparing water resources law reform,[15] it is timely to contemplate how to provide for restoration of environmental water flows to our waterways and wetlands in

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[3] Opened for signature 2 February 1971, 996 UNTS 245 (entered into force 21 December 1975) ('*Ramsar Convention*'); Australian Treaty Series No. 48.

[4] Richard T. Kingsford, 'Ecological Impacts of Dams, Water Diversions and River Management on Floodplain Wetlands in Australia' (2000) 25 *Austral Ecology* 109, 109; M. Kennish, 'Environmental threats and environmental future of estuaries' (2002) 29 *Environmental Conservation* 78, 85-86.

[5] Michael Bennett and Alex Gardner, 'How do environmental conservation laws interact with environmental aspects of water laws?' (2014) 31 *Environmental and Planning Law Journal* 3, 7; J. Pittock, M. Finlayson, A. Gardner and C. McKay, 'Changing Character: The Ramsar Convention on Wetlands and Climate Change in the Murray-Darling Basin, Australia' (2010) 27 *Environmental and Planning Law Journal* 401, and references cited; Climate Commission, *The Critical Decade: Western Australia climate change impacts* (August 2011) 2-4; 'Climate change impacts in Western Australia' on Department of the Environment and Energy, Australian Government, *Topics*, *Climate change*, *Climate science*, *Climate change impacts* <https://www.environment.gov.au/climate-change/climate-science/impacts/wa>. As for WA, see further the case study below in section 2.

[6] *The Ramsar Strategic Plan 2009-2015,* as adopted by Resolution X.1 (2008) and adjusted for the 2013-2015 triennum by Resolution XI.3 (2012) para 20.

[7] See e.g., *Peatlands, climate change and wise use: Implications for the Ramsar Convention*, Ramsar Resolution XII.11, 12th meeting of the COP (1-9 June 2015); D. Russi, P. ten Brink, A. Farmer, T. Badura, D. Coates, J. Förster, R. Kumar, and N. Davidson, *The Economics of Ecosystems and Biodiversity for Water and Wetlands* (IEEP, London and Brussels; Ramsar Secretariat, 2013); S. Crooks, D. Herr, J. Tamelander, D. Laffoley, and J. Vandever, *Mitigating Climate Change through Restoration and Management of Coastal Wetlands and Near-shore Marine Ecosystems: Challenges and Opportunities* (Environment Department Paper 121, World Bank, 2011).

[8] Alex Gardner, 'Environmental Water Allocations in Australia' (2006) 23 *Environmental and Planning Law Journal* 208, 208, 210-11.

[9] Water and Rivers Commission, 'Environmental Water Provisions Policy for Western Australia' (Statewide Policy No. 5, 2000) 2 ('*Environmental Water Provisions Policy for Western Australia*').

[10] Agriculture and Resource Management Council of Australia and New Zealand and the Australian and New Zealand Environment and Conservation Council, 'National Principles for the Provision of Water For Ecosystems' (Occasional Paper SWR No. 3, July 1996) 4 <http://www.scew.gov.au/system/files/resources/378b7018-8f2a-8174-3928-2056b44bf9b0/files/anzecc-ppr-national-principles-provision-water-ecosystems-199607.pdf> ('*National Principles for the Provision of Water For Ecosystems*').

[11] Ibid.

[12] Gardner (2006), above n 8, 208, quoting the *National Principles for the Provision of Water For Ecosystems*, above n 10, iii.

[13] Gardner (2006), above n 8, and see especially, Council of Australian Governments, 'Intergovernmental Agreement on a National Water Initiative' (2004) [35] ('*Intergovernmental Agreement on a National Water Initiative*').

[14] Gardner (2006), above n 8, 225-9, 231-3. See also, Bennett & Gardner, above n 5, 7-9.

[15] Department of Water, Government of Western Australia, *Water reform* <http://water.wa.gov.au/legislation/water>.

a way that meets national water policy and fulfils our Ramsar Convention obligations. It is also opportune to consider how the Commonwealth Government can exercise its authority to fulfil the Convention obligations. We do this by applying the three legal duty questions to an overview of the current regulatory framework applicable in WA - including the Commonwealth and State legislation - to test the operation of the current legislation and suggest solutions to the legal deficiencies. The relevant international obligations have been analysed and assessed in a separate article for which reason they will only be summarised briefly in this article.[16]

We apply the analysis to a case study of restoration of the Ramsar-listed Peel-Harvey Estuary and related waterways, in particular the North Dandalup River, which are located in south-west WA.[17] Eight of the 12 national biodiversity hotspots are located in WA, and the south-west of WA is one of the world's 35 biodiversity hotspots.[18] As the fastest growing region in WA,[19] the Peel Region faces the distinct challenges of increasing water scarcity induced by the drying climate and an increasing demand for water supply. The projected average annual population growth of 1.7% suggests that the Perth and Peel Regions together will reach 3.5 million people by around 2050.[20] The urban water use in these two regions is estimated to increase from 430 GL to 690 GL by 2050 (medium growth forecast).[21] Currently, 58% (230 GL) in Perth and 54% (13 GL) in the Peel Region of urban water use is scheme water, which usually includes both groundwater and surface water.[22]

However, according to the Department of Water (DoW), surface water is no longer a part of urban water supply in the Peel Region.[23] But the dams and weirs in the area still supply much of their water to Perth urban areas. Due to the drying climate the supply is decreasing. Surface water now constitutes less than 10% of the water supply in the Perth Region.[24] In 2016, from January to September, it has contributed merely 7% to WA's supply,[25] whereas surface water stored in dams constituted at least 40% of urban water supply in the 1990s.[26] This reflects the lower inflows rather than a reduction in diversions as such. By September 2016, we had had 29.6 GL of streamflow into our dams this year (after 11 GL in 2015),[27] whereas the average inflow to Perth dams in the period 1975-2000 was 177 GL.[28] While the DoW is reducing its reliance on surface water from dams for urban water supply,[29] surface water still plays 'a very important role in water supply across the state'.[30] The DoW plans to continue to utilise the dams 'to make the most of the region's future rainfall and for temporary storage of water from other sources'.[31] The drying climate presents enormous ethical and legal challenges to urban water supply attitudes, including whether taking that water in the south west should be selectively discontinued over time in favour of environmental values.

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[16] Jeanette Jensen and Alex Gardner, 'Is there an international legal duty to restore wetlands by environmental water allocations?' (Submitted for publication review, 2016).
[17] Peel-Harvey Catchment Council (PHCC) et al., 'Peel-Yalgorup System Ramsar Site Management Plan' (Government of Western Australia, 2009) 4 ('*Peel-Yalgorup System Ramsar Site Management Plan*'). The listing is made under the *Ramsar Convention*.
[18] Environmental Protection Authority (EPA),'State of the Environment Report: Western Australia 2007' (Theme 5 – Biodiversity, Department of Environment and Conservation, Government of Western Australia, 2007) 121 <http://www.epa.wa.gov.au/AbouttheEPA/SOE/2007/Pages/default.aspx>.
[19] 'Fastest Growing Region in Western Australia' on Peel Development Commission, Government of Western Australia <http://www.peel.wa.gov.au>.
[20] Department of Water, 'Water for Growth: Urban – Western Australia's water supply and demand outlook to 2050' (Government of Western Australia, June 2016) 9, 25 ('*Western Australia's water supply and demand outlook to 2050*').
[21] Ibid 25.
[22] Ibid 9 (Table 1).
[23] Ibid 22 (Figure 9).
[24] Ibid.
[25] 'Sources' on Water Corporation, *Residential*, *Water supply & services* <https://www.watercorporation.com.au/water-supply-and-services/rainfall-and-dams/sources>.
[26] *Western Australia's water supply and demand outlook to 2050*, above n 20, 6, 11.
[27] Ibid.
[28] Climate Commission, above n 5, 5; Climate Commission, *The Critical Decade: Western Australia climate change impacts* (August 2011) 2-4; 'Climate change impacts in Western Australia' on Department of the Environment and Energy, Australian Government, *Topics*, *Climate change*, *Climate science*, *Climate change impacts* <https://www.environment.gov.au/climate-change/climate-science/impacts/wa>.
[29] *Western Australia's water supply and demand outlook to 2050*, above n 20, 6, 23.
[30] 'Surface Water' on Department of Water, Government of Western Australia, *Water topics, Surface water* <http://www.water.wa.gov.au/water-topics/surface-water>.
[31] *Western Australia's water supply and demand outlook to 2050*, above n 20, 6, 23.

Although we acknowledge the link between water quantity and quality management,[32] and the particular problems of water quality in the Peel-Harvey system,[33] this report can consider only the challenges for water quantity restoration. Nevertheless, it is important to note that those two elements along with timing constitute the three key characteristics of environmental water provisions.[34]

2. Case study: The Peel-Harvey Estuary

We have chosen the Peel-Harvey Estuary (the Estuary) as our case study, as it is a biodiversity hotspot and it forms part of the Peel-Yalgorup System (PYS). The PYS was included on the list of Wetlands of International Importance under the Ramsar Convention[35] in 1990,[36] and is listed for:

- Its ecological value in south-west WA as the 'largest and most diverse estuarine complex and also particularly good examples of coastal saline lakes and freshwater marshes';
- Being 'one of only two locations in south-western Australia and one of very few in the world where living thrombolites (a type of microbialite, superficially similar in appearance to stromatolites) occur in hyposaline water';
- Performing the critical life stage functions of migration, drought refuge, breeding, and moulting for a range of waterbirds, including pelicans and cormorants;
- Comprising 'the most important area for waterbirds in south-western Australia, supporting in excess of 20,000 waterbirds annually, with greater than 150,000 individuals recorded at one time (February 1977)';
- Regularly supporting 1% of the population of 14 shorebirds (the criterion for listing is six); and
- Providing important 'nursery and/or breeding and/or feeding ground for at least 50 species of fish.[37]

Furthermore, there have been three listings under the *Environment Protection and Biodiversity Conservation Act 1999* (Cth) (*EPBC Act*) that qualify the PYS as meeting a further seventh criteria (Criteria No. 2).[38] The Thrombolite (microbialite) Community of Coastal Brackish Lake (Lake Clifton) was listed as a critically endangered Threatened Ecological Community (TEC) in 2009; the Fairy Tern (Sternula nereis nereis) was listed as a vulnerable threatened species in 2011; and the Subtropical and Temperate Coastal Saltmarsh was listed as a vulnerable TEC in 2013.[39]

The Estuary is also included in the Directory of important wetlands in Australia,[40] which means that it is identified as being a high conservation value aquatic ecosystem.[41] The PYS wetlands are representative of the Swan Coastal Plain wetlands, 80% of which have been lost to clearing

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[32] Alex Gardner, 'Water Reform and the Federal System' in P Kildea et al. (eds), *Tomorrow's Federation: Reforming the Australian Government* (The Federation Press, 2012) 269.
[33] P. Kelsey et al., 'Hydrological and nutrient modelling of the Peel-Harvey catchment' (Report no. WST 33, Department of Water, Government of Western Australia, February 2011).
[34] Email from Keith Bradby to Jeanette Jensen, 9 October 2016.
[35] *Ramsar Convention*.
[36] *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17, 4.
[37] J. Hale and R. Butcher, 'Ecological character description for the Peel-Yalgorup Ramsar site' (Report to the Department of Environment and Conservation and the PHCC, 2007) 35-8; *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17, 17 (Table 4).
[38] Criteria No. 2 states: 'A wetland should be considered internationally important if it supports vulnerable, endangered, or critically endangered species or Threatened Ecological Communities'. The Ramsar Information Sheet has yet to be updated to reflect this change, see ibid 162.
[39] Department of the Premier and Cabinet, 'Perth and Peel Green Growth Plan for 3.5 million – Strategic Assessment of the Perth and Peel Regions – Draft EPBC Act Strategic Impact Assessment Report – Appendix D: Ramsar Condition Statements' (Government of Western Australia, December 2015) 161-62 <http://www.planning.wa.gov.au/publications/8220.asp>.
[40] 'Directory of Important Wetlands in Australia – Information sheet' on Department of the Environment, Australian Government, *Water*, *Wetlands*, *Australian Wetlands Database* (Last updated 2005) <http://www.environment.gov.au/cgi-bin/wetlands/report.pl>.
[41] Centre of Excellence in Natural Resource Management, 'Framework for prioritizing waterways for management in Western Australia' (Report No. CENRM120, University of Western Australia, May 2011) 2.

and infilling for agricultural and urban development purposes.[42] Another important feature of wetlands is their function as greenhouse gas or carbon sinks,[43] and coastal wetlands have the greatest potential as sinks.[44] Indeed, wetlands play an important role in Australia's national response strategy to climate change.[45] Apart from being significant per se, the environmental qualities of wetlands are, therefore, also significant to the wellbeing of humans. Another example is their ability to improve water quality by working as biological filters of nutrients.[46] This capacity is, however, not infinite, which emphasises the need for unpolluted freshwater inflows. [47] Finally, wetlands, and particular internationally significant wetlands, are also important economic assets for tourism.[48] Specifically, commercial fisheries in the Peel-Harvey Estuary were worth $13.7 million to the local economy in 2005-06,[49] and tourism in the Peel region has been estimated to contribute approximately $150 million annually to the region.[50] The Peel-Harvey Water Quality Improvement Plan (WQIP) (2008) recognises that '[r]estoring and preserving the natural functions of wetlands, rivers and other waterways is a high priority for all future development'.[51]

The Estuary is located approximately 80 km south of Perth and consists of the circular Peel Inlet (approximately 10 km in diameter) and the long narrow Harvey Estuary (approximately 20 km x 2-3 km), which are connected by a narrow deep channel.[52] An estuary may be defined as 'a wide lower course of a river where the freshwater flow meets and is influenced by ocean tides, or it can be visualized as an arm of the sea extending inland to meet the mouth of a river'.[53] Prior to construction of the Dawesville Channel in 1994, the daily mean tidal range in the Peel Inlet and Harvey Estuary averaged 17% and 15%, respectively, of the ocean tides.[54] This would have classified it as an upper or fluvial estuary, as it was 'characterised by fresh water but subject to daily tidal action'.[55] The conditions of the Estuary were extreme, as 70% of river flow came in the months June-September, which combined with the limited tidal exchange meant that the water was almost fresh in winter and 'saltier than the sea in summer'.[56] With the construction of the Dawesville Channel to the sea (1994), the Estuary became subject to the full force of tides,[57] and is now instead considered a marine embayment,[58] or a marine estuary being in free connection with the ocean.[59] In comparison, the tidal ranges in the Peel Inlet and the Harvey Estuary increased to 48% and 55%, respectively, following the opening of the

[42] *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17, 4 (citations omitted).
[43] Department of Sustainability, Environment, Water, Population and Communities and the Wetlands and Waterbirds Taskforce, 'The Role of Wetlands in the Carbon Cycle' (Issues Paper, Australian Government, 2012) 2-7.
[44] Ibid 7.
[45] Ibid.
[46] Water and Rivers Commission, 'Living Wetlands: An Introduction to Wetlands' (Water facts 16, Government of Western Australia, 2001) 3. The Australian Bureau of Statistics has estimated that 'terrestrial biodiversity contributes up to $325 billion to the Australian economy in ecosystem services annually', see Phillipa McCormack and Jan McDonald, 'Adaptation strategies for biodiversity conservation: Has Australian law got what it takes?' (2014) 31 *Environmental and Planning Law Journal* 114, 114, citing the Australian Bureau of Statistics (ABS), *Year Book Australia 2009-10* <http://www.abs.gov.au/AUSSTATS/abs@.nsf/Previousproducts/1301.0Feature%20Article12009%E2%80%9310?opendocument&tabname=Summary&prodno=1301.0&issue=2009%9610&num=&view=>..
[47] Environmental Protection Authority (EPA), 'Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System - Phosphorus Management' (Government of Western Australia, November 2008) 38 ('*Peel-Harvey Water Quality Improvement Plan*').
[48] See, eg, similarly, Deloitte Access Economics, *Economic contribution of the Great Barrier Reef* (Great Barrier Reef Marine Park Authority, 2013); Kathryn Gillies and Tim Quinn, *Tourism Investment Monitor 2014* (Tourism Research Australia, Australian Government, Austrade, 2014).
[49] *Draft EPBC Act Strategic Impact Assessment Report – Part D*, above n 39, 19-61. See also, *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17, 21-22.
[50] Ibid.
[51] *Peel-Harvey Water Quality Improvement Plan*, above n 47, 38.
[52] Hale & Butcher, above n 37, 43.
[53] Angela H. Arthington, *Environmental Flows – Saving Rivers in the Third Millennium* (University of California Press, 2012) 192 (citations omitted).
[54] D.A. Lord & Associates, 'Dawesville Channel Monitoring Programme – Technical Review' (Water and Rivers Commission Report WRT 28, 1998) 9.
[55] Arthington, above n 53, 192.
[56] Keith Bradby, *Peel-Harvey – The Decline and Rescue of an Ecosystem* (Greening the Catchment Taskforce, 1997) 10.
[57] Ibid 195.
[58] *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17, 11 (Table 2).
[59] Arthington, above n 53, 192. See also, 'Directory of Important Wetlands in Australia – Information sheet' on Department of the Environment, Australian Government, *Water*, *Wetlands*, *Australian Wetlands Database* (Last updated 2005) <http://www.environment.gov.au/cgi-bin/wetlands/report.pl>.

Channel.[60] What this means for the ecological character of the Estuary is discussed further below in Section 3.2.

Despite being a marine embayment, the Estuary is a surface water-dependent wetland,[61] as the oceanic exchange on an annual basis is a net outflow.[62] The Estuary is mainly recharged through direct rainfall (15%) and surface water runoff generated by rainfall elsewhere in the catchment (85%).[63] Groundwater contributes less than 0.5% of total flows to the Estuary, but the Peel-Harvey waterways have large contributions from groundwater,[64] except for the North Dandalup River.[65] While the majority of this River on the Coastal Plain (downstream of the North Dandalup Dam)[66] does receive groundwater discharges,[67] they are not large. Thus, surface water and superficial or shallow groundwater are, generally, closely connected in this area.[68] This means that groundwater extraction is likely to have an indirect impact on the Estuary as well.[69]

The three major rivers that recharge the Estuary are the Murray, Serpentine, and Harvey, all with their source in the Darling Range ('the hills'), which are supplemented by seven main drain systems.[70] The Murray River is the biggest and most significant inflowing river, which discharges into the Peel Inlet. It has been estimated to contribute twice the flow of Serpentine.[71] The Dandalup River, which begins at the confluence of the North and South Dandalup Rivers, feeds the Murray shortly before it reaches the Inlet.[72] The Harvey River discharges into the Harvey Estuary and has been estimated to contribute approximately one third of total river inflows.[73] It should be noted that none of these rivers were continuous prior to European settlement, but were more or less constructed as drainage systems for the coastal plain wetlands to allow settlement.[74] Initially, the net impact of the extensive clearing, drainage work and dam construction on the Swan Coastal Plain saw increased inflows to the Estuary.[75] The Harvey, Serpentine, and the North and South Dandalup Rivers all contain major dams.[76] In fact, there are 15 dams in the Peel-Harvey catchment.[77] However, since 1988, the drying climate has decreased the land use flows so that the dam diversions have become relatively larger.[78]

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[60] Lord & Associates, above n 54, 9.
[61] Hale & Butcher, above n 37, 46.
[62] Ibid 45 (citation omitted).
[63] Water and Rivers Commission, above n 46, 6; Hale & Butcher, above n 37, 45-46.
[64] Ibid 46; Kelsey et al., above n 33, 122.
[65] J. Hall, P. Kretschmer, B. Quinton, and B. Marillier, 'Murray hydrological studies: Surface water, groundwater & environmental water – Conceptual model report' (Water Science Technical Series report no. 16, Department of Water, Government of Western Australia, 2010) 32.
[66] Aquatic Research Laboratory (ARL), 'Stream Fauna Studies – North Dandalup, Canning Reservoir, Lower Canning River, and Stinton Creek Catchments' (Appendices to Reports ARL 009, 010, 011 and 012, Department of Zoology, The University of Western Australia, 1988) 51 (Figure 1).
[67] EPA, 'Next Major Water Supply Source for Perth (post 1992) – Water Authority of Western Australia – Report and Recommendations of the Environmental Protection Authority' (Bulletin 343, August 1988) app 4, 9 ('*Next Major Water Supply Source for Perth (post 1992)*').
[68] Hall et al., above n 65, 14-5, 30-2. See also 'Bibra lake rehabilitation and climate change' on Department of Environment, Australian Government, *Water in our environment*, *Wetlands*, *Wetlands publications and resources*, *Wetlands Australia National Wetlands Update September 2012* (21 September 2012) <http://www.environment.gov.au/water/wetlands/publications/wetlands-australia/national-wetlands-update-september-2012-22>.
[69] See, e.g., 'Directory of Important Wetlands in Australia – Information sheet' on Department of the Environment, Australian Government, *Water*, *Wetlands*, *Australian Wetlands Database* (Last updated 2005) <http://www.environment.gov.au/cgi-bin/wetlands/report.pl>; Hall et al., above n 65, 48, 59.
[70] *Peel-Harvey Water Quality Improvement Plan*, above n 47, 1; Bradby, above n 56, 9; 'Directory of Important Wetlands in Australia – Information sheet' on Department of the Environment, Australian Government, *Water*, *Wetlands*, *Australian Wetlands Database* (Last updated 2005) <http://www.environment.gov.au/cgi-bin/wetlands/report.pl>.
[71] Hale & Butcher, above n 37, 46.
[72] Ibid; Bradby, above n 56, 9.
[73] Hale & Butcher, above n 37, 46.
[74] See, eg, Bradby, above n 56.
[75] See, eg, Bradby, above n 56.
[76] Hale & Butcher, above n 37, 46.
[77] Kelsey et al, above n 33, 19.
[78] Kelsey et al., above n 33, 20; *Peel-Harvey Water Quality Improvement Plan*, above n 47, 28, 32.

Modification of water flows through dams and weirs is a general threat to estuaries and wetlands.[79] Declining water resources and the increasing demand for water extraction have been recognised as the main factors that 'generate continuous change and lead to the deterioration and disappearance of wetlands and their services'.[80] Large water-supply dams, farm dams, flow diversion, water extraction from rivers and groundwater pumping alter the amount, quality and timing of freshwater inflows to estuaries and wetlands.[81] Such modifications are bound to 'have profound effects on estuarine conditions', including potentially causing saline water to intrude farther upstream, and/or 'alter the accessibility and availability of important nursery habitats…thereby influencing recruitment and subsequent abundance of estuarine species'.[82] Hence, freshwater flows are crucial to the ecosystems and, therefore, biodiversity. Indeed, the Ramsar Convention framework has recognised the devastating impact of large dams on wetlands.[83] To understand these mechanisms, how they interact, and their relevance for individual wetlands is essential to the development of environmental flow regimes.[84] Hence, there is no doubt that the dams in the Peel-Harvey catchment have had and have a profound impact on the Estuary, which the drying climate would only exacerbate. Despite the fact that the Peel-Harvey Estuary is the most studied estuary in south-western Australia,[85] it has been a challenge to uncover the exact extent of these impacts due to a seeming lack of baseline and monitoring data for the whole of the Peel-Harvey Estuary regarding flow, or environmental water requirements in particular. In 1998, the EWRs of the Harvey Estuary were set to 'maintenance of existing salinity and water levels'.[86] For the whole of the Peel-Harvey Estuary, the authors have merely been able to obtain indicative information and data, as seen below.

During the period 1900-90, the average monthly inflows to the Peel Inlet and the Harvey Estuary from direct rainfall were 65,000 ML and 50,000 ML, respectively.[87] The three major inflowing rivers contribute the bulk of overall inflows:

- **Murray River:** During the period 1977-88, which forms the basis of the ecological character description of the PYS, the mean annual streamflow of the undammed Murray River to the Peel Inlet was 264,000 ML.[88] According to CSIRO, during the period 1993-2002, the average annual streamflow of the Murray had dropped to 245,000 ML,[89] and in 2011, the average annual flow of the Lower Murray, Mid Murray and Dandalup Catchment for the period 1997-2007 was modelled to no more than 74,300 ML.[90] Curiously though, the number, 264,000 ML, was considered to reflect current conditions in 2007.[91] In 2015, the Murray River experienced the lowest stream flow on record, being less than 10% of the flow twenty years earlier.[92] Hence, the current contribution of the River to the Estuary is unlikely to be much more than 24,500 ML, which is one tenth of what it is estimated to have been around 1995.
- **Harvey River:** From 1977-88, the mean annual streamflow of the Harvey River, including

[79] Arthington, above n 53, 193.
[80] *Call to action to ensure and protect the water requirements of wetlands for the present and the future*, Ramsar Resolution XII.12, 12th Meeting of the Conference of the Parties (COP) (1-9 June 2015) para 5.
[81] Arthington, above n 53, 195.
[82] Ibid 196 (citations omitted).
[83] *The Report of the World Commission on Dams (WCD) and its relevance to the Ramsar Convention*, Ramsar Resolution VIII.2, 8th Meeting of the COP (18-26 November 2002) para 5.
[84] Arthington, above n 53, 197 (citations omitted).
[85] Email from Keith Bradby to Jeanette Jensen, 9 October 2016.
[86] Water and Rivers Commission, 'Proposed Harvey Basin Surface Water Allocation Plan' (WRAP Report No. 14, Government of Western Australia, 1998) 40 (Table 9), 41 ('*Harvey Basin Surface Water Allocation Plan*'). This Plan was formally approved, see, Alex Gardner and Vivian Chung, 'The Law and Policy of Environmental Water Allocations in Western Australia' (Draft of Paper for presentation to the EDO Water Law Conference, 8 July 2005) 13 (footnote 71).
[87] Hale & Butcher, above n 37, 46.
[88] Ibid.
[89] Commonwealth Scientific and Industrial Research Organisation (CSIRO), 'Surface water yields in south-west Western Australia' (Report to the Australian Government, 2009) 45.
[90] Kelsey et al., above n 33, 61.
[91] Hale & Butcher, above n 37, 90.
[92] 'South West Rainfall and Streamflow Summary – October 2015' on Department of Water, Government of Western Australia, *Water topics, Surface water, Climate and Streamflow* <http://www.water.wa.gov.au/water-topics/surface-water/climate-and-streamflow/south-west-rainfall-and-streamflow-summary-october-2015>. See also Kelsey et al., above n 33, 152-3.

drains, was 225,000 ML with a minimum of 86,000 ML and a maximum of 370,000 ML.[93] In 1993-2002, this average had dropped to 135,000 ML.[94] During the period 2000-13, the mean annual flow of the Harvey River was 93,000 ML with a minimum of 38,000 ML and a maximum of 208,000 ML.[95] Hence, the mean flow during the past decade is less than half of what it was two decades ago and the former minimum is close to the recent average.

- **Serpentine River:** At the time of Ramsar listing, the Serpentine River was estimated to contribute on average 129,000 ML per year to the Estuary with a minimum of 50,000 ML and a max of 190,000 ML.[96] While the mean annual flow was merely 403.3 ML for the years 2005-07,[97] the mean annual flow of the Lower Serpentine was modelled to be 6,200 ML in 2011.[98]

It is not possible to calculate total inflows to the Estuary from current monitoring data without modelling.[99] Indeed, a lack of flow data has been recognised for parts of the Peel-Harvey Catchment.[100] It is, however, clear that the streamflow of the three major inflowing rivers to the Estuary have all declined dramatically, which is bound to have had and have an adverse effect on the Estuary. Notably, there has been little public (government or community) attention to this dramatic decline in streamflow.

In contrast to water quantity issues, the Peel-Harvey Estuary has a long history of public attention to water quality issues. These issues are well documented and have been targeted since the 1970s.[101] Indeed, the Dawesville Channel was constructed to tackle water quality problems.[102] The idea was to flush out the Estuary to alleviate the nutrient pollution problem.[103] Still in 2014, it was 'formally recognized as the most at-risk estuary (excluding freshwater environments)' in WA.[104] Notably, one of the issues raised in the public submissions on construction of the North Dandalup Dam was that the dam would 'exacerbate already existing problems created as a result of other dam construction in the hills' and that it would 'contribute to nutrient enrichment problems in the Peel-Harvey systems and reduce fresh water flushing in the river system'.[105] The Aquatic Research Laboratory (ARL) undertook the environmental impact assessment (EIA) of the North Dandalup Dam proposal on behalf of the Water Authority.[106] This study (the ARL study), indeed, suggested that the likely flow alteration of dam construction would have an adverse impact on the productivity of the river, which provided in-situ processing of nutrients, in particular nitrogen, and, therefore, would have implications for the nutrient input to the Peel-Harvey Estuary.[107] Also for this reason, the ARL recommended the dam's release regime to mimic the natural flow variability,[108] which confirms the well-recognised link between water quality, quantity and timing.[109] Indeed, the environmental

[93] Hale & Butcher, above n 37, 46.
[94] CSIRO, above n 89, 45.
[95] Department of Water, 'Peel-Harvey catchment Nutrient report 2010 – Harvey River – 2014 update' (Government of Western Australia, 2015) <http://www.peel-harvey.org.au/wp-content/uploads/Harvey_River2014_update.pdf>.
[96] Hale & Butcher, above n 37, 46.
[97] Department of Water, 'Peel-Harvey catchment Nutrient report 2010 – Lower Serpentine River – 2014 update' (Government of Western Australia, 2015) <http://www.peel-harvey.org.au/wp-content/uploads/LowerSerpentine-GullRoad_2014_update.pdf>.
[98] Kelsey et al., above n 33, 61.
[99] Telephone correspondence with Katherine Bennett, Department of Water, Government of Western Australia (16 February 2016).
[100] Hall et al., above n 65, 15, 78 (Figure 1-1).
[101] See, e.g., Bradby, above n 56, 89; Kelsey et al., above n 33, 19.
[102] See, e.g., Bradby, above n 56, 128-41, 183-9.
[103] Ibid 128.
[104] Sarah Metcalf, Jeffrey Dambacher, Peter Rogers, Neil Loneragan, and Daniel Gaughan, 'Identifying key dynamics and ideal governance structures for successful ecological management' (2014) 37 *Environmental Science and Policy* 34, 35, citing, W Fletcher et al, Department of Fisheries, 'State of the Fisheries and Aquatic Resources Report 2010/11' (Government of Western Australia, 2011).
[105] *Next Major Water Supply Source for Perth (post 1992)*, above n 67, app 3, 1.
[106] ARL, 'Stream Fauna Studies' (Report 15, The University of Western Australia, June 1989) 19.
[107] Water Resources Directorate, 'North Dandalup Dam Environmental Management Plan' (Report No WP 112, Water Authority of Western Australia, August 1991) 35 ('*North Dandalup Dam Environmental Management Plan*').
[108] ARL, 'North Dandalup – Stream Fauna Study: Results and Recommendations 1985-1987' (Report 9, Department of Zoology, The University of Western Australia, 1988) 12, 58 (Table 6) ('*North Dandalup Stream Fauna Study*').
[109] See, e.g., *Peel-Harvey Water Quality Improvement Plan*, above n 47, 27.

condition of inland waters is primarily based on the streamflow regime.[110]

In 2002, the Murray and Harvey rivers were found to be disturbed by river training and dams reducing flow.[111] In this year, the Agency Statement of Important Natural Resources Management Assets in Western Australia recognised the significant value of the Peel-Harvey Estuary and found it subject to a high level of threat.[112] The threats identified include rapidly increasing urban population and salinisation of coastal freshwater wetlands.[113] In 2005, WA together with New South Wales and South Australia received the lowest scores of a nationwide stream habitat assessment.[114] This largely reflected the condition of the South-west Coast drainage divisions.[115] In 2009, the streamflow trends in the region were generally found to be decreasing and in some areas significantly so.[116] Twenty-two of 29 gauging stations showed a decrease in total streamflow and five of these showed 'statistically significant' changes (likely to be an actually occurring and distinguishable trend as opposed to random variability in the data).[117] In 2010, it was estimated that mean annual streamflow will have decreased by 12-63% compared to 1990.[118] The Intergovernmental Panel on Climate Change (IPCC) have predicted that rainfall will decline by 20-30% by 2030 in the Peel-Harvey Catchment.[119] It has already declined by 15% since 1975.[120] Run-off in the hills catchments may have declined by 64% and some estimates indicate that it could cease altogether.[121] Indeed, studies have shown that 'for a given change in rainfall, there is generally a threefold change in streamflow'.[122] The south-western Australian coast experienced the lowest rainfall on record since at least 1900 during the period 1 April 1997 to 31 March 2010.[123]

In 2011, the State of the Environment Report gave inland water flows and levels of the south-west coast of Australia, where the PYS is located,[124] the assessment grade 'poor' towards 'very poor' (the lowest grade) and found them greatly affected by river regulation and climate change.[125] At this time, wetland vegetation on the Swan Coastal Plain was being lost or degraded at a rate of more than 300 hectares per year.[126] Inland water ecological processes, in particular ecological river functions that require high river flows, and key species populations were assessed to be 'very poor'.[127] Only about 30% of WA's major rivers were found to be in

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[110] State of the Environment 2011 Committee, 'Australia State of the Environment 2011' (Independent report to the Australian Government Minister for Sustainability, Environment, Water, Population and Communities, 2011) 202 (Figure 4.1).
[111] *Peel-Harvey Water Quality Improvement Plan*, above n 47, 27-28; S.A. Halse, M.D. Scanton and J.S. Cocking, 'Australia-Wide Assessment of River Health' (Report Number 7, Department of Conservation and Land Management, Government of Western Australia, 2002) 20, 35, 43.
[112] State NRM Office 2007 (Unpublished Report prepared for NRM Senior Officers Group Government of Western Australia, January 2007) 28, 73.
[113] Ibid.
[114] State of the Environment 2011 Committee, above n 110, 214.
[115] Ibid.
[116] *Streamflow trends in south-west Western Australia*, above n 23 (citations omitted).
[117] Ibid 18.
[118] Department of Water, 'The effects of climate change on streamflow in south-west Western Australia' (Report no. HY34, Surface water hydrology series, Government of Western Australia, 2010) vii (citations omitted). See also, State of the Environment 2011 Committee, above n 110, 251; 'Climate change impacts in Western Australia' on Department of the Environment and Energy, Australian Government, *Topics*, *Climate change*, *Climate science*, *Climate change impacts* <https://www.environment.gov.au/climate-change/climate-science/impacts/wa>.
[119] Peter Hick, 'Understanding, quantifying and demonstrating the likely local effects of climate change and variability in the Peel-Harvey Catchment' (Climate Change Report No. L2.G4, South West Catchments Council and Peel-Harvey Catchment Council, Mandurah, Western Australia, 2006) 19.
[120] Ibid. See also, 'Thirty-six-monthly rainfall deciles for Western Australia' on Bureau of Meteorology, Australian Government, *Climate, Climate Maps, Rainfall Latest* <http://www.bom.gov.au/jsp/awap/rain/index.jsp?colour=colour&time=latest&step=0&map=decile&period=36month&area=wa>.
[121] Ibid. See also, Department of Water, 'Annual Report 2015' (Government of Western Australia, September 2015) 24; Climate Commission, above n 5, 2-4; 'Climate change impacts in Western Australia' on Department of the Environment and Energy, Australian Government, *Topics*, *Climate change*, *Climate science*, *Climate change impacts* <https://www.environment.gov.au/climate-change/climate-science/impacts/wa>.
[122] Department of Water, 'Streamflow trends in south-west Western Australia' (Report no. HY32, Surface water hydrology series, Government of Western Australia, 2009) 6 (citations omitted) ('*Streamflow trends in south-west Western Australia*') 6; CSIRO, above n 89, iv.
[123] State of the Environment 2011 Committee, above n 110, 222, 79.
[124] Ibid 195 (Figure 4.1).
[125] Ibid 205.
[126] Ibid 217. See also, Hall et al., above n 65, 36 regarding degradation of wetlands in the Peel-Harvey catchment.
[127] State of the Environment 2011 Committee, above n 110, 222, 251.

good condition, and most of these lie outside the South-west Coast division.[128] Indeed, a 2011 hydrological modelling of the Peel-Harvey Catchment found that 'stream restoration needs to be pursued'.[129]

So, what is the effect of the above scenario on the Estuary? To the knowledge of these authors, the impact of declining streamflow on the Estuary has not been examined or directly linked to the declining health of the system. In 2010, the potential impacts of climate change on the Peel region were identified to include impacts on biodiversity caused by declining water levels exposing potential acid sulphate soils, and altered stream and river flows.[130] In 2014, the PHCC and other community members reported the impacts of climate change in the catchment to be less water in the creeks; rivers more salty; less water on paddocks – drains flow for a shorter period of time; areas of trees dying and changing balance of flora and fauna; national shore birds reducing; and a simplification of the ecosystems.[131] The Peel-Yalgorup System Ramsar Site Management Plan (Ramsar Management Plan)[132] recognises that agriculture, urban development, groundwater extraction, and climate change endanger the ecological character of the PYS, but it is silent on surface water diversions.[133] The threatening activities for each wetland subsystem are ranked as to their contribution and irreversibility ('the feasibility of restoring the original condition') of each resulting 'stress'.[134] Apart from groundwater extraction, the impact of which is unknown and/or undocumented,[135] the threatening activities of the Estuary are all ranked as 'high'.[136] The threats or stresses they induce include decreased freshwater inflows, waterbird abundance or diversity, and duration and extent of inundation as well as increased nutrient concentrations and salinity, including at river mouths.[137] These threats, too, are ranked in order to prioritise management actions.[138] However, only the threats of increased nutrient concentrations and decreased waterbird abundance or diversity are ranked as 'high'.[139] The threat of decreased freshwater flows is not ranked at all.[140] Similar to the impact of groundwater inflows, the reason for this seems to be a lack of and/or undocumented data.[141] Indeed, the impact of climate change on biodiversity in terms of habitat and extent for the entire system is recognised as a 'knowledge gap'.[142] This means that '[c]omprehensive baseline data is urgently required to determine the current status of wetland threats'.[143] Thus, it seems decreased freshwater inflows are only recognised as a threatening effect of climate change and not surface water diversions. Considering that the Ramsar Convention's object is to protect wetlands, especially as waterfowl habitats, it must be considered quite serious that there is a high level of threat to waterbird abundance or diversity.

Under the Ramsar Convention framework, the Australian Government is obliged to report any changes in the ecological character of the PYS.[144] In the most recent national report submitted for the 12th meeting of the Conference of the Contracting Parties (COP12) in 2015, Australia did not report any changes in the ecological character of the PYS. Neither did it report on 'all

[128] Ibid 217.
[129] Kelsey et al., above n 33, 122.
[130] PHCC, 'Adapting to climate change in the Peel region' (Peel Climate Change Adaptation Project Report, June 2010 Revised May 2012) 26-8.
[131] South West Catchments Council, 'Community Engagement for the Climate Change Project' (2014) 113-5.
[132] *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17.
[133] Ibid 24.
[134] Ibid 25.
[135] Ibid, 24-25. A reason for this knowledge gap may be the complexity of the issue. According to Keith Bradby, some groundwater extraction may be beneficial, as it "recycles" nutrient rich groundwater and reduces the amount reaching the Estuary, email from Keith Bradby to Jeanette Jensen, 9 October 2016.
[136] Ibid (Table 8).
[137] Ibid 26 (Table 9).
[138] Ibid 27.
[139] Ibid.
[140] Ibid 26 (Table 9).
[141] Ibid 29.
[142] Ibid 24, 29.
[143] Ibid 29.
[144] *Assessing and reporting the status and trends of wetlands, and the implementation of Article 3.2 of the Convention*, Ramsar Resolution VIII.8, 8th Meeting of the COP (18-26 November 2002) paras 4-6, 12-13; *Ramsar Resolution VIII.2* para 19; Pittock et al., above n 6, 413.

cases of change or likely negative change in the ecological character of the Ramsar Site' to the Ramsar Secretariat in accordance with Article 3.2 of the Convention.[145]

On the basis of the above, it seems safe to assume that surface water diversions and alterations in the form of dams for public water supply and irrigation have had and have an adverse effect on the Estuary. This report uses the North Dandalup Dam as a sub-case study, as it is the newest dam serving Perth and because the condition of the North Dandalup River has caused recent public criticism of the Department of Water.[146]

So, is there a duty to restore environmental flows, particularly in a drying climate? The following sections will examine the regulatory framework to ascertain whether and, if so, to what extent it provides for and/or facilitates restoration of environmental water flows. While not the focus of this report, relevant national and State policy principles will briefly be summarised to provide a standard and background knowledge.

3. Policies, plans, and guidelines

There are a vast amount of relevant and potentially relevant policies, plans, and guidelines, including general policies, those promoting EWRs and EWPs as well those concerning the Estuary or catchment in particular.[147] They have, however, not been enough to provide the setting of either EWRs or EWPs for the Peel-Harvey Estuary, despite its international status and recognition. To mention but a few, the national water policy principles pertaining to EWPs are:

1. EWPs should be given statutory recognition and have at least the same degree of security as water access entitlements for consumptive use and be fully accounted for;[148]
2. Where environmental water requirements cannot be met due to existing uses, action (including reallocation) should be taken to meet environmental needs;[149]
3. From 1994, any future allocations of water should only be made after appropriate assessments are conducted to ensure that ecological values are sustained;[150]
4. EWPs should be determined through statutory water plans on the basis of the best scientific information available on the water regimes necessary to sustain ecological

[145] Department of the Environment, 'Australia's National Report to the twelfth Conference of the Contracting Parties to the Ramsar Convention - Section 4' (Submitted to the 12th Meeting of the COP, Australian Government, 2015) 1, 3 <http://www.environment.gov.au/water/wetlands/publications/australias-national-report-12th-conference-contracting-parties-ramsar-convention>.

[146] 'North Dandalup Dam' on Water Corporation, *Residential, Water supply & services* <http://www.watercorporation.com.au/water-supply-and-services/visiting-our-dams/north-dandalup-dam>; Jessica Strutt, 'WA Water Department accused of "environmental vandalism" over North Dandalup river flows', *ABC News* (online), 17 June 2015 <http://www.abc.net.au/news/2015-06-17/water-department-accused-of-environmental-vandalism/6554578>.

[147] See, e.g., Water and Rivers Commission, 'Policy Statement on Water Sharing' (Statewide Policy No. 3, 2000); Western Australian Planning Commission, *Statement of Planning Policy No. 2.1 - The Peel-Harvey Coastal Plain Catchment*, No. 25, 21 February 1992, 947, as amended by No. 154, 19 September 2003, 4153; Western Australia, *State Planning Policy 2.9 – Water Resources*, No. 227, 19 December 2006, 5709; Western Australia, *State Planning Policy No. 2.6 – State Coastal Planning Policy*, No. 91, 10 June 2003, 2059, as amended by No. 227, 19 December 2006, 5707; EPA, 'Environmental Guidance for Planning and Development' (Guidance Statement No. 33, Government of Western Australia, May 2008); Department of Water, 'Water efficiency, recycling and alternative supplies' (Perth-Peel regional water plan background paper, Government of Western Australia, September 2009); Department of Water 'Operational policy no. 1.02 – Policy on water conservation/efficiency plans – achieving water use efficiency gains through water licensing' (Government of Western Australia, November 2009); Department of Water, 'Operational policy 5.10 – Managing breaches of the *Rights in Water and Irrigation Act 1914* on watercourses in Western Australia' (DWPF 5.10, Government of Western Australia, September 2010); Western Australian Planning Commission, 'State Coastal Planning Policy Guidelines' (30 July 2013); Department of Water, 'Securing Western Australia's water future' (Position paper – reforming water resource management, Government of Western Australia, September 2013); Department of Water, 'Compliance and enforcement policy' (Government of Western Australia, October 2015).

[148] Council of Australian Governments. 'Communique' (1994) Attachment A 'Water Resource Policy' [4(b)] ('*Water Resource Policy*'); *National Principles For The Provision Of Water for Ecosystems*, above n 10, Principle 3; *Intergovernmental Agreement on a National Water Initiative*, above n 13, [35(i)].

[149] *National Principles For The Provision Of Water for Ecosystems*, above n 10, Principle 5.

[150] *Water Resource Policy,* above n 148, [4(f)]; *National Principles For The Provision Of Water for Ecosystems*, above n 10, Principle 6.

values of water dependent ecosystems, with socio-economic analysis and community input;[151]

5. A water plan should provide for, inter alia,[152] ecological outcomes and define appropriate water management arrangements to achieve those outcomes, which may include environmental water provided on a 'rules basis or held as a water access entitlement';[153]
6. States should monitor the implementation of water plans and provide regular public reports; and[154]
7. States have agreed to provide better water balance for all over-allocated river systems and ground water resources, including by appropriate allocations to the environment and adjustment of water access entitlements.[155]

The basic premise of the above principles is that river regulation for consumptive use has altered the flow regime of rivers and streams 'with the inevitable result that instream and wetland processes have been adversely affected'.[156] It is also recognised that identifying ecological values and determining EWRs are the first steps in determining and providing EWPs, which require studies of the water regime.[157]

The current State policy on environmental water provisions, the Statewide Policy No. 5 from 2000 (State Policy), does not reiterate the first national principle stated above regarding statutory recognition.[158] In accordance with national policy, the 'overall goal in providing water for the environment is to sustain and where necessary restore processes and biodiversity of water dependent ecosystems'.[159] The Policy also recognises that EWRs constitute the basis of EWPs and that EWRs should be determined on the basis of best available scientific information.[160] Where such information is limited, interim EWRs and EWPs should be estimated adopting the 'precautionary principle',[161] and then reviewed when monitoring and further research information becomes available.[162] It is also stated that '[o]nly water that is in excess of EWPs (by definition) may become available for consumptive use' and thus in 'some areas of high conservation value, it might be determined that all water should be allocated to ecological values, such as is proposed for the Shannon River'.[163] EWPs may, however, 'be less than EWRs where some ecological impact is accepted, provided key ecological values are protected'.[164] Social water requirements are subordinate to environmental requirements and will only form part of EWPs, 'where they do not unacceptably impact on significant ecological values'.[165] The Policy also advocates the use of statutory water allocation plans to determine and set EWPs,[166] and states that allocation planning and licensing processes will allow for 'regular review of allocations and EWPs to consider the implications of improved knowledge of hydrology, ecology, climate variation and community values for water management issues'.[167] The Commission 'will require effective management and monitoring to ensure EWPs are being met and that environmental values are being protected'.[168] Finally, fundamental to the guiding principles is the principle of transparency; 'ensuring that the Commission's approach to providing water for the environment is "transparent"'.[169] While this may sound good, there are several factors that call for a review of this policy. Firstly, the Policy should have been reviewed

[151] *Water Resource Policy,* above n 148, [4(d)]; *National Principles For The Provision Of Water for Ecosystems*, above n 10, Principle 2; *Intergovernmental Agreement on a National Water Initiative*, above n 13, [36].
[152] *Intergovernmental Agreement on a National Water Initiative*, above n 13, [38].
[153] Ibid [37(i)], [35(ii)].
[154] Ibid [35(ii)-(iii)].
[155] Ibid [40].
[156] *National Principles For The Provision Of Water for Ecosystems*, above n 10, 13 (Principle 1).
[157] Ibid.
[158] *Environmental Water Provisions Policy for Western Australia*, above n 9; 'Department of Water policies and guidelines' on Department of Water, Government of Western Australia, *Legislation*, *Current legislation* <http://www.water.wa.gov.au/legislation/current-legislation/department-of-water-policies>.
[159] *Environmental Water Provisions Policy for Western Australia*, above n 9, 3.
[160] Ibid 4.
[161] Ibid 3-4.
[162] Ibid 8.
[163] Ibid.
[164] Ibid 7.
[165] Ibid 4.
[166] Ibid 6.
[167] Ibid 5.
[168] Ibid.
[169] Ibid.

after five years, in 2005,[170] which does not seem to have been done. Secondly, the primary responsible agency under the Policy, the Water and Rivers Commission, is now defunct. The Water Resources Legislation Amendment Bill 2006 (WA) abolished the Commission in 2007 and established the Department of Water (DoW) instead.[171] Hence, the Minister for Water and the DoW assumed the responsibilities of the Commission, which include the functions or duties to conserve, protect, manage, and assess water resources.[172] Thirdly and most importantly, the Policy does not commit to a level or extent of EWPs.[173]

Another example of the WA Government's non-compliance with national policy is the failure to enact statutory water plans. Moreover, it seems the only surface water allocation plan in the Peel-Harvey Catchment is the Harvey Basin Surface Water Allocation Plan from 1998,[174] which is a sub-regional plan.[175] However, although proposed before the year 2000, it does adhere to the above principles.[176]

In the absence of recent surface water allocation plans, including for the Peel-Harvey Catchment, the very recent Peel Coastal groundwater allocation plan[177] serves to illustrate the practical approach of the DoW.[178] The Plan has identified groundwater-dependent ecosystems and assessed their values by desktop investigation, [179] i.e. scientific studies were not undertaken for the purpose of the Plan. In the absence of sufficient monitoring data to determine the environmental water requirements of groundwater-dependent ecosystems, allocation limits were set through a risk-based approach.[180] Notably, risk-based management approaches are commonly perceived as contrary to precaution-based management approaches,[181] the latter of which is advocated by the State Policy.

Finally, the Perth and Peel Green Growth Plan for 3.5 million should be mentioned, as it is a Draft Strategic Conservation Plan for the Perth and Peel Regions (DSCPPPR), the population of which is projected to grow to 3.5 million by 2050, which is close to a 70% increase of current population.[182] The Plan is a Strategic Assessment Plan under the *EPBC Act*[183] and 'the largest undertaking of its kind in Australia'. [184] In general, the purpose of strategic environmental planning instruments is to plan 'for the future, creating policy documents that outline the future intentions of the regulator or responsible authority in managing a resource', such as the use and development of land, or exploitation and conservation of specific resources, including water and nature reserves.[185] In the absence of a strategic plan, approval decisions are made entirely on an ad-hoc basis 'according to influences and attitudes that prevail at the time'.[186] One of the key outcomes of the DSCPPPR is to deliver a conservation package that, inter alia, provides for the protection of wetlands of international significance and threatened ecological communities, including ensuring the long-term health of the Peel-Harvey Estuary.[187] Also, it is

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[170] Ibid 3.
[171] See Cl 189; Explanatory Notes, Water Resources Legislation Amendment Bill 2006 (WA) 1.
[172] *Water Agencies (Powers) Act 1984* (WA) ss 3(1) (definition of 'functions'), 9; 'Managing our waterways' on Department of Water, Government of Western Australia, *Water topics*, *Waterways* <http://www.water.wa.gov.au/water-topics/waterways/managing-our-waterways2>.
[173] Gardner (2006), above n 8, 221.
[174] 'Water allocation plans' on Department of Water, Government of Western Australia, *Planning for the future* < http://www.water.wa.gov.au/planning-for-the-future/allocation-plans>.
[175] *Harvey Basin Surface Water Allocation Plan*, above n 86, 7.
[176] Ibid 37-8.
[177] M. Antao, 'Peel Coastal groundwater allocation plan: groundwater-dependent ecosystems' (Department of Water, Government of Western Australia, 2015) ('*Peel Coastal groundwater allocation plan*').
[178] Alex Gardner and Jeanette Jensen, Interview with Ben Drew and Katherine Bennett (Department of Water, 26 May 2016).
[179] *Peel Coastal groundwater allocation plan*, above n 177, 8.
[180] Ibid 42, 50.
[181] See, eg, Andreas Klinke and Ortwin Renn, 'A New Approach to Risk Evaluation and Management: Risk-based, Precaution-Based, and Discourse-Based Strategies' (2002) 22 *Risk Analysis* 1071, 1071, 1074-5.
[182] Department of the Premier and Cabinet (Government of Western Australia, December 2015) ii ('*Perth and Peel Green Growth Plan for 3.5 million (draft)*'); 'Perth and Peel Green Growth Plan for 3.5 million (draft)' on Department of Planning, Government of Western Australia, *Plans and policies*, *Publications* <http://www.planning.wa.gov.au/publications/8220.asp>.
[183] *Environment Protection and Biodiversity Conservation Act 1999* (Cth) pt 10.
[184] *Perth and Peel Green Growth Plan for 3.5 million (draft)*, above n 182, iii.
[185] Gerry Bates, *Environmental Law in Australia* (LexisNexis Butterworths, 8th ed, 2013) 262.
[186] Ibid 261.
[187] *Perth and Peel Green Growth Plan for 3.5 million (draft)*, above n 182, iv.

an overarching commitment of the Plan to implement controls and standards for all development to reduce direct and indirect environmental impacts, including on water use.[188]

Nevertheless and disappointingly, the DSCPPPR does not advocate EWPs to protect and conserve wetlands; the protection of the Estuary is still concerned mainly with improving water quality, not quantity.[189] Although the Environmental Protection Authority (EPA) has identified 'hydrological processes' as an environmental factor relevant to the Strategic Assessment,[190] and the DSCPPPR does mention measures to manage threats to migratory and other shorebirds and their habitat in the Estuary and broader PYS, including managing the Estuary and its tributaries,[191] the specific conservation commitments to the PYS do not include EWPs.[192]

The State does, however, commit to continue to implement measures to reduce water use and increase water recycling; review EWRs, including consider and incorporate into allocation plans the effects of climate change; improve monitoring and reporting on the health of the PYS wetland and river system; and review the State Planning Policy 2.1 for the Peel-Harvey Coastal Plain Catchment and the Environmental Protection (Peel-Harvey Estuary) Policy.[193] Moreover, the Plan recognises that some areas within the broader Peel-Harvey catchment may require additional measures to address water quantity in order to achieve the environmental objective of maintaining the hydrological regimes of surface water, 'so that existing and potential uses, including ecosystem maintenance, are protected'.[194] This is due to their location in environmentally sensitive hydrological catchments and it should be identified as early as possible in the land use planning process in accordance with the Better Urban Water Management Frame-work.[195]

Policies, plans and guidelines, including planning policies, are not legally binding instruments per se.[196] Thus, according to Bates, '[p]lanning instruments should not be interpreted as if they were statutes; they should be interpreted with the intent of providing a practical outcome consistent with a reasonable interpretation using a common-sense approach'.[197] For this reason, when state policies are applied to development applications, they 'must be judged in the context of each particular application'.[198] In case of conflict, a court must apply purposive interpretation to determine the extent of the conflict.[199] If a statutory direction provides that an approval must not compromise a desired environmental outcome or conflict with a planning scheme unless justified, then the environmental outcomes take priority.[200] Unfortunately, no such direction exists in WA law. While not legally binding per se, policies and non-statutory plans are, usually, mandatory considerations for the relevant decision-makers.[201] The significance of this position was illustrated by the very recent Supreme Court case of *Save Beeliar Wetlands (Inc) v Minister for Environment* (*Roe 8* case).[202] In this case, the Court found the EPA approval of the controversial Perth Freight Link proposal invalid due to a failure of the EPA to take into account its own policies, particularly policies setting out policy positions.[203]

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[188] Department of the Premier and Cabinet, 'Draft Action Plan F: MNES conservation commitments' (Government of Western Australia, December 2015) 11 (Table 1) ('*Action Plan F*').
[189] *Perth and Peel Green Growth Plan for 3.5 million (draft)*, above n 182, vi, 4, 15-16, 45.
[190] Ibid 6 (Table 1-1).
[191] *Perth and Peel Green Growth Plan for 3.5 million (draft)*, above n 182, 45; *Action Plan F*, above n 188, 28-29 (Table 6); Department of the Premier and Cabinet, 'Draft Action Plan H: Conservation Program' (Government of Western Australia, December 2015) 14-5. See also, Jacqueline Peel and Lee Godden, 'Australian Environmental Management: A "Dams" Story' (2005) 28 *UNSW Law Journal* 668, 685-9, 693.
[192] *Action Plan F*, above n 188, 27 (Table 5), 28-29 (Table 6).
[193] Department of the Premier and Cabinet, 'Draft Action Plan G: State environmental objectives' (Government of Western Australia, December 2015) 13-6 (Table 1) ('*Action Plan G*').
[194] Ibid 13 (Table 1); *Action Plan F*, above n 188, 28-29 (Table 6).
[195] *Action Plan G*, above n 193, 13 (Table 1); *Action Plan F*, above n 188, 28-29 (Table 6).
[196] They may, however, become binding instruments by virtue of statutory provision.
[197] See, e.g., *Katoomba Gospel Trust v Blue Mountains City Council* (1993) 130 LGERA 266 (Talbot J); Bates (2013), above n 185, 296-7.
[198] Bates (2013), above n 185, 297 (citations omitted).
[199] Bates (2013), above n 185, 297.
[200] See, e.g., *Webster v Caboolture Shire Council* [2008] QPEC 82; Bates (2013), above n 185, 297.
[201] *Minister for Aboriginal Affairs v Peko Wallsend Limited* (1986) 162 CLR 24, 39 (Mason J); *Save Beeliar Wetlands (Inc) v Minister for Environment* [2015] WASC 482, 128 (Martin CJ).
[202] [2015] WASC 482.
[203] *Save Beeliar Wetlands (Inc) v Minister for Environment* [2015] WASC 482, 7-8.

The policies concerned provided the presumption that the EPA would not recommend the proposal considering its significant residual impact on critical environmental assets to which the provision of environmental offsets would be inappropriate to render the proposal environmentally acceptable.[204] Indeed, it has been argued that 'offset schemes are in reality just an excuse to allow developers to do what they should not be allowed to do, in which case a refusal of consent would be more appropriate'.[205] The Minister for Environment and the EPA appealed the *Roe 8* decision and the Court of Appeal upheld the appeal.[206] The sole ground of appeal was 'that the primary judge erred in law in holding that the [EPA] Policies were mandatory relevant considerations' with which the Court agreed.[207] It found that they were simply 'permissive relevant considerations'.[208]

Nonetheless, the *Roe 8* case prompted the formal response of an EPA policies and governance review, which resulted in the recently published report *Independent Legal and Governance Review into Policies and Guidelines for Environmental Impact Assessments under the Environmental Protection Act 1986 (WA)*.[209] The review team recommends, inter alia, an overhaul of the EPA's policies and guidelines to 'develop and adopt a simplified policy framework that is arranged in a hierarchical manner, with the objectives and principles of the *EP Act* [Environmental Protection Act 1986 (WA)] at its apex',[210] as the 'current policy structure is inadequate to provide the necessary guidance'.[211] The conduct of the EPA with regard to environmental impact assessments (EIAs) has been under scrutiny in another case, the *Coastal Waters Alliance of Western Australia (Inc) v Environmental Protection Authority*.[212] In this case, the Court found that the EPA had acted improperly by including private commercial interests in its report, which, similarly, caused the EPA report and approval of the Minister to be rendered invalid.[213] The EPA is restricted to consider environmental factors alone, thus excluding competing social, commercial, economic, or political benefits.[214] These are for the Minister to consider.[215]

In summary, while policies, plans and guidelines are not legally binding in the sense that the EPA must apply their principles;[216] it must give 'proper, genuine and realistic consideration' to them in any given case.[217] Hence, such instruments are important to steer and guide decision-making, and they 'should, therefore, contribute to consistent decision-making, which focuses attention on the statutory functions with which the EPA is entrusted',[218] or the DoW and other relevant department and agencies for that matter.

4. The regulatory framework for restoration

We introduce the national and state dimensions of the regulatory framework for restoration and then analyse each to ascertain whether it mandates maintenance and restoration of waterways and wetlands by ensuring adequate water flow. In the article *Is there an international legal duty to restore wetlands and waterways by environmental water allocations?*, we analysed the international framework and found that the Ramsar Convention does mandate restoration of

[204] *Save Beeliar Wetlands (Inc) v Minister for Environment* [2015] WASC 482, 7.
[205] Bates (2013), above n 185, 505.
[206] *Jacob v Save Beeliar Wetlands (Inc)* [2016] WASCA 126, [89]-[91].
[207] *Jacob v Save Beeliar Wetlands (Inc)* [2016] WASCA 126, [3].
[208] *Jacob v Save Beeliar Wetlands (Inc)* [2016] WASCA 126, [61].
[209] P.D. Quinlan SC, E.M. Heenan, and S.U. Govinnage (6 May 2016).
[210] Ibid xii, 127.
[211] Ibid viii.
[212] [1996] LGERA 136.
[213] *Coastal Waters Alliance of Western Australia (Inc) v Environmental Protection Authority* [1996] LGERA 136; Bates (2013), above n 185, 193; Quinlan, above n 209, 41.
[214] *Coastal Waters Alliance of Western Australia (Inc) v Environmental Protection Authority* [1996] LGERA 136; Bates (2013), above n 185, 204; Quinlan, above n 209, 41.
[215] *Environmental Protection Act 1986* (WA) s 45(2).
[216] See, eg, Quinlan, above n 209, 10.
[217] *Khan v Minister for Immigration, Local Government & Ethnic Affairs* [1987] FCA 457; *Williams v Minister for the Environment & Heritage* (2003) 74 ALD 124, [29] (Wilcox J); *Re Shire of Carnavon; Ex parte Humphrey* [2005] WASCA 182, [60] (McLure JA & Le Miere AJA); Quinlan, above n 209, 13. But see *A v Corruption and Crime Commission* (2013) 136 ARL 491, [92] (Martin CJ & Murphy JA); *Marshall v Metropolitan Redevelopment Authority* [2015] WASC 226, [108] (Pritchard J); Quinlan, above n 209, 10, 13.
[218] Quinlan, above n 209, 12.

wetlands and related waterways by provision of environmental water, where it is necessary to maintain the ecological character of the wetland, at least, as at the time of listing and where the adverse change is human-induced.[219] It is assumed that anthropogenic climate change falls within this category. The Ramsar Convention creates two essential international obligations for Australia: (i) to designate for listing wetlands of international importance and to promote their conservation, which include a duty to maintain the ecological character, and (ii) a general commitment to promote the wise use of all wetlands.[220] There are other international conventions and agreements relevant to wetland management and migratory waterfowl,[221] but our international focus was mainly on the first of the Ramsar obligations pertaining to listed wetlands, as the Convention is the only multilateral convention dedicated to wetlands as waterfowl habitat.

That first obligation supports the Ramsar provisions of the *EPBC Act*,[222] which constitute the national implementation of the Ramsar Convention in Australia. The *EPBC Act* Ramsar provisions are directed only at specific conservation measures for listed wetlands and, therefore, do not implement the second obligation. States and Territories are seen as primarily responsible for the general implementation of both obligations for wetlands within their territory.[223]

State law provides the main framework for the management of waterways and wetlands in WA, including Ramsar listed wetlands. There are a number of statutes that are potentially relevant to waterways and wetlands management,[224] in fact water resources legislation in Australia is spread across six different Acts,[225] but we focus on the two that can directly regulate the flow of water in waterways and wetlands; namely, the *EP Act* and the *Rights in Water and Irrigation Act 1914* (WA) (*RiWI Act*).[226] The following reviews these national and state laws following the structure of the three questions set out in the introduction.

4.1 A duty to restore

4.1.1 Environment Protection and Biodiversity Conservation Act 1999 (Cth)

The *EPBC Act* includes three main mechanisms for implementing the Ramsar Convention obligations for listed wetlands: (1) designation of wetlands for listing, (2) environmental assessment and approval of 'actions' that may adversely impact on them, and (3) the preparation and implementation of plans for their conservation in co-operation with the States and Territories.[227] The third mechanism is the most relevant to restoring human-induced adverse change to wetlands.[228] For wetlands in a State:

> The Commonwealth *must use its best endeavours to ensure a plan* for managing the [listed] wetland in a way that is not inconsistent with Australia's obligations under the Ramsar Convention or the Australian Ramsar management principles is *prepared and implemented in co-operation with the State* or Territory (emphasis added).[229]

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[219] Jensen & Gardner, above n 16.
[220] Alex Gardner, 'The legal protection of Ramsar Wetlands: Australian reforms' in P. Martin et al. (eds), *Environmental Governance and Sustainability* (Edward Elgar, 2012).
[221] For example, there are the migratory bird agreements that Australia has with China, Korea and Japan: Australian Government, Department of Environment, Migratory birds, <http://www.environment.gov.au/biodiversity/migratory-species/migratory-birds#International_cooperation>. The *Convention on Biological Diversity*, opened for signature 5 June 1992 (entered into force 29 December 1993); Australian Treaty Series 1993 No. 32, is also relevant. See also, D. Rothwell, 'International law and the Murray-Darling Basin Plan' (2012) 29 *Environmental and Planning Law Journal* 268.
[222] *Environment Protection and Biodiversity Conservation Act 1999* (Cth) pt 3, sub-div B, pt 15 div 2.
[223] Maria P. Comino, 'The Ramsar Convention in Australia – Improving the Implementation Framework' (1997) 14 *Environmental and Planning Law Journal* 89, 92.
[224] For example, *Waterways Conservation Act 1976* (WA), *Conservation and Land Management Act 1984* (WA), *Wildlife Conservation Act 1950* (WA), and the *Planning and Development Act 2005* (WA), but none of these Acts provides specifically for the flow of water in wetlands and waterways.
[225] Department of Water, 'Securing Western Australia's water future' (Position paper – Reforming Water Resource Management, Government of Western Australia, 2013) 4.
[226] The relevance of this legislation is discussed in Bennett & Gardner, above n 5.
[227] Gardner (2012), above n 220, 200.
[228] *Environment Protection and Biodiversity Conservation Act* (Cth) ss 328-336.
[229] *Environment Protection and Biodiversity Conservation Act* (Cth) s 333(2). By s 328, the Minister must make a written plan for managing a Ramsar listed wetland that is entirely within one or more Commonwealth areas. The

This qualified duty to cooperate with the States is elaborated in the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth),[230] which prescribe the Australian Ramsar management principles. They provide that each declared Ramsar wetland 'should' have '[a]t least 1 management plan' that 'should', inter alia:[231]

- Describe the ecological character of the wetland and what 'must' be done to maintain this character;
- 'state mechanisms to deal with the impacts of actions that individually or cumulatively endanger its ecological character, including risks arising from' changes to water regimes; and
- state whether restoration or rehabilitation is needed and, if so, explain how the plan provides for this.

There is no guidance on how to respond to climate change.

In summary, the *EPBC Act* provides a qualified duty of cooperation to make and implement a management plan rather than a duty to restore. This is not surprising considering that the duty to restore under the Ramsar Convention is largely derived from resolutions of the Conference of the Parties (COP), and the legal status or binding character of this duty is, therefore, subject to interpretation. The Commonwealth need only use its 'best endeavours' to ensure that a management plan is prepared and implemented in cooperation with the State, a term which appears to have no recent judicial interpretation in application to Commonwealth action. In other words, the Commonwealth is not authorised to make a plan that will override state legislative and executive decisions. Commonwealth-State agreement is required to fulfil this duty. This reflects the 'cooperative federalism' approach to Australia's international environmental obligations established in the 1990s.[232] This approach was rooted in a desire by the Commonwealth Government to avoid coming into direct conflict with the states, and instead favour a policy of cooperation rather than imposition.[233] Even after the *Tasmanian Dam* case,[234] which established the Commonwealth's legislative power in this area, 'the "imagined" Constitution – limited by traditional states' rights arguments – retained a tenacious hold on the Australian political psyche'.[235] This hold has yet to cease.

That leads us to the question of how the State will make those determinations (discussed next) and whether the planning instrument adopted for this purpose imposes actual duties to restore, which will be explored further below in relation to our case study.

4.1.2 Rights in Water and Irrigation Act 1914 (WA) and Environmental Protection Act 1986 (WA)

The legal duties to make EWPs under these two Acts were considered in detail in 2006 and the position remains unchanged.[236] The *RiWI Act* does not mandate the making of an EWP, either generally or in any particular location. As noted by the WA Government itself, the Act is some of the oldest water legislation in Australia and it 'was originally developed at a time when demand was low and water was relatively abundant'.[237] This is the current state of affairs despite the fact that in the second reading speech for the Rights in Water and Irrigation Amendment Bill 1999, Hon Ken Travers stated that '[t]his legislation seeks to make the allocation of water for the environment a key priority when determining water use', and that '[i]t must be put before other potential uses'.[238] The management plan provisions inserted in 2000 have never been used, so only non-statutory plans with limited legal effect have so far been

Minister must do so as soon as practicable. The Commonwealth must act consistently with a plan made under s 328: s 330.

[230] Sch 6 cl 10.02.

[231] *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) sch 6 cl 2.01-2.02.

[232] Peel & Godden, above n 191, 676, 682. See further the 'Intergovernmental agreement on the environment', *National Environment Protection Council Act 1994* (Cth) sch 1.

[233] Peel & Godden, above n 191, 675-8.

[234] *Commonwealth v Tasmania* (1983) 158 CLR 1.

[235] Peel & Godden, above n 191, 675.

[236] Gardner (2006), above n 8, 220-221.

[237] Department of Water, 'above n 225, 4.

[238] Western Australia, *Parliamentary Debates*, Council, 20 September 2000, p1492b-1499a, 1-2 (Hon Ken Travers).

adopted with variable and limited EWPs as policy goals.[239] Notably, the DoW intends to make statutory water allocation plans mandatory for those water resources governed by the proposed water access entitlements framework under the new water resources management framework currently under consideration, but this is not the case for the water resources that continue to be subject to the water take licensing regime.[240] These resources will, however, be subject to a statutory allocation limit.[241] The only "legal" EWPs created under the *RiWI Act* are set as conditions on Water Corporation licences. The Minister 'is to seek to ensure that the objects are achieved' in setting such conditions,[242] which objects include managing water resources for the competing purposes of sustainable use and development and for protection of the water resource ecosystems.[243] Further, in determining a licence application and conditions, the Minister is required to have regard to whether the proposed taking and use of the water 'are ecologically sustainable' or 'are environmentally acceptable'.[244] In other words, conditions relating to these objects may also be included.[245] The *RiWI Act* creates no duties to restore any waterways and wetlands, and makes no reference to Ramsar Convention obligations. It does, however, impose upon licensees and riparian rights holders a duty to 'take all reasonable steps to minimise the degradation of the water resource'.[246] 'Degradation' includes the 'sensible diminishing of the quality or quantity of water'.[247] 'Sensible diminishing' is not defined in the Act, but according to Chief Justice Madden, to 'sensibly diminish' water flow; it must be diminished to an extent that affects the use of water by *people* above or below the diminishing action.[248] Considering that 'degradation' under the Act is not defined to be, inter alia, the sensible diminishing of water, but simply 'includes' this aspect; that the duty to avoid degradation was adopted as a part of the 2000 amendments, which aimed to bring the *RiWI Act* in line with environmental protection;[249] and that the ordinary meaning of the verb 'degrade' in the context of natural habitats refers to lowering the character or quality of a water resource;[250] it seems safe to assume that such degradation includes diminishing water flow not just to the detriment of riparian users, but also to the water resource's ecological character.

The *EP Act* procedures for EIAs provide the facility for setting EWPs on approval of proposals to construct and licence large works for the taking of water. While this power has been used often in the past twenty years, it is entirely the creature of ministerial discretion and confers no duties to make EWPs, let alone ensure that the ecological character of listed Ramsar wetlands is maintained or restored.

The *EP Act* also authorises the making of environmental protection policies (EPPs) that have the force of law. The *Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992* was aimed at addressing serious problems of nutrient pollution causing algal blooms that were degrading the estuary. It is notable that the EPP makes no reference to the Ramsar wetland values that were recognised by international listing in 1990 and that there is no mention of water flow in the setting of water quality objectives and the mainly general land management measures.

So, have the above opportunities to set EWPs been seized in the case of the North Dandalup Dam, i.e. either through the environmental approval of the Dam or the water licence?

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[239] 'How we develop water allocation plans' on Department of Water, Government of Western Australia, *Planning for the future*, *Water allocation plans* <http://www.water.wa.gov.au/planning-for-the-future/allocation-plans/developing-water-allocation-plans>.
[240] Department of Water, 'Securing Western Australia's water future' (Position paper – Reforming Water Resource Management, 2013) 6 (Figure 2), 7, 17-9.
[241] Ibid 6 (Figure 2).
[242] *Rights in Water and Irrigation Act 1914* (WA) s 4(3).
[243] *Rights in Water and Irrigation Act 1914* (WA) s 4.
[244] *Rights in Water and Irrigation Act 1914* (WA) sch 1 cl 7(2).
[245] Alex Gardner, Richard Bartlett and Janice Gray, *Water Resources Law* (LexisNexis Butterworths, 2009) 253 (citation omitted).
[246] *Rights in Water and Irrigation Act 1914* (WA) s 5E(1)(b). 'Water resources' include watercourses and wetlands as well as other surface waters, see *Rights in Water and Irrigation Act 1914* (WA) s 2 (definition of 'water resource').
[247] *Rights in Water and Irrigation Act 1914* (WA) s 2 (definition of 'degradation').
[248] *Nagle v Miller* [1904] 29 VLR 765, 786 (Madden CJ). See also, the parliamentary debate concerning this section, Western Australia, *Parliamentary Debates*, Council, 10 October 2000, p1728b-1739a, 8-9.
[249] Western Australia, *Parliamentary Debates*, Council, 10 October 2000, p1728b-1739a, 8-9.
[250] Angus Stevenson (ed), *Oxford Dictionary of English* (Oxford University Press, 3rd ed, 2010).

4.1.3 The North Dandalup Dam

The North Dandalup Dam was given environmental approval in 1990 and completed in 1994.[251] Thus, it was constructed prior to the adoption of the *EPBC Act*, which implements the Ramsar Convention in Australia. The long-term average volume of water entering the North Dandalup Pipehead Dam was 28,800 ML/year (1912-2000).[252] During the period 1975-2005, this average was reduced by 35% to 18,700 ML/year as a result of low rainfall.[253] In 2006-16, the average annual inflow was merely 8,651 ML with a maximum of 16,923 ML in 2009 and a minimum of 434 ML in 2010.[254] The dam supplied approximately 10% of Perth's annual water consumption in 2005,[255] but the current percentage is expected to be very low considering the miniscule inflows in 2015.

While the environment was recognised as a legitimate user of the water, EWPs were not set or required upon approval of the North Dandalup Dam proposal.[256] Although the concept of EWPs was very new at the time, the ARL study did recommend to consider the adoption of a 'compensation' flow release regime from the dam and how this might be done to cause the least environmental impact.[257] The PYS was Ramsar listed approximately four months prior to approval, but the ministerial approval statement does not mention the System. [258] Instead, the relevant basic legal commitments consist of imposing the following two duties on the proponent: [259]

1. To adhere to the proposal for the North Dandalup River as assessed by the EPA and fulfil the commitments made in the Environmental Review and Management Programme (ERMP);[260] and
2. Prior to construction, to prepare and implement an Environmental Management Programme, also known as an Environmental Management Plan (EMP) to the satisfaction of the Minister for the Environment on advice of the Environmental Protection Authority and the Department of Conservation and Land Management [CALM]', [261] which must include details of, inter alia, 'the management of environmental impacts in the reservoir, dam and immediate downstream sections of the river and valley during and following the construction phase including the mitigation of impacts upon habitats'.

The commitments of the ERMP are attached to the ministerial approval statement and the most relevant commitments in this regard are commitments 7 and 8 (commitment 8 will be further discussed under Section 4.3). According to commitment 7, the 'Water Authority is not required by law to release any water stored behind the proposed dam'.[262] This assertion is derived from Section 14 of the *Metropolitan Water Supply, Sewerage and Drainage Act 1909* (WA) (*MWSSD Act*)[263] and Section 11 of the *Country Areas Water Supply Act 1947* (WA) (*CAWS Act*).[264] At the time of approval, Section 14 of the Act provided that the Authority:

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[251] Minister for the Environment, 'Next major water supply source for Perth (Post 1992) – Stage 1' (Ministerial Statement, Bulletin 111, 3 October 1990) ('*Ministerial Statement for the North Dandalup Dam*').
[252] Department of Environment, 'North Dandalup Dam Catchment Area Drinking Water Source Protection Plan' (Water Resource Protection Series 54, Government of Western Australia, 2005) 5 ('*North Dandalup Dam Catchment Area Drinking Water Source Protection Plan*').
[253] Ibid.
[254] Email from Ben Drew, Department of Water, Government of Western Australia, to Alex Gardner and Jeanette Jensen, 2 November 2015. See Appendix below.
[255] Department of Environment, 'North Dandalup Pipehead Dam Catchment Area Drinking Water Source Protection Plan' (Water Resource Protection Series Report No. WRP 54, Government of Western Australia, 2005) 1 ('*North Dandalup Pipehead Dam Catchment Area Drinking Water Source Protection Plan*').
[256] *Next Major Water Supply Source for Perth (post 1992)*, above n 67, app 4, 1.
[257] *North Dandalup Stream Fauna Study*, above n 108, 61-2.
[258] The Minister makes the final decision on whether to approve a proposal or not, which is given in the form of a statement issued under section 45(5) of *Environmental Protection Act 1986* (WA), see *Environmental Impact Assessment (Part IV Divisions 1 and 2) Administrative Procedures 2012* (WA) cl 16.
[259] *Ministerial Statement for the North Dandalup Dam*, above n 251, Condition 2(3).
[260] Ibid Condition 1.
[261] Ibid Condition 2.
[262] Ibid.
[263] The North Dandalup Pipehead Dam Catchment Area was proclaimed under the *MWSSD Act* in 1982, see *North Dandalup Pipehead Dam Catchment Area Drinking Water Source Protection Plan*, above n 255, 1.
[264] *Next Major Water Supply Source for Perth (post 1992)*, above n 67, app 4, 6.

> [M]ay divert, intercept, and store *all* water coming from the streams, watercourses, and other sources within the boundaries of any such reserve or catchment area, and alter the course of any stream or watercourse, and may take any water found on or under such land (emphasis added).[265]

Thus, as opposed to the common law regime, this provision did not have regard for environmental sustainability and natural flow.[266] Notwithstanding, the Water Authority undertook to review 'present' use of the river flow and determine 'a satisfactory arrangement for meeting the genuine and reasonable domestic, stock and garden watering requirements of the landowners' in consultation with existing riparian landowners due to 'the possible adverse impact [of the dam] on riparian users' of the North Dandalup River.[267] If the arrangement arrived at is to release prescribed flows, then 'the amount released would not exceed the natural stream flow into the reservoir at the time and no water would be released in periods when the natural stream flow ceased altogether'.[268] As per usual, the commitments of the ministerial approval statement have been implemented in the EMP.

Contrary to the ministerial approval statement, the EMP recognises that the dam will reduce flows to the Estuary. For this reason, the Water Authority (now the Water Corporation as service provider and the DoW as regulator) undertook to supplement downstream river flows through releases from the Harvey River Diversion (Drain) and the North Dandalup Dam to 'ensure that on average there is no net reduction in water flows to the Peel-Harvey Estuary'.[269] This undertaking was a 'result of representations to the Minister for Water Resources regarding the perceived impact that the North Dandalup project would have on the Peel-Harvey Estuary'.[270] This undertaking and 'commitment 11 of the EPA Conditions of approval', which presumably refers to commitment 7 as the 11th commitment or condition of the ministerial statement of approval overall, required the proponent to implement a release regime.[271] The proponent undertook 'to make annual releases through the dam in summer months from December to March', which would be 'in quantities typical of summer flows over the last 15 years and…additional to any overflows during winter months'.[272] The regime would release 215 ML in December, 82 ML in January, 15 ML in February, and 14 ML in March, which in total comes to 326 ML.[273] These summer releases were estimated to 'ensure that flow rates are maintained immediately downstream of the pipehead dam'.[274] It was estimated that the Dam would reduce mean annual river flows to the Peel Inlet by about 14,000 ML/year, which represents a reduction of 3.3% in hills stream flows and 2.6% of total flows (including the coastal plain).[275] While this may not seem substantial, it was significant enough for the proponent to undertake to discharge an amount of water equivalent to any reductions by the dam from the Harvey River Diversion 'back into the Harvey River and consequently to the Estuary'.[276] The aim was to release 13,000 ML/year on average,[277] which constitute 92.9% of the estimated reduction (14,000 ML/year). In contrast, the summer release regime from the dam (326 ML/year) merely constitutes 2.3% of the projected reduction. During the EIA in 1988, it was found that winter flow in the North Dandalup River would be reduced in all years, 'except those in which the dam overflows continuously'.[278] The dam was, however, only expected to 'fill to near overflowing once every two or three years'.[279] Some important points may be drawn from the above. First, the flow and health of the North Dandalup River was not considered in determining the release regime. Secondly, the proponent relied mainly on releases through the Harvey River Diversion to keep

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[265] *Metropolitan Water Supply, Sewerage and Drainage Act* (1909-1995) (WA) s 14. Notably, this section has since been made subject to s 5C of the *RiWI Act* by inserting the following subsection: 'A licensee shall not exercise the powers conferred by subsection (1) in relation to water to which section 5C of the *Rights in Water and Irrigation Act 1914* applies, except under a licence or right granted or conferred under Part III of that Act' (s 14(2)).
[266] Gardner et al., above n 245, 201.
[267] *Ministerial Statement for the North Dandalup Dam*, above n 251, Commitment 7.
[268] Ibid.
[269] *North Dandalup Dam Environmental Management Plan*, above n 107, 29; Minister for Water Resources (Press Statement, 29 August 1990).
[270] Ibid.
[271] *North Dandalup Dam Environmental Management Plan*, above n 107, 29.
[272] Ibid.
[273] Ibid 30.
[274] Ibid.
[275] *Next Major Water Supply Source for Perth (post 1992)*, above n 67, app 4, 9.
[276] *North Dandalup Dam Environmental Management Plan*, above n 107, 29.
[277] Ibid 30.
[278] *Next Major Water Supply Source for Perth (post 1992)*, above n 67, app 4, 9.
[279] *North Dandalup Dam Environmental Management Plan*, above n 107, 12.

its promise of no net reduction in flows to the Estuary. These compensatory releases would, however, discharge into the Harvey Estuary rather than the Peel Inlet, the ramifications of which are unknown to the authors. Finally, the releases from the dam were not intended to compensate natural flows, but rather riparian use of water during summer months.

The reason for the lack of EWPs for environmental purposes seems to be that the adverse impact of the dam on the stream environment was considered to be 'relatively small' due to 'the already degraded nature of the River on the Swan Coastal Plain [downstream the Dam]' and the 'intermediate levels of disturbance due to the impact of the pipehead dam'.[280] On the other hand, the ARL found the nature of the North Dandalup River worthy of conservation,[281] and the proponent considered it 'important to manage the system so that further degradation does not occur, and that habitat for existing aquatic species is enhanced'.[282] This seems difficult to achieve without EWPs throughout the year following the natural regime. Notwithstanding, it must have been found satisfactory to the Minister for the Environment, the EPA and CALM for the EMP to be approved. Clearly, none of these authorities considered themselves subject to a duty to restore.

In 1998, the Water and Rivers Commission commissioned a study of the EWRs for lowland river systems on the Swan Coastal Plain.[283] This study includes a proposed flow allocation regime for the North Dandalup Dam based on these findings. Under this regime, the total annual volume of releases amounts to 7,024 ML, which, not surprisingly, sees significantly higher releases during winter and the colder months in general than those of summer months.[284] In contrast, the release regime of the EMP from 1991 constitutes merely 4.6% of the release regime recommended in 1998 on the basis of EWRs. Moreover, the flows of the 1998 regime are intended as 'minimum requirements', which is evident from the percentile values, which are generally 'well below the 50th percentile'.[285] The question then is, what has actually been released? And have the commitments above been adhered to, also through the following drier decades?

According to the Department of Water (DoW), during the period July 2006-June 2016, the average summer (December-March) releases were 68.2 ML/month and in total 272.9 ML.[286] This means that the release regime of the EMP has decreased by 16.3% since 1991.[287] Considering the significant reduction in stream flows since the 1990s, this does not seem unreasonable. Winter releases, including September, were, in fact, made between July 2006 and July 2011, but then ceased altogether.[288] In 2010, winter inflows to Integrated Water Supply Scheme dams, including the North Dandalup Dam, were merely 11% of the average inflow in the previous 10 years and the lowest on record.[289] For this reason, releases were set to 50% of previous years – it was found too detrimental to reduce releases to reflect inflows, i.e. by 89%.[290] A task force of the DoW decided on this management response, as it 'provided significant water savings at a low cost and was immediately implementable'.[291] The average monthly releases from April-November (2006-16) were 28 ML.[292] This is less than half of the monthly summer releases and thus contrary to the natural regime. It should be noted that we do not support the sustenance of artificial flow, but rather a release regime that mimics the natural flow variability. According to this position, releases should have ceased during summer rather than during winter. However that may be, the limited, and now no, releases throughout

[280] Ibid 35.
[281] *North Dandalup Stream Fauna Study*, above n 108, 65.
[282] *North Dandalup Dam Environmental Management Plan*, above n 107, 35.
[283] Peter M. Davies, Stuart E. Bunn, Angela Arthington, & S. Creagh, 'Environmental Water Requirements for Lowland River Systems on the Swan Coastal Plain' (Water and Rivers Commission, 1998).
[284] Ibid 79 (Table 4.12).
[285] Ibid 80.
[286] Email from Ben Drew, Department of Water, Government of Western Australia, to Alex Gardner and Jeanette Jensen, 2 November 2015. See Appendix to this document below.
[287] 272.9 ML/(326 ML/100%) = 83.7%.
[288] Email from Ben Drew, Department of Water, Government of Western Australia, to Alex Gardner and Jeanette Jensen, 2 November 2015. See Appendix to this document below.
[289] Email from Ben Drew, Department of Water, Government of Western Australia, to Alex Gardner and Jeanette Jensen, 27 November 2015.
[290] Ibid.
[291] Ibid.
[292] Ibid.

the rest of the year place a great deal of pressure on diversions from the Harvey River Diversion to substitute flows to the Estuary.

In the winter of 1994, 7,000 ML was diverted from the Harvey River Diversion Drain back into the Harvey River to offset an equivalent reduction from the Dam.[293] There is, however, no publicly available information on the matter hereon after. When the Stirling-Harvey redevelopment scheme was proposed in 1999, which included diverting an additional 34,000 ML/year from the Stirling Reservoir upstream of the Harvey Dam, the EPA did not recommend the setting of EWPs for the new Harvey Dam (2002). It is worth noting that the capacity of the new dam is approximately 10 times that of the old dam or weir (approximately 10.3 ML).[294] The reason seems to be that the Water and Rivers Commission had found that the water requirements of the environment downstream of the new Dam could 'be adequately met by flows from other unregulated and semi regulated streams within the basin' and, therefore, there was no need for releases from the new Dam.[295] In other words, the streamflow upstream of the new Harvey Dam was not considered to contribute to key water-dependent ecosystems of the Harvey River, 'as flow from this catchment is diverted down the Harvey Diversion Drain to the ocean'.[296] Runoff from the coastal plain and streams to the north of the Harvey River was considered to contribute 'the bulk of current streamflow to the Harvey Estuary'.[297] For these reasons, the ministerial statement of approval for the new Harvey Dam does not contain a condition of EWPs downstream of the dam.[298] It does, however, contain a commitment to study the adequacy of this and to determine the EWRs between the Harvey Reservoir and Stirling Dam, but not below the new Harvey Dam.[299] The ministerial statement of approval for the Harvey Dam completely disregards the obligation to divert flow from the Diversion Drain back into the Harvey River when necessary. It seems unlikely that the promise not to reduce flows to the Estuary has been kept with no EWPs and the fact that the (new) Harvey Dam does not overflow on a regular basis.[300] The instruments left to consider is the water licences for these dams.

The current water licence for the North Dandalup Dam, which is valid for the period 16 November 2012 to 30 June 2017,[301] sadly, does not contain EWPs. The water entitlement for the dam is 22,200 ML,[302] which is curious considering that this has, by far, exceeded inflows for decades. Already in 2002-03 and 2003-04, the annual abstraction was far less than this amount, namely 11,5000 ML and 9,300 ML, respectively, due to reduced rainfall and inflows.[303] The licence is, however, conditional upon the licensee's compliance with the commitments and requirements of the operating strategy 'as prepared by the licensee and approved by the Department of Water'.[304] The current operating strategy for the North Dandalup Dam, which runs during the same period as the licence, covers several other dams as well, including the Serpentine and Lower South Dandalup.[305] Rather than distinguishing between social and

[293] Paul Omodei, 'Diversion of water to Harvey River offsets reduction through new dam' (Media Statement, 1 November 1994).
[294] Email from Steve Fisher, PHCC, to Jeanette Jensen, 18 October 2016.
[295] Environmental Protection Authority, 'Stirling-Harvey redevelopment scheme including changes to the Harris Dam project – Report and Recommendations of the Environmental Protection Authority' (Bulletin 950, September 1999) app 4, 16.
[296] EPA, 'Harvey Basin Surface Water Allocation Plan – Water and Rivers Commission – Advice to the Minister for the Environment from the Environmental Protection Authority under Section 16 (e) of the Environmental Protection Act 1986' (Bulletin 910, November 1998) (withdrawn) 14.
[297] Ibid.
[298] Minister for the Environment, 'Stirling-Harvey Redevelopment Scheme' (Ministerial Statement No. 525, 29 October 1999) sch 2 commitments P15-6 ('*Ministerial Statement for the Stirling-Harvey Redevelopment Scheme*'); Gardner (2006), above n 8, 227.
[299] Ibid.
[300] Gardner (2006), above n 8, 227; Kelsey et al., above n 33, 38. To the knowledge of the authors, Harvey Dam has overflown three times in the past decade, see, Water Corporation of WA, 'Harvey Dam peaks' (Media release, 9 November 2005); Water Corporation of WA, 'Harvey Dam is overflowing for the second time in two years' (Media release, 1 October 2010).
[301] Water Corporation, 'Licence to take water' (Instrument No. SWL56735(10), Department of Water, from 16 November 2012 to 30 June 2017) ('*North Dandalup Dam water licence*'). Obtained via email from Ben Drew, Department of Water, Government of Western Australia, to Alex Gardner and Jeanette Jensen, 27 November 2015.
[302] Ibid.
[303] *North Dandalup Dam Catchment Area Drinking Water Source Protection Plan*, above n 255, 2.
[304] *North Dandalup Dam water licence*, above n 301.
[305] Water Corporation, 'Integrated Water Supply Scheme – Water Resources Management Operation Strategy' (July 2012 – June 2017) ('*Water Resources Management Operation Strategy 2012-2017*').

environmental water requirements, as the State Policy on EWPs does, the strategy distinguishes between surface water riparian releases and surface water environmental water provisions.[306] According to the strategy, riparian releases haven been made from, inter alia, North Dandalup Dam in recent years, but it is not specified from which dams EWPs have been made.[307] Hence, it is recognised that these two kinds of releases serve different purposes and EWPs have not been determined for all surface water sources.[308] Yet, only in the case of the Canning Dam, a distinction seems to have been made between riparian and environmental releases (baseflow releases and freshwater cobbler passage flows, respectively),[309] which suggests that EWPs have not been set/adopted for the other dams, including North and South Dandalup as well as Serpentine dams[310] – none of which overflow.[311] However that may be, it is not apparent from the operating strategy for which dams EWPs have been set.

The release regime for the North Dandalup Dam as enshrined in the operating strategy largely reflects the regime of the EMP. In standard years (≥670 mm rainfall), 1 ML/day is released from 15 November to 20 December, where releases increase to 2 ML/day with the possibility of increasing to 3 ML/day for a short period depending on the weather.[312] Unless the DoW or the Water Corporation receives a phone call from landholders, this regime runs until 60 mm cumulative rainfall has been received after 1 April at Serpentine BOM station no. 9039.[313] Disregarding the potential increase to 3 ML/day and assuming that releases continue until 1 April, this amounts to a total of 239 ML.[314] In low rainfall years (<670 mm rainfall), the above numbers are reduced to 0.5, 1 and 1.5 ML/day, respectively.[315] Notably, the Water Corporation is to look at the current capacity of the dam and discuss with the Environmental Water Section of the DoW before turning releases on.[316] Historically, the proponent 'kept releases on to manage water quality in the recreational lake immediately downstream of release point'.[317] These releases are designed to flow as far as the summer groundwater discharges to the North Dandalup River and facilitate flows from there to the Estuary.[318] The groundwater discharges are, however, receding downstream.[319] The DoW's environmental objective for releases was 'to ensure that high value pools were maintained and that river connectivity continued as far downstream as possible to provide drought refuge for fish and crayfish'.[320] This objective seems to reflect the ARL's EIA findings, which recognised that regular flushing with compensation releases from the dam were necessary to maintain 'intermediate disturbance', 'maintaining species richness and diversity of macroinvertebrate and fish communities', especially with regard to the part of the river between the dam and the coastal plain, where a natural 'reset' occurs.[321] Yet, at least in June 2015, the North Dandalup River did not flow, which caused North Dandalup farmers to accuse the DoW of environmental vandalism, as it resulted in the failure of the river's environment and ecosystem.[322] The environmental objective has since been limited to maintain the high value pools downstream.[323] The DoW considers further releases to be a waste of water.[324] In summary, EWPs or environmental protection is not a condition of the water licence for North Dandalup Dam. While the operating strategy does determine a release regime for the dam and there is an environmental objective for such releases, the regime clearly reflects riparian needs rather than environmental.

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[306] Ibid 17.
[307] Ibid.
[308] Ibid.
[309] Ibid 39-42 (app 4).
[310] Ibid 40-1 (app 4).
[311] Kelsey et al., above n 33, 38.
[312] *Water Resources Management Operation Strategy 2012*-2017, above n 305, 40 (app 4).
[313] Ibid.
[314] ((16+19 days) x 1 ML) + ((12+31+28+31 days) x 2 ML) = 239 ML.
[315] *Water Resources Management Operation Strategy 2012*-2017, above n 305, 41 (app 4).
[316] Ibid 40 (app 4).
[317] Ibid.
[318] Telephone correspondence with Katherine Bennett, Department of Water, Government of Western Australia (16 February 2016).
[319] Ibid.
[320] Email from Ben Drew, Department of Water, Government of Western Australia, to Alex Gardner and Jeanette Jensen, 27 November 2015. See Appendix below.
[321] *North Dandalup Stream Fauna Study*, above n 108, 61.
[322] Strutt, above n 146.
[323] Meeting with Ben Drew and Katherine Bennet from the Department of Water at the Department of Water on Thursday 26 May 2016.
[324] Ibid.

Similarly, the current operating strategy for Harvey Dam does contain EWPs, but they consist only of social water requirements to maintain 'an aesthetically attractive flow' through the Harvey Tourist precinct over the summer period,[325] rather than an ecological component or compensation flows for the North Dandalup Dam. This is due to the findings put forward in the Harvey Basin Surface Water Allocation Plan from 1998,[326] which found that this part of the River 'did not have significant ecological values and was not important in contributing flows to the lower Harvey River and Estuary'.[327] The flows into the Harvey Estuary present at this time were 'sufficient for the maintenance of estuarine wetlands' and, therefore, the EWRs of these wetlands were set to 'maintenance of existing salinity and water levels'.[328] In fact, inflows from Harvey River were estimated to be around 25% greater than pre-European settlement levels,[329] for which reason a reduction in streamflow 'might be acceptable provided that flows were not reduced below pre-European settlement levels'.[330] EWPs were not even recommended on behalf of riverine and floodplain vegetation, as such releases were found inappropriate for 'these highly-modified water-dependent ecosystems…and would result in significant bank and channel erosion and further in-filling of pools'.[331] These findings were based on the best scientific information available at the time;[332] indeed, the Commission had ecological studies conducted to identify important ecological values and water requirements.[333] The Plan also recognises the drying climate and estimates that it will 'reduce overall source yields or consumptive use allocations by about 10-15% per year and increase unit costs by about the same amount' based on 1975-95 rainfall sequence.[334] It advocates that EWRs and EWPs be reviewed 'as information becomes available from monitoring and research'.[335] The original EWPs of 25 L/sec through the tourist precinct has been increased by 37.5 L/sec to a total of 62.5 L/s following continued call from locals and community groups for additional flow provisions.[336] This flow 'should be partitioned between Harvey Diversion Drain and the Harvey River (Main Drain) downstream of the diversion drain'.[337] But it is 'insufficient to stop vegetation encroachment or weed invasion along the watercourse…[m]uch higher release rates (made outside the irrigation season) would be required'.[338] The DoW, however, considers higher releases to be an inefficient use of water and 'believes appropriate river restoration and maintenance programs would be effective in meeting community expectations for this reach of the river [below the dam]'.[339] No releases are required outside the irrigation season (summer period).[340] It was the intention of the social environmental releases that 'any runoff below the Harvey Dam could contribute to achieving the flow requirements', but the intended flows are not being achieved.[341] There are two main reasons for this:[342]

1. Infrastructure to divert the additional releases from the Harvey River below the dam, into the Harvey River below the diversion drain has not been provided. Instead, in Dec 2010 an outlet pipe was fitted from the irrigation pipeline at Larson's Cut to release the additional water directly into the Harvey River below the diversion drain. As a result, the additional water does not flow through the tourist district as originally intended.
2. There are currently no gauging stations below the dam to measure runoff. The contribution to flow and the actual flow within the drains and river are consequently unknown.

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[325] Harvey Water, 'Harvey-Waroona Irrigation – Water Resource Management Operating Strategy' (2013) 13 ('*Harvey-Waroona Irrigation WRMOS*'). Relevant pages kindly provided by Harvey Water upon request.
[326] *Harvey Basin Surface Water Allocation Plan*, above n 86, 41-2.
[327] *Harvey-Waroona Irrigation WRMOS*, above n 325, 13.
[328] *Harvey Basin Surface Water Allocation Plan*, above n 86, 40 (Table 9), 41.
[329] Ibid 18.
[330] Ibid 41.
[331] Ibid 41-2.
[332] Ibid 41.
[333] Ibid 38.
[334] *Harvey Basin Surface Water Allocation Plan*, above n 86, 33.
[335] Ibid 38.
[336] *Harvey-Waroona Irrigation WRMOS*, above n 325, 13.
[337] Ibid.
[338] Ibid 14.
[339] Ibid.
[340] Ibid.
[341] Ibid.
[342] Ibid.

Harvey Water is to investigate and present these issues for approval in the annual Surface Water Review for Harvey Dam report.[343] Until the Surface Water Review is undertaken, the above release regime, which is a temporary arrangement, will operate.[344] The status of the review is unknown to the authors, but, although the strategy was supposed 'to be replaced on or before July 2014';[345] it is still the overriding strategy.[346] In other words, the temporary release regime is still operating. According to the operator, Harvey Water, the strategy is, however, discussed with the DoW every year and adjustments have been made.[347] Interestingly, Harvey Water seems to be of the opinion that the current dam operations are "saving" the Harvey River. The DoW projected to re-evaluate the water source system, including environmental release requirements and redefining source yields and operating rules as a result of the drier climate,[348] but this seems yet to be done. Harvey Water is currently obliged to increase the releases from the dam, if complaints are received regarding insufficient flows through the tourist precinct.[349] While some review of EWPs been conducted since 1998, they have only been adjusted to satisfy social water requirements. EWRs and EWPs do not seem to have been reviewed on behalf of the Estuary, as proposed by the Harvey Basin Surface Water Allocation Plan.

In summary, water is released into the Harvey River downstream of the diversion drain, but to satisfy social water requirements rather than ecological and only during summer months/the irrigation season. The missing infrastructure is curious considering the commitment of the 1991 North Dandalup EMP to divert water from the diversion drain back into the Harvey River below the drain and the Media Statement from 1994 announcing that such a diversion was made. The pipeline, through which current releases downstream the diversion drain are made, was not installed until 2010 and is designed to address summer flows only.[350] From an ecological perspective, such compensation flows may pose problems for the aquatic ecosystems, as the water delivered is often cold and chlorinated.[351] Whether the failure to keep the promise of no net water flow reduction to the Estuary is a result of simple forgetfulness, or a deliberate prioritisation of water for human consumptive use in a drying climate is not clear. The attitude of the DoW with regard to further releases from both North Dandalup and Harvey Dams, however, evidence a clear prioritisation of water for consumptive use.

This position is also clearly reflected by the proportion of water inflow released from the dam. Over the past decade, releases have on average constituted 21.2% of inflow.[352] For eight of the 10 years releases were, however, on average less than 6% of inflow.[353] The picture is skewed by the very dry years 2010-11 and 2015-16 where releases were 126.4% and 43.7% of inflow, respectively.[354] Again, the majority of this flow was released in summer months in the year 2010-11 after which winter releases ceased completely. According to scientific studies, an instantaneous stream flow regime of less than 10% of the average flow results in 'catastrophic degradation to fish and wildlife resources and harm both the aquatic and riparian environments'.[355] 10% of the average flow 'is a minimum instantaneous flow recommended to sustain *short-term* survival habitat for most aquatic life forms (emphasis added)'.[356] This information has been misconstrued to mean that 10% of the average flow is an acceptable

[343] Ibid.
[344] Ibid.
[345] Ibid 8.
[346] Email from Stephen Cook, Harvey Water, to Jeanette Jensen, 31 May 2016.
[347] Ibid.
[348] *Harvey-Waroona Irrigation WRMOS*, above n 325, 8.
[349] Ibid 14
[350] Email from Katherine Bennett, Department of Water, Government of Western Australia, to Jeanette Jensen, cc Stephen Cook (Harvey Water), 8 June 2016.
[351] Email from Keith Bradby to Jeanette Jensen, 9 October 2016.
[352] Email from Ben Drew, Department of Water, Government of Western Australia, to Alex Gardner and Jeanette Jensen, 2 November 2015. See Appendix below.
[353] Ibid.
[354] Ibid.
[355] Donald Leroy Tennant, 'Instream Flow Regimes for Fish, Wildlife, Recreation, and Related Environmental Resources' (1976) 1 *Fisheries* 6, 10.
[356] Ibid 9; James M. Loar and Michael J. Sale, 'Analysis of Environmental Issues Related to Small-Scale Hydroelectric Development. V. Instream Flow Needs for Fishery Resources' (Prepared for U.S. Department of Energy, Assistant Secretary for Conservation and Renewable Energy Division of Hydroelectric Resource Development. Publication No. 1829, Environmental Sciences Division, 1981) 52-3.

minimum.[357] In fact, 10% of the average flow will significantly reduce channel widths, depths, and velocities; degrade aquatic habitat; 'islands will no longer function as wildlife nesting, denning, nursery, and refuge habitat'; fish will be crowded into the deepest pools; and natural beauty and stream aesthetics will be badly degraded.[358] The recommended base flow to sustain 'good survival conditions for most aquatic life forms and general recreation' is 30% of the average flow.[359] With this percentage, widths, depths, velocities of channels, as well as stream aesthetics and natural beauty will, generally, be 'satisfactory'; island wildlife nesting, etc., will be secured in many cases; invertebrate life will be reduced but it is not expected to become a limiting factor in fish production'; and 'water quality and quantity should be good for fishing, floating and general recreation'.[360] The ideal environmental flow releases from dams and other diversion structures are 60% of the average flow, which will 'provide excellent to outstanding habitat for most aquatic life forms during their primary periods of growth and for the majority of recreational uses'.[361] These guidelines or thresholds constitute a significant part of what is known as the Montana Method for determining flows to protect aquatic resources.[362]

The above findings illustrate three things. First, climate change has reduced inflows significantly. Secondly, water for consumptive use has been prioritised. The proposed flow allocation regime based on EWRs from 1998 has been completely disregarded. Thirdly, the EMP riparian release regime has, largely, been complied with over the past decade, despite the lower inflows, while winter releases have been cut. This means that water for riparian use has been released even where such flow would not have occurred naturally, 'effectively inverting the natural seasonal distribution of river flows'.[363] Hence, water for this purpose is also prioritised before environmental requirements. While one may think that releasing more water during a formerly dry period would be beneficial, 'it generally has a range of adverse effects on aquatic and riparian species and ecosystem function'.[364] Indeed, the ARL study identified the dam's likely impact of 'unseasonal fluctuations in regulated flow regime' as a problem for which reason 'compensation releases' were recommended to 'mimic seasonality of natural flow regime'.[365] The study also recognised that climate change, in terms of the 'greenhouse' effect, would 'substantially reduce annual rainfall' in WA.[366] But it was not expected to have a severe impact on the North Dandalup Catchment, as it lay in an area with the highest recorded rainfall of the northern jarrah forest.[367] Stream permanence in this area was expected,[368] including providing drought refuge for aquatic macroinvertebrate fauna during such drier periods.[369] This illustrates that the 1988 flow projections, including the impact of climate change, were awfully inaccurate. The Harvey Dam inflow data is unknown to the authors, which, however, would be a bit more complicated to interpret, as the Harvey River upstream of the dam is also dammed (Stirling Dam).

In conclusion, the opportunity to set EWPs in the ministerial statement of approval and/or the water licence has not been seized, both in regards to the North Dandalup and Harvey Dams. Instead, EWPs have been set in the EMP and/or the operating strategies for the dams, but with the purpose to maintain social values rather than ecological. Although the EWP concept may have been new at the time of the ministerial approval of the North Dandalup Dam, it certainly was not on approval of the new Harvey Dam, or when the current water licences were granted. Moreover, while the riverine environment downstream of Harvey Dam might not have needed environmental flows per se at the time of approval, EWRs and EWPs were supposed to be reviewed and adjusted with, e.g., climatic changes. Moreover, this finding seems to overlook that the Harvey River Diversion was supposed to provide compensation flows for the North

[357] E.g., Christopher Gippel, 'The international transfer of environmental flow methods' (Speech delivered at the International River*symposium*, New Delhi, 12-14 September 2016).
[358] Tennant, above n 355, 9.
[359] Ibid 6, 9.
[360] Ibid.
[361] Ibid 9.
[362] Ibid 6.
[363] Email from Ben Drew, Department of Water, Government of Western Australia, to Alex Gardner and Jeanette Jensen, 2 November 2015 (See Appendix below); ARL, above n 66, 53 (Figure 3); Arthington, above n 53, 86.
[364] Arthington, above n 53, 86 (citations omitted).
[365] *North Dandalup Stream Fauna Study*, above n 108, 58 (Table 6).
[366] Ibid 56.
[367] ARL, above n 66, 17-8, 28, 51 (Figure 1).
[368] *North Dandalup Stream Fauna Study*, above n 108, 56; ARL, above n 66, 17-8, 28, 51 (Figure 1).
[369] *North Dandalup Stream Fauna Study*, above n 108, 56, 61-2.

Dandalup Dam reductions. Hence, the missing EWPs to maintain ecological values seem to be a result of all of the above, i.e. prioritisation of water for human consumptive use, climate change, and unawareness of, or disregard for prior commitments. This raises questions as to the legal effect of ministerial statements, including EMPs, and water licences, including operating strategies, which is the subject of the next section.

4.2 Legal effect of decisions or instruments made in fulfilment of the duty

As implied in the introduction, there are two aspects to the legal effect of duties. Whether they are binding on government agencies and all other persons, which is a prerequisite for them to be enforceable, and whether the obligations can be enforced by proceedings for judicial review in a court of law, in which case the obligations are also justiciable. In the context of public duties, the role of courts may be seen as 'providing machinery for accountability'.[370]

4.2.1 Environment Protection and Biodiversity Conservation Act 1999 (Cth) and the Environment Protection and Biodiversity Conservation Regulations 2000 (Cth)

As seen above, while the *EPBC Act* does not contain a duty to restore wetlands, the *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) (*EPBC Regulations*) may contain an indirect duty to restore by virtue of the management principles. These principles can, however, 'only guide State planning and management', and, similar to the case of groundwater, for surface water management they 'would operate only as a guideline, twice removed, for State management of listed Ramsar wetlands'.[371] Nevertheless, the content of a plan should accord with the management principles as subordinate legislation. While the Commonwealth must not contravene or authorise contravention of a plan,[372] the *EPBC Act* gives a plan no greater legal force against a State than it would have as an agreement with the Commonwealth, enforceable only by them. In other words, these principles are clearly not legally binding on government agencies and all other persons, and, therefore, cannot constitute justiciable obligations. As we advocate binding legal duties to restore, it is relevant to examine the effect of these non-binding principles, in terms of the extent to which they have been implemented.

As seen above and in accordance with the Ramsar Convention and the *EPBC Act*, a management plan has been adopted for the PYS, namely, the Ramsar Management Plan. Apart from the obligation to formulate and implement planning to promote conservation of wetlands, the plan recognises that Australia has undertaken a commitment to 'work towards the wise use of all their wetlands through national land-use planning, appropriate policies and legislation, management actions and public education'.[373] And indeed, the aim of the Ramsar Management Plan is to 'describe and maintain the ecological character of the Ramsar site', and to provide a management framework that 'works towards protecting and/or restoring the ecological character of the Peel-Yalgorup System',[374] among others. Also, in compliance with the *EPBC Regulations*, the Plan identifies the "actions" that endanger the ecological character of the wetland, which, as mentioned above, include agriculture, urban development, groundwater extraction, and climate change.[375] As seen above, the Plan ranks the threats of increased nutrient concentrations and decreased waterbird abundance or diversity for the Estuary as 'high', which, importantly, are considered human-induced.[376] This ranking is significant, as management action is only required for the threat levels 'high' and 'very high'.[377] The management responses to these threats are to implement the recommendations of the WQIP and to '[p]rovide support to local volunteers to undertake key waterbird monitoring

[370] Carol Harlow, 'Public Law and Popular Justice' (2002) 65 *Modern Law Review* 1, 5.
[371] Bennett & Gardner, above n 5, 5.
[372] *Environment Protection and Biodiversity Conservation Act* (Cth) s 330.
[373] *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17, 6.
[374] Ibid.
[375] Ibid 24.
[376] Ibid 25.
[377] Ibid 27.

programs', respectively.[378] Considering that one of the main objects of the Ramsar Convention is to 'stem the progressive encroachment on and loss of wetlands' as waterfowl habitats,[379] the latter response seems very mild. Unfortunately, the recommendations of the WQIP, with respect to waterways and wetlands, do not provide for increased flows,[380] but the WQIP is designed to achieve environmental flow objectives.[381] This objective can, however, only be achieved if the EWRs are known, which had not been determined for the Peel-Harvey catchment in 2008 and still does not seem to have been determined, even though further research for this purpose was advocated.[382] For this reason, the river flow objective for the tidal reaches of the three major rivers was temporarily set 'to maintain current flow variability'.[383] The EPA considered returning flows to their original state to be both 'impractical and unattainable'.[384] Indeed, it found further flow reductions inevitable due to the drying climate.[385] Nonetheless, the EPA also declared that the Water Corporation 'should be required to release flows as permitted under their legislation'; if studies show that this is necessary for the health of the rivers.[386] As mentioned above, the issue is not directly listed under the 'Summary of knowledge gaps' in the Ramsar Management Plan, but comprehensive baseline data on wetland threats and the impacts of climate change are. Notably, in 2002, the Ramsar Convention framework urged contracting parties to 'undertake the systematic implementation of environmental flow assessments, where appropriate, to mitigate socio-economic and ecological impacts of large dams on wetlands'.[387]

As opposed to the Peel-Harvey Estuary, the threat of decreased freshwater flows is ranked as 'high' for the Yalgorup, Goegrup and Black Lakes (part of the PYS).[388] The management action required to address this is to undertake further research of the severity and impact of the issue.[389] In offset policy terms, this amounts to an indirect response. In contrast, the threats of acidification ('very high'), decreased waterbird abundance or diversity ('high'), and decreased duration and extent of inundation ('high') for Lake Mealup,[390] triggered the management response of a diversion weir, which allowed 'controlled diversion of flow from the Mealup Main Drain into Lake Mealup to maintain water levels and reduce acidification'.[391] In the beginning of 2015, Lake Mealup was reported to be on the road to recovery with the pH level returning to within a normal range and the abundance of water birds increasing from less than 100 to over 2000, including new species.[392] The changes in the lake's natural hydrology were identified as the cause of the decline in ecological health.[393] This affirms the link between streamflow and ecological health. Curiously, the threat of decreased freshwater flows did not provide restoration of flows for the Yalgorup, Goegrup and Black Lakes, but such provision was made for Lake Mealup as a response to other threats. So, what facilitated this implementation of the duty to restore by environmental flows?

First of all, threats needs to be identified and measured. This requires comprehensive knowledge about and data on the threatening activity. The knowledge that allowed the above rankings was derived from the ecological character description of the sites setting out limits of acceptable change.[394] More specifically, the particular limits of acceptable change to nutrients, salinity, pH and littoral vegetation enabled wetland managers to find the human-induced impacts to be beyond acceptable change.[395] Secondly, the threats were ranked as 'high' and

[378] Ibid 28.
[379] *Ramsar Convention* Preamble.
[380] *Peel-Harvey Water Quality Improvement Plan*, above n 47, 42 (Table 7), 45 (Table 8).
[381] Ibid 27.
[382] Ibid.
[383] Ibid 32.
[384] Ibid.
[385] Ibid.
[386] Ibid.
[387] *Ramsar Resolution VIII.2* para 13.
[388] *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17, 26 (Table 9).
[389] Ibid 29.
[390] Ibid 26 (Table 9).
[391] Department of the Environment, *Wetlands in Australia – National Wetlands update February 2015 – Issue No 26* (Australian Government) 19.
[392] Ibid.
[393] Ibid.
[394] *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17, 47.
[395] Ibid 47-8.

'very high' requiring management action. As the extent and severity of acidification at Lake Mealup was unknown, the management response was to determine the cause and extent of acidification in surface and groundwater and investigate options for remediation.[396] As for decreased waterbird abundance or diversity, the management action was to '[p]rovide support to local volunteers to undertake key waterbird monitoring programs', and for decreased duration and extent of inundation(/decreased freshwater inflows) to '[d]etermine current conditions of flood duration and extent…together with an assessment of likely impacts on key species and communities within each ecosystem'.[397] Hence, the management actions did not directly require restoration of freshwater flows, which is, however, not surprising considering that the level of this threat was unknown, but the investigation led to knowledge about this impact, which again led to restoring flows. This illustrates how crucial knowledge about EWRs is, as a lack of such knowledge stalls the restoration of freshwater flows. In summary, to trigger management or restoration action under the Ramsar Management Plan, threats need to be identified, measured and ranked 'high' or 'very high'. A crucial component in this process is limits of acceptable change, as they provide the baseline against which change is measured. Phillips defines limits of acceptable change as:

> [T]he variation that is considered acceptable in a particular measure or feature of the ecological character of the wetland. This may include population measures, hectares covered by a particular wetland type, the range of certain water quality parameter, etc. The inference is that if the particular measure or parameter moves outside the 'limits of acceptable change' this may indicate a change in ecological character that could lead to a reduction or loss of the values for which the site was Ramsar listed. In most cases, change is considered in a negative context, leading to a reduction in the values for which a site was listed. [398]

It is, however, far from simple to set limits of acceptable change due to the often limited knowledge and understanding of these complex ecosystems.[399] Such limits can only be set for the relevant components and processes:

1. For which there is adequate information to form a baseline against which change can be measured;
2. For which there is sufficient information to characterise natural variability;
3. That are primary determinants of ecological character;
4. That can be managed; and
5. That can be monitored.[400]

Unfortunately, the abiotic component of hydrology does not meet all of these criteria,[401] which explains why the ecological character description of the PYS, including the Peel-Harvey Estuary and Lake Mealup, does not include limits of acceptable change to the site's hydrology. This is so despite the fact that it is recognised that hydrology 'is a key driver of wetland ecology', and that the alteration of river flows into the Estuary is of particular concern as well as the reduction of groundwater flow to the Yalgorup Lakes and Lakes McLarty and Mealup, which both 'have the potential to seriously impact the ecological character of the site [PYS]'.[402] The effect of climate change in terms of reduced rainfall and rises in sea levels is also recognised to have an equal potential to impact the hydrology of the site and thus the ecological character.[403] As it seems clear that hydrology meets the last three criteria,[404] the problem must be the first two, which fits with the above findings regarding knowledge gaps. For this reason, a different approach was adopted to the abiotic components of hydrology and water quality,[405] namely, establishing a set of guideline or trigger values for, inter alia, nutrients, pH, and salinity.[406] In other words, these components are indicative of the ecological health of the

[396] Ibid 28.
[397] Ibid 28-9.
[398] Hale & Butcher, above n 37, 125, quoting B. Phillips, 'Critique of the Framework for describing the ecological character of Ramsar Wetlands' (Department of Sustainability and Environment, Victoria, 2005).
[399] Hale & Butcher, above n 37, 127.
[400] Ibid.
[401] Ibid 127-8.
[402] Ibid 178.
[403] Ibid.
[404] Ibid 127.
[405] Hale & Butcher, above n 37, 128.
[406] Ibid 127-8.

wetland to which hydrology is a primary control factor.[407] This also explains why the ultimate restoration response to the acidification of Lake Mealup was a change in the hydrological regime. Another set of parameters through which change to the abiotic components of hydrology and water quality may be detected is the primary responses to these components and processes.[408] These include primary production, littoral vegetation extent and condition, and the distribution of aquatic plants to which limits of acceptable change can be set.[409] Finally, the key biological components are considered, which include key species and communities, i.e. the number and species of water birds, fish community, and thrombolites.[410]

Nutrient, pH, and salinity trigger values were set for the Peel-Harvey Estuary as well as a limit for the primary response of phytoplankton, but not the primary responses of seagrass, macroalgae, samphire, or paperbark due to insufficient baseline data.[411] Contrary to the case of Lake Mealup, the threats of acidification and decreased duration and extent of inundation were not ranked high enough to require management actions for the Estuary, as seen above. But the threats of increased nutrient concentrations and decreased waterbird abundance or diversity were, the former of which is an abiotic component indicative of water quality and the latter a key biological component indicative of, inter alia, hydrology. Ironically, the Dawesville Channel, which was constructed to alleviate the nutrient issue to prevent change in the ecological character, resulted in a 'fundamental and permanent' change to the ecological character of the Estuary.[412]

At the time of listing the Estuary was characterised by, inter alia, highly seasonal freshwater inflows from direct precipitation and rivers, limited tidal exchange with the Indian Ocean, and limited groundwater inflows (critical ecosystem components and processes), seasonal variability in salinity, samphire communities around the shorelines, paperbark communities in the Harvey River delta, and estuarine and marine species.[413] Following the Dawesville Channel these components and processes changed significantly.[414] While it decreased the nutrient concentration and increased marine species, it changed the salinity regime to more marine, i.e. increased salinity and made it more constant, caused changes to samphire (data deficient) and deterioration in tree health in the Harvey Estuary (littoral vegetation)[415] – this is an effect of seawater intrusion upstream, which low or no freshwater flows facilitate[416] – and possibly, and most likely, caused a decrease in estuarine species.[417] No evidence of change in waterbird abundance or diversity was found,[418] but no numerical baseline existed at this time due to a lack of systemic, long-term monitoring.[419] Thus, the new ecological character became the benchmark for measuring future change.[420] There are two legitimate explanations to why this change did not mandate restoration; either the change was not considered adverse,[421] or restoration was not physically possible.[422] It would have been politically difficult, if not impossible, to reverse the Dawesville Channel and more forcefully address the source of nutrients, but not physically impossible. This change in the ecological character is significant

[407] Ibid 127.
[408] Ibid.
[409] Ibid.
[410] Ibid 127-9.
[411] Ibid 129.
[412] Ibid 88-9.
[413] Ibid 42.
[414] Ibid 41.
[415] See also, the Ramsar Information Sheet (2003), which reported 'a significant decline in tree health along the lower Harvey River and the death of fringing vegetation along western shore of Harvey Estuary', which is believed to be due to changes in the salinity and tidal regime following the opening of the Dawesville Channel, see 'Peel-Yalgorup System RIS' (Department of Conservation & Land Management, 2003) 11 <http://www.environment.gov.au/cgi-bin/wetlands/ramsardetails.pl?refcode=36#>; Hall et al., above n 65, 48, 59. See further, N. Gibson, 'Decline of the riverine trees of the Harvey River delta following the opening of the Dawesville Channel' (2001) 84 *Journal of the Royal Society of Western Australia* 116, 116-117.
[416] Hall et al., above n 65, 14.
[417] Hale & Butcher, above n 37, 89.
[418] Ibid.
[419] Ibid 130 (Table 40).
[420] Ibid 88.
[421] *A Framework for processes of detecting, reporting and responding to change in wetlands ecological character*, Ramsar Resolution X.16, 10th Meeting of the COP (28 October – 4 November 2008) 8 (Flowchart 2); *A Conceptual Framework for the wise use of wetlands and the maintenance of their ecological character*, Ramsar Resolution IX.1 Annex A, 9th meeting of the COP (8-15 November 2005) para 19; Pittock et al., above n 6, 404.
[422] *Ramsar Resolution X.16* 8 (Flowchart 2); Pittock et al, above n 6, 420.

because the trigger values for the components of salinity and pH must have, compared to what they would have been at the time of listing, increased significantly with this change, and the subsequent deterioration of littoral vegetation became the baseline. Indeed, these are the exact parameters that triggered the restoration of freshwater flows in the case of Lake Mealup. In other words, if the Dawesville Channel had not been constructed, then these trigger values might have already been exceeded, and possibly, provided restoration of flows to the Estuary.

In summary, a lack of data and knowledge about the hydrology and EWRs of the Peel-Harvey catchment have prevented the setting of limits of acceptable change, including trigger values for primary responses and biological components, to this abiotic component. Noteworthy, the Estuary is the most studied estuarine system in south-western Australia. This emphasises the importance of monitoring and reporting on waterway and wetland conditions in general. Until such knowledge and data is obtained and the limits surpassed, this framework will not provide for restoration of freshwater flows to the Estuary. However, even if such knowledge was available, the Ramsar Management Plan does not provide a legal mandate to restore environmental flows. Indeed, the success of Lake Mealup may also have something to do with its moderate size (70 hectares).[423] The current status or outcome of the Plan's management actions for the Estuary is unknown, but in 2011 it was reported that there had been no reduction in nutrient exports to the Estuary since monitoring began.[424] The Ramsar Management Plan complies with the Ramsar management principles by describing the ecological character of the PYS, supplemented by a detailed document from 2007,[425] identifying actions that threaten this character, stating whether restoration or rehabilitation is needed (ranking system), where there is sufficient data, and, if so, explaining how the plan provides for this (management actions).[426] It is presumed that this ranking system facilitating management action is considered a 'mechanism to deal with the impacts' of the threatening activities. However, no management actions were required to deal with risks from changes to water regimes due to a lack of data. Nor does the Plan directly describe what, in general, must be done to maintain the ecological character of the PYS; it merely states the critical components and processes to this character, which if altered may cause a significant change. While these include hydrology, the description with regard to freshwater inflows from rivers is simply that they are 'highly seasonal',[427] there is no description or indication of what must be done to maintain this character, such as providing environmental flows, or setting limits to diversion. Considering the limited legal effect of the Ramsar management principles, this can have no legal consequences and is unlikely to have any consequences at all. Certainly, it has not had so far.

In conclusion, the limited legal effect of the Ramsar management principles may explain why the Ramsar Management Plan for the PYS does not fully comply with or implement these principles. Were these principles, including a duty to restore, legally binding, it would, arguably, have mandated the obtainment of the missing data needed to rank the threats and restore.

4.2.2 Rights in Water and Irrigation Act 1914 (WA)

Decisions on EWPs are given legal effect by the Department of Water through the issuing of a surface water licence under the *RiWI Act* specifying the conditions, or constraints applying to the use of the water source.[428] As seen above, EWPs are, however, often set in the operating strategy, compliance with which is a condition of the water licence.[429] Breach of licence conditions in terms of constraints amounts to the taking of water without right or a licence, which is an offence.[430] Hence, licence conditions are legally binding on the proponent.

The enforceability of licence conditions was also examined in 2006 and the position remains

[423] Hale & Butcher, above n 37, 77.
[424] Kelsey et al., above n 33, 32. Keith Bradby makes the relevant point that this may be due to an increase of nutrients from new sources, such as urbanisation, etc., which fill the "gap" of reduction from "old" sources, such as agricultural runoff.
[425] Hale & Butcher, above n 37.
[426] *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) sch 6 cl 2.01-2.02.
[427] *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17, 11 (Table 2).
[428] EPA, 'Samson Brook Redevelopment Scheme' (Bulletin 1055, July 2002) 10.
[429] Ibid 10; *Environmental Water Provisions Policy for Western Australia*, above n 9, 6.
[430] *Rights in Water and Irrigation Act 1914* (WA) s 5C.

the same.[431] The practical enforceability of licence conditions, including operating strategies, is hampered by the fact that these instruments are not publicly available.[432] Presuming that they may, however, be obtained upon request through the *Freedom of Information Act 1992* (WA) (*FoI Act*),[433] are they then justiciable?

As the enforcement mechanisms of the *RiWI Act* include criminal sanctions and civil enforcement mechanisms,[434] licence conditions are, prima facie, justiciable. The criminal enforcement mechanism includes the prosecution of offences and the power of the Department to investigate those offences,[435] but only the Minister has standing to enforce the criminal law.[436] Although this discretion is not absolute,[437] enforcement is largely subject to ministerial discretion with the common law right of any person to prosecute a criminal offence being repealed in 2004.[438] This is significant as only seven prosecutions were brought under the *RiWI Act* during the period 2003-14 despite extensive non-compliance with extraction limits under the Act revealed by the Gnangara Mound Metering Project. [439] This emphasises the importance of civil enforcement mechanisms to enforce the law and ensure accountability.
As statutory duties, both contravention of a licence condition and breach of the duty to take all reasonable steps to minimise degradation[440] may trigger the civil enforcement mechanism.[441] Contravention of a licence condition is, however, actionable only by an affected water rights holder, including licensees and landholders with riparian rights.[442] Furthermore, action 'against the Crown or…any contractor under the Crown', including its agencies, 'arising from any violation of the right to flow' has been barred,[443] at least, in proclaimed areas.[444] In other words, landholders cannot bring actions against the Department of Water or the Water Corporation for breach of EWPs on the grounds that their riparian right to flow[445] has been affected. On the other hand, not taking all reasonable steps to avoid degradation of the water resource, which, arguably, include EWPs to maintain ecological values, is actionable by 'a *person directly affected* by the degradation (emphasis added)'.[446] A 'person' includes a public body, company, or association or body of persons, corporate or unincorporate'.[447] Persons with such legal standing would, in addition to seeking an injunction, 'have the right to seek the exercise of the Supreme Court's extraordinary jurisdiction to injunct a criminal offence'.[448] So, whom exactly does the term 'directly affected' include, or perhaps rather exclude?

According to the parliamentary debates on the relevant section (5E), a 'person directly affected' is a limitation that excludes third party action.[449] This means that environmental groups and organisations are, prima facie, excluded. During the 2000 amendments, the Greens (WA) advocated a provision for third party standing in order to make 'any person who is concerned about the protection of the environment' able to have recourse to judicial review and seek a civil remedy.[450] Indeed, lack of standing is a 'major impediment to successful prosecution or

[431] Gardner (2006), above n 8, 226.
[432] Ibid.
[433] Ibid.
[434] Sarah Robertson, 'A Regulatory Framework for Monitoring and Enforcement of Water Access Rights in Western Australia' (2014) 37 *University of Western Australia Law Review* 215, 217.
[435] Ibid 217-8.
[436] *Rights in Water and Irrigation Act 1914* (WA) s 26J; Robertson, above n 434, 225.
[437] Robertson, above n 434, 230 (citations omitted).
[438] *Criminal Procedure Act 2004* (WA) s 20; Explanatory Memorandum, Criminal Procedure Act 2004 (WA) 3; Gardner (2006), above n 8, 226.
[439] Robertson, above n 434, 216 (citation omitted), 225, citing Director of the Magistrates Courts, 'Report of the Department of Water Prosecutions in the Western Australian Magistrates Court' (2010). Court records are not available prior to 2003.
[440] Western Australia, *Parliamentary Debates*, Legislative Assembly, 19 October 2000, p2473c-2492a, 11.
[441] *Rights in Water and Irrigation Act 1914* (WA) s 5E; Gardner (2006), above n 8, 226; Robertson, above n 434, 225.
[442] *Rights in Water and Irrigation Act 1914* (WA) s 5E(1)(a), (2)(a).
[443] *Rights in Water and Irrigation Act 1914* (WA) s 35(a); Gardner et al., above n 245, 204.
[444] Robertson, above n 434, 225, citing S. Scott, 'The Impact of ICM Agriculture v The Commonwealth in Western Australia: Returning the Gnangara Groundwater System to a Sustainable Level of Extraction' (LLB Hons Thesis, The University of Western Australia, 2010).
[445] See, e.g., Gardner et al., above n 245, 157-60.
[446] *Rights in Water and Irrigation Act 1914* (WA) s 5E(1)(b), (2)(b).
[447] *Interpretation Act 1984* (WA) s 5 (definition of 'person').
[448] Gardner (2006), above n 8, 226.
[449] Western Australia, *Parliamentary Debates*, Council, 10 October 2000, p1728b-1739a, 11-2.
[450] Ibid 4 (Hon Giz Watson).

redressing environmental degradation'.[451] While a provision to this effect was drafted and passed on 17 October 2000 during the Committee of the Whole House Stage of the Bill,[452] it was not moved to the Legislative Assembly out of fear that a rejection of this amendment would 'kill the Bill' in the upper House.[453] So, whom does the phrase 'directly affected' include?

To the knowledge of these authors, the phrase has been subject to judicial review in one case only.[454] In this case, the subsection was merely mentioned as conferring 'a right on *certain* water users to take civil proceedings for the degradation of water resources' (emphasis added).[455] While it confirms a limitation, it is not particularly helpful in ascertaining who exactly such certain water users are. Thus, it is necessary to draw on the general principles of standing.

The general or common law principle of legal standing in Australia is that an applicant must have a special interest in the subject matter of the proceedings.[456] The *Australian Conservation Foundation v Commonwealth* case established the so-called 'special interest' test.[457] The test applies to proceedings to prevent the violation of a public right or to enforce the performance of a public duty,[458] but for cases concerning constitutional validity.[459] While recognising 'that a person might have a special interest in the preservation of a particular environment',[460] i.e. the special interest need not be pecuniary,[461] Justice Gibbs rejected that a 'mere intellectual or emotional concern' suffices.[462] To pass the special interest test, a person must be 'likely to gain some advantage, other than the satisfaction of righting a wrong, [or] upholding a principle…if his action succeeds or to suffer some disadvantage, other than a sense of grievance or a debt for costs, if his action fails'.[463] These conditions clearly include personal property and economic rights and interest,[464] whereas public interests are explicitly excluded.[465] Hence, it is not possible to have recourse to the courts to prevent the violation of a public right or to enforce the performance of a public duty on the basis that this is in the public interest. This position embodies the general law concept of 'private rights' standing, which sees the judiciary's role purely as protecting individual rights and interests, whereas protecting public interests is the responsibility of the government.[466]

The *Onus v Alcoa of Australia* case[467] opened up for some 'beneficiaries of environmental laws'

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[451] Ibid.

[452] A Section 80 to this effect was proposed in the following terms:

80. Standing to bring proceedings in respect of breach of this Act

(1) Any person may bring proceedings in the Supreme Court for an order to remedy or restrain a breach or a threatened breach of this Act, whether or not any right of that person has been or may be infringed by or as a consequence of that breach.

(2) Proceedings under this section may be brought by a person on his or her own behalf or on behalf of himself or herself and on behalf of other persons (with their consent), or a body corporate or unincorporated (with the consent of its committee or other controlling or governing body), having like or common interests in those proceedings.

(3) Any person on whose behalf proceedings are brought is entitled to contribute to or provide for the payment of the legal costs and expenses incurred by the person bringing the proceedings.

See Western Australia, *Parliamentary Debates*, Council, 17 October 2000, p2102a-2116a, 9-10, 16.

[453] Western Australia, *Parliamentary Debates*, Legislative Assembly, 19 October 2000, p2473c-2492a, 19.

[454] *Ryan v Commissioner of Soil and Land Conservation* [2006] WASAT 380; Robertson, above n 434, 225.

[455] *Ryan v Commissioner of Soil and Land Conservation* [2006] WASAT 380, 11.

[456] *Australian Conservation Foundation v Commonwealth* (1980) 146 CLR 493, 527 (Gibbs J); *Onus v Alcoa of Australia* (1981) 149 CLR 27; *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 133 (Murray J); Andrew Edgar, 'Standing for environmental groups: Protecting public and private interests' in Matthew Groves (ed), *Modern Administrative Law in Australia* (Cambridge University Press, 2014) 140, 141.

[457] *Australian Conservation Foundation v Commonwealth* (1980) 146 CLR 493. 527 (Gibbs J); Edgar, above n 456, 141.

[458] *Australian Conservation Foundation v Commonwealth* (1980) 146 CLR 493. 526 (Gibbs J).

[459] Ibid 547 (Mason J).

[460] *Australian Conservation Foundation v Commonwealth* [(980) 146 CLR 493, 531 (Gibbs J).

[461] Michael Barker, 'Standing to Sue in Public Interest Environmental Litigation: From ACF v Commonwealth to Tasmanian Conservation Trust v Minister for Resources' (1996) 13 *Environmental and Planning Law Journal* 186, 190.

[462] *Australian Conservation Foundation v Commonwealth* (1980) 146 CLR 493. 531 (Gibbs J).

[463] Ibid.

[464] Edgar, above n 456, 142, 144.

[465] *Australian Conservation Foundation v Commonwealth* (1980) 146 CLR 493. 532 (Gibbs J).

[466] Samantha Hepburn, 'Implications of abolishing the representative standing provisions under the EPBC Act' (2015) 42 *Water: Journal of the Australian Water Association* 6, 7, citing Harlow, above n 370, 5.

[467] (1981) 149 CLR 27.

to be granted standing.[468] Justice Stephen did not consider the state of the law to be that 'the possession of intellectual or emotional concern is any disqualification from standing to sue', or 'the absence of mere material interest in that subject matter, in the sense of property or possessory rights'.[469] The applicants were found to have a personal interest in the protection of the environment, as they lived in close proximity and claimed to be custodians of the particular relics on the site.[470] The case expanded personal interests to include cultural and spiritual interests.[471] Notably, the case concerned emotional and intellectual interests of aboriginal communities, which are 'quite different from those of ordinary Australians'.[472] Nevertheless, the *Onus v Alcoa* case emphasised the flexibility of the test:[473]

> [T]he distinction between this case and the A.C.F. Case is not to be found in any ready rule of thumb, capable of mechanical application; the criterion of "special interest" supplies no such rule. As the law now stands it seems rather to involve in each case a curial assessment of the importance of the concern which a plaintiff has with particular subject matter and of the closeness of that plaintiff's relationship to that subject matter.[474]

But public interest claims are still excluded.[475] Similarly, in *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (*Bridgetown/Green-bushes*),[476] the court found that the special interest test does not require a person 'to uphold a private right or prove loss or damage'; that 'special interest will partly depend on the particular statute concerned';[477] and that '[q]uestions of standing are as much questions of fact as of law: the answers depend on the circumstances of the particular plaintiffs'.[478] An important distinction is to what category of beneficiaries the applicants belong.[479] Edgar divides stakeholders for environmental decisions into three categories, and it is in the second category that 'directly affected' becomes a requirement:[480]

1. Developers who apply for approvals and permits;
2. Neighbours, local residents, and those who may use the area in which the development is to occur; and
3. Individuals and groups who seek to protect the environment.

The first category of stakeholders has legal standing, as the interest, to maximise the development potential, is personal and related to economic and property rights, which are private rights.[481] In the context of water resources, this category would include water rights holders by licence, or riparian rights.[482]

According to traditional or strict standing laws, the second category of stakeholders has standing, if their property or economic interests are *directly affected*.[483] I.e. this phrase is a condition that determines whether special interest exists for this category of persons. The current requirement is that a personal interest must be directly affected. In addition to the above, such interests also include noise and odour impacts as well as the aesthetic and recreational qualities of the particular area.[484] The case Edgar refers to in this regard is *Day v Pinglen Pty Ltd*,[485] in which the appellant was granted standing to maintain proceedings for an injunction on the basis that a proposed development would interfere significantly with her existing panoramic view of Lavender Bay, the Harbour and the city.[486] The Court further noted that 'the

[468] Edgar, above n 456, 144.
[469] *Onus v Alcoa of Australia* (1981) 149 CLR 27, 42.
[470] Ibid; Edgar, above n 456, 144.
[471] *Onus v Alcoa of Australia* (1981) 149 CLR 27, 42; Edgar, above n 456, 144-5.
[472] Barker, above n 461, 191.
[473] Ibid 192.
[474] *Onus v Alcoa of Australia* (1981) 149 CLR 27, 42.
[475] Ibid 42; Edgar, above n 456, 142, 144.
[476] (1997) 18 WAR 126.
[477] *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 127.
[478] Ibid 159 (Templeman J).
[479] Edgar, above n 456, 142.
[480] Ibid 141-2.
[481] Ibid 142.
[482] *Rights in Water and Irrigation Act 1914* (WA) ss 5C, 9(1), 10(1), 20(1), 21(1); Gardner et al., above n 245, 208.
[483] Edgar, above n 456, 142.
[484] Ibid 142.
[485] (1981) 148 CLR 289, 299-300; Edgar, above n 456, 142.
[486] *Day v Pinglen Pty Ltd* (1981) 148 CLR 289, 300.

interference would also reflect on the value of her property'.[487] It is not clear why Edward does not refer to the *Onus v Alcoa* case in this context, as he finds that the 'applicants in *Onus* were treated as local residents with personal interests directly affected by the [particular development] decision'. [488] In *Bridgetown/ Greenbushes*, the environmental associations Bridgetown Greenbushes and Balingup Friends of the Forest, as well as the South-West Forests Defence Foundation were granted standing.[489] The special interest test was satisfied, inter alia, by the fact that the associations were 'responsible and representative' bodies with a particular focus on and purpose of the management and conservation of the relevant forests, which some received funding for, and, therefore, they were not mere 'busy bodies'.[490] For these reasons, the associations were directly affected by the development decision. These factors are similar to the requirements for the third party standing under the *EPBC Act*.[491] The associations would not have been granted standing simply on the basis of representing their members' personal interests;[492] '[m]embers' pre-incorporation activities can only indicate that if the association continues such activities it is likely to acquire standing in due course'.[493] This is contrary to the position in the United States and the United Kingdom.[494] In the context of our case study, the above means that the Peel-Harvey Catchment Council (PHCC) would have legal standing with regard to protecting the Peel-Harvey Catchment, including the Estuary.[495]

The third category of stakeholders represents the public interest, which is per definition neither private nor personal and, thus, excluded from obtaining legal standing under the current general rules.[496] While both sets of stakeholders in the second and third categories are considered beneficiaries of environmental law, only those belonging to the second category may acquire legal standing pursuant to the general law. Geographical proximity is currently a precondition for having a personal interest to the satisfaction of the special interest test in environmental or conservation cases.[497]

As the general standing principles do not provide for 'open standing',[498] but exclude broad third party or public interest actions, standing on these grounds must be specifically provided for by statute to apply.[499] As seen above, the *RiWI Act* does not allow such action. The Act concerns the balancing of private rights and protecting the environment,[500] which, currently, falls in favour of the former. In contrast, the *EPBC Act* does provide for 'representative standing'.[501] The Act grants organisations and individuals standing to seek injunctive relief and initiate judicial review of decisions taken by the Commonwealth Environment Minister under the Act on certain conditions,[502] which has enabled judicial consideration of the legislation's operation.[503] Such provision may be explained by the fact that decisions under the *EPBC Act* often impact Crown rather than private land.[504] However, decisions under the *RiWI Act*, too, concern the public resources of Crown vested waterways and wetlands, which make it 'highly amenable' to public

[487] *Day v Pinglen Pty Ltd* (1981) 148 CLR 289, 300.
[488] Edgar, above n 456, 145.
[489] *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 162-4 (Templeman J), 135 (Murray J).
[490] Ibid.
[491] *Environment Protection and Biodiversity Conservation Act 1999* (Cth) ss 475(7), 487(3).
[492] *Australian Conservation Foundation v Commonwealth* (1980) 146 CLR 493. 531 (Gibbs J); *Bridgetown/ Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 127, 159 (Templeman J); Edgar, above n 456, 148-51. But see, *Australian Conservation Foundation v Commonwealth* (1980) 146 CLR 493, 531 (Murphy J); *Shop Distributive and Allied Employees Association v Minister for Industrial Affairs of South Australia* (1995) 183 CLR 552, 557-9; Edgar, above n 456, 149.
[493] *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 127.
[494] Edgar, above n 456, 149-50 (citations omitted).
[495] Peel-Harvey Catchment Council, 'About us' on Peel-Harvey Catchment Council <http://www.peel-harvey.org.au/?page_id=14>.
[496] Edgar, above n 456, 142-3. See also *Day v Pinglen Pty Ltd* (1981) 148 CLR 289, 300.
[497] *Onus v Alcoa of Australia* (1981) 149 CLR 27, 42 (Stephen J); *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 127, 134 (Murray J); Barker, above n 461, 192.
[498] Hepburn, above n 466, 7.
[499] *Australian Conservation Foundation v Commonwealth* (1980) 146 CLR 493. 526 (Gibbs J).
[500] Western Australia, *Parliamentary Debates*, Council, 10 October 2000, p1728b-1739a, 2 (Hon Giz Watson).
[501] *Environment Protection and Biodiversity Conservation Act 1999* (Cth) s 487; Hepburn, above n 466, 7.
[502] *Environment Protection and Biodiversity Conservation Act 1999* (Cth) ss 475(6)-(7), 487; Peel & Godden, above n 191, 681.
[503] Peel & Godden, above n 191, 669.
[504] Hepburn, above n 466, 7.

interest action as well.[505] Although the tendency seems to be to expand standing rules in the rest of the world,[506] sadly, the Commonwealth Government wants to repeal the provision (Section 487(2)) that allows representative standing for judicial review of the *EPBC Act*.[507]

In summary, breach of licence conditions, such as EWPs, is actionable only by other water rights holders, including licensees and landholders. Such persons have interests other than environmental protection and with regard to riparian rights such action is barred against the Crown and its contractors/agencies. Hence, while some riparian rights are maintained in public drinking water supply areas, they cannot be enforced against the Crown. Breach of the duty to take all reasonable steps to minimise degradation is actionable by neighbours to and local residents of a degraded water resource in addition to water rights holders. Finally, those who use the area for recreational activities may be granted standing to seek an injunction, among other things, if the degradation devalues their property, causes an odour impact, or affects the aesthetic and recreational qualities of the particular area. At least, the three latter impacts are or have been relevant to the Peel-Harvey Estuary. Indeed, an odour impact has been observed on several occasions.[508] Despite the longstanding degradation of the Peel-Harvey Estuary, such impacts do not seem to have generated use of the enforcement provisions. This may be explained by the fact that 'individuals are unlikely to bring proceedings on their own', as '[t]he harm to the affected individuals may be small and the costs and stress of litigation too great for them to bring proceedings themselves'.[509] This is one of the main arguments in favour of representative or third party standing, i.e. to allow environmental organisations to undertake proceedings on behalf of such individuals.[510]

In conclusion, licence conditions are enforceable in theory, but less so from a practical perspective.[511] They are also justiciable, but only by the Minister and other water rights holders and not against the Department of Water or the Water Corporation with respect to any violation of the right to flow. Thus, securing or enforcing environmental responsibility in terms of EWPs, which is in the public interest, cannot be enforced by the public. For this reason, the practical legal effect of EWPs as licence conditions is limited. While the duty to take all reasonable steps to minimise degradation is enforceable and justiciable through civil enforcement mechanisms, and by a wider range of stakeholders, this avenue has not been utilised. Such stakeholders may not have the interest or means to enforce it for which reason the enforceability of this duty is also practically hampered by the limited category of people afforded standing. Hence, as noted by Robertson, 'there is definitely room for improvement when considering the civil enforcement mechanisms under the *RiWI Act*';[512] '[f]ailure to enforce the law fosters a dangerous culture of entitlement among water users', and 'undermines the objectives of the legislation and erodes the ability for the law to act as a deterrent'.[513] Although Justice Gibbs in *Onus v Alcoa* recognised that law enforcement is a factor, when considering standing on the grounds of intellectual and emotional concern, he found it to be outweighed by competing considerations, such as not putting others to 'very great cost and inconvenience in defending the legality of his actions'.[514] Moreover, he finds the proper role of courts to be that of an adversary system; which 'should decide only a real controversy between parties each of whom has a direct stake in the outcome of the proceedings'.[515] The special interest test is an attempt to reconcile these competing considerations,[516] and ensure 'that courts remain within the scope of judicial rather than political functions'.[517] Thus, as noted by Edgar, standing rules are, ultimately, determined by which of the competing principles of the rule of law and separation of powers a jurisdiction favours,[518] and Australia so far favours the latter. However, Australia did

[505] Ibid 7.
[506] Harlow, above n 370, 5.
[507] Hepburn, above n 466, 6.
[508] See, e.g., Bradby, above n 56, 92.
[509] Edgar, above n 456, 150.
[510] See, e.g., Edgar, above n 456, 148-51.
[511] Gardner (2006), above n 8, 227.
[512] Robertson, above n 434, 218.
[513] Ibid 217.
[514] *Onus v Alcoa of Australia* (1981) 149 CLR 27, 36; Edgar, above n 456, 147.
[515] *Onus v Alcoa of Australia* (1981) 149 CLR 27, 36.
[516] Ibid.
[517] Edgar, above n 456, 146 (reference omitted).
[518] Edgar, above n 456, 148.

take the first step towards the rule of law in *Onus v Alcoa*,[519] and Justice Templeman recognised that the law in environmental cases is developing.[520] Indeed, 'non-governmental actors and courts are emerging as the most prominent players in this new era, and the theme is changing from "centralisation" to that of "ecologically sustainable development"'.[521]

4.2.3 Environmental Protection Act 1986 (WA)

The legal effect of ministerial conditions was also considered in 2006 and this position has not changed either. As opposed to water licences, ministerial conditions are publicly available from the EPA's website.[522] Ministerial conditions under the *EP Act* 'have the apparent force of law', as non-compliance with such conditions is an offence.[523] Hence, it is a public duty to comply with ministerial conditions.[524] For this reason, although only the Chief Executive Officer (CEO) of the Department of Environment or an authorised person has authority to prosecute under the *EP Act*,[525] a person with legal standing may enforce the duty through civil enforcement mechanisms.[526] The practical scope of such enforcement is, however, limited by the special interest test, as seen above. Moreover, even if legal standing is granted, the *Bridgetown/Greenbushes* case has proved it difficult to enforce the duty to comply with ministerial conditions. In this case, it was established that the discretionary relief of injunction to prohibit conduct,

> will only be exercised by a court…in extraordinary or exceptional circumstances, which clearly call for the intervention of the court, rather than leave the process of enforcement of the obligation to the ordinary application of the criminal law and the prosecution process. The sort of case which may be appropriate for the grant of relief by injunction in such circumstances is where there is a continuing offence which may be established, or a clearly threatened intention to do acts or make omissions which would constitute the commission of an offence in circumstances where the effect would be to cause irreparable damage or irreversible harm.[527]

The court found that breach of the ministerial condition in question was not subject to judicial review until the monitoring Committee and the EPA had found non-compliance.[528] This finding was based on the terms of a particular compliance condition of the ministerial approval statement, which prescribed that the EPA and, if necessary, the Minister were responsible for verifying compliance with the ministerial conditions.[529] Justice Templeman found this state of affairs confirmed by the fact that only the CEO, or an authorised person, has authority to prosecute under the *EP Act*.[530] Both Justices Murray and Scott agreed with the ultimate finding,[531] but Justice Murray did not agree that section 114 of the *EP Act* in question per se excluded civil enforcement mechanisms by a private litigant with standing.[532] Justice Scott did not comment on this particular point. Similarly, in the context of the *Conservation and Land Management Act 1984* (WA) (*CALM Act*), the court found that the function of the Lands and Forest Commission 'to monitor the carrying out of management plans by the Department in respect of land vested in the Commission' did not oust the court's jurisdiction to review

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[519] *Onus v Alcoa of Australia* (1981) 149 CLR 27, 73-4.
[520] *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 157 (Acting Master Chapman), 159 (Templeman J).
[521] Peel & Godden, above n 191, 690, 694.
[522] 'Ministerial Approval Statements' on Environmental Protection Authority, *Post Assessment* <http://www.epa.wa.gov.au/peia/approvalstatements/Pages/default.aspx?cat=Ministerial%20Approval%20Statements&url=peia/approvalstatements>.
[523] *Environmental Protection Act 1986* (WA) s 47(1).
[524] *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 141 (Murray J); Gardner (2006), above n 8, 228.
[525] *Environmental Protection Act 1986* (WA) s 114.
[526] *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 128, 141 (Murray J); Gardner (2006), above n 8, 228.
[527] Ibid 141-2 (Murray J).
[528] Ibid 128.
[529] *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 179-81 (Templeman J); Minister for the Environment, 'Amendments to the 1987 Forest Management Plans and Timber Strategy and proposals to meet environmental conditions on the regional plans and the WACAP ERMP' (Ministerial Statement, Bulletin 652, 24 December 1992) Condition 18; Gardner (2006), above n 8, 228.
[530] *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 180 (Templeman J).
[531] Ibid 140 (Murray J), 156 (Scott J).
[532] Ibid 141 (Murray J).

compliance with that section;[533] 'it is only in a clear case, or by the use of express words, that the courts will accept that there has been a legislative ouster of the jurisdiction they would otherwise possess'.[534] It seems the same should apply to ministerial conditions. Moreover, with respect, the opposite 'proposition strains constitutional principle because it opens the possibility that the executive can, by the terms of a condition, empower itself to determine after the fact when a condition is breached'.[535] On this basis, arguably, it is not a precondition for judicial review of ministerial conditions that the relevant monitoring or compliance body finds non-compliance, regardless of whether such responsibility is stated or implied in the conditions. However that may be, the North Dandalup Dam ministerial statement of conditions does not include a specific compliance condition, or confers compliance responsibility on any particular body. Thus, if the terms of the conditions are of an enforceable nature, then they are justiciable. It is, however, doubtful that Commitment 7 is enforceable as requiring a riparian (/environmental) release regime. Rather it may be construed to include a duty to consult riparian landowners to determine a satisfactory arrangement.[536] As mentioned above, the conditions do not stipulate EWPs. Instead, EWPs have been adopted in the EMP, as per usual.[537] So, what is the legal effect of an EMP?

The EMP is an outcome of the EIA. While the EIA process itself is a legal requirement in WA,[538] the EIA recommendations are not legally enforceable per se.[539] The proponent is not bound by 'any of the statements made in the assessment documentation about likely impacts'.[540] EIAs are 'purely informative'.[541] Likewise, management plans per se are, generally, not legally binding instruments, unless legal force has been conferred upon them by statute, etc. The enforceability of management plans was also considered in the *Bridgetown/Greenbushes* case and Justices Murray and Scott found that the Forest Management Plan under the *CALM Act* was 'no more than a broad statement of policy or guidelines'.[542] Notwithstanding, the legal effect was considered due to the statutory duty imposed on the defendants to manage State forests in accordance with the relevant Forest Management Plans.[543] The court, however, found that this duty did not oblige the proponent to implement such plans 'in any particular manner', as the implementation was subject to 'wide discretion as to the manner in which the statutory duties are discharged', but for a duty to act honestly and in good faith as well as in compliance with Ministerial directions.[544] Thus, compliance with such plans was subject to judicial review, but the wide discretion made such enforcement practically difficult, if not impossible.[545] The plaintiffs sought to establish breach of the management plan objectives by not having fulfilled the duties stated in the plan to achieve this objective.[546] The court rejected this, as, similar to the case of statutory objectives, while the defendants are legally obliged to consider them, 'the way in which they take these considerations into account, and the weight given them, are matters for their discretion'.[547] Furthermore, the particular duties of the management plan were subject to political and financial consideration at the discretion of the defendants.[548] It should, however, be noted that management plans under the *CALM Act* and the *EP Act* serve different purposes. Under the *CALM Act*, management plans are legislative and, therefore, directed at many. In contrast, management plans under the *EP Act* are executive and, therefore, directed at few, or in other words, simply, at the proponent, for which

[533] Ibid 138 (Murray J).
[534] Ibid.
[535] Gardner (2006), above n 8, 228.
[536] See, e.g., *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 144-5 (Murray J), 168 (Templeman J), albeit concerning a management plan.
[537] Gardner (2006), above n 8, 227.
[538] *Environmental Protection Act 1986* (WA) Part IV; Bates (2013), above n 185, 343.
[539] Bates (2013), above n 185, 344, 349-50.
[540] Lee Godden and Jacqueline Peel, *Environmental Law – Scientific, Policy and Regulatory Dimensions* (Oxford University Press, 2010) 169; *AGC (Advances) v Roads and Traffic Authority NSW* (1993) 30 NSWLR 391, 397-9. See also, Bates (2013), above n 185, 348.
[541] Godden & Peel, above n 540, 169; *Environmental Protection Act 1986* (WA) s 44. See also Bates (2013), above n 185, 349-50.
[542] *Bridgetown/Greenbushes Friends of the Forest v Conservation and Land Management* (1997) 18 WAR 126, 137 (Murray J), 153 (Scott J). See also, 169 (Templeman J).
[543] Ibid.
[544] Ibid 128.
[545] Ibid 128, 174-5.
[546] Ibid 128.
[547] Ibid.
[548] Ibid 169 (Templeman J).

reason it is more likely to be enforced. For these reasons, the *CALM Act* is also more susceptible to political and financial considerations. Yet, contrary to the *CALM Act*,[549] neither the *EP Act* nor the *RiWI Act* require that dams or water resources are managed in accordance with an EMP. The ministerial statement of approval concerned does, however, require that the proponent 'implement to the satisfaction of the Minister for Environment on advice of the Environmental Protection Authority and the Department of Conservation and Land Management, an Environmental Management Programme [the EMP]'.[550] Considering the *Bridgetown/Greenbushes* case, the phrase 'to the satisfaction of' may exclude enforcement of the EMP, where these authorities are satisfied with the implementation. The ministerial statement of approval for the Stirling-Harvey Redevelopment Scheme takes a clearer approach and requires the proponent to 'implement subsequent environmental management commitments which the proponent makes as part of the fulfilment of conditions and procedures in this statement'.[551] While both statements afford legal effect to the environmental commitments of the EMPs, civil enforcement is likely to prove difficult. This means that the EWPs and commitment of the North Dandalup Dam EMP to 'ensure that on average there is no net reduction in water flows to the Peel-Harvey Estuary' may not be practically enforceable by civil enforcement mechanisms or justiciable.

In summary, while ministerial conditions of approval are, prima facie, both enforceable and justiciable, as always, such legal effect depends on the particular language. Furthermore, EWPs are usually not included as a ministerial condition, but instead as a commitment of the EMP, which compromises the legal effect even further. While EMP commitments are enforceable and justiciable in theory, provided that the ministerial conditions require implementation of the EMP, the practical reality draws a different picture. Although distinguishable on both the facts and law, the *Bridgetown/Greenbushes* case illustrates the difficulty with enforcing ministerial approval conditions and management plans. Combined with the fact that there is still no public record of EMPs,[552] EWPs under the *EP Act*, are, indeed, unenforceable from a practical perspective.[553]

4.3 Duty to monitor and report

Compliance information is a precondition for enforcement. According to Bates, this purpose of helping to ensure that the proponent complies with approval conditions is only the secondary purpose of monitoring and evaluation.[554] The primary purpose is to compare predicted and actual impacts of the activity after it has commenced to measure the accuracy of the EIA process predictions and adjust conditions accordingly, where appropriate, i.e. to apply adaptive management.[555] While this is not the purpose of this analysis, it is an important point to note. If too little water is allocated to the environment to begin with, then this process will facilitate further allocations. Thus, the question is whether there is a duty on the responsible agency to monitor and report on the implementation of EWPs? This question, too, was considered in 2006.[556] Although not legally enforceable, the Ramsar Management Plan for the PYS will be mentioned briefly to ascertain whether it includes such duties.

The Ramsar management principles prescribe that the management plan should 'provide for continuing monitoring and reporting on the state of its ecological character'.[557] In response, the Ramsar Management Plan provides for 'ecological monitoring' on the basis of the limits of acceptable change.[558] The Plan also lists priority monitoring needs and areas requiring further

[549] *Conservation and land Management Act 1984* (WA) s 33(3)(a).
[550] *Ministerial Statement for the North Dandalup Dam*, above n 251, Condition 2.
[551] *Ministerial Statement for the Stirling-Harvey Redevelopment Scheme*, above n 298, Commitment 2-2.
[552] Gardner (2006), above n 8, 227. The *North Dandalup Dam Environmental Management Plan*, above n 107, was obtained from the State Library of Western Australia's archive upon request. A select few seem to be available from the EPA's website, possibly, due to a ministerial condition of publication: <http://www.epa.wa.gov.au/SearchCentre/results.aspx?k=management%20plan>.
[553] Gardner (2006), above n 8, 227.
[554] Bates (2013), above n 185, 347.
[555] Ibid. See also Jackie King and Cate Brown, 'Environmental Flows: Striking the Balance between Development and Resource Protection' (2006) 11 *Ecology and Society* 15-18.
[556] Gardner (2006), above n 8, 229.
[557] *Environment Protection and Biodiversity Conservation Regulations 2000* (Cth) sch 6 cl 2.02(h).
[558] *Peel-Yalgorup System Ramsar Site Management Plan*, above n 17, 47.

research due to knowledge gaps.[559] In relation to the Estuary, such needs include water quality, aquatic plants, littoral vegetation, and waterbirds, which are all categorised as being of high priority.[560] This complements the finding above regarding insufficient information on the Estuary and its water requirements.

The *Water Agencies (Powers) Act 1984* imposes certain general legal duties on the Minister for Water with regard to water resources.[561] These duties include conserving, protecting, managing, and assessing water resources.[562] However, as with the former akin duties of the Water and Rivers Commission and similar to the EMP duties,[563] 'there is a very broad discretion in the execution of those duties, and the fulfilment of them has to be considered in the light of the constraints on human and financial resources'.[564] These duties are the only general statutory duties pertaining to the monitoring and reporting of water resources management.[565] The *RiWI Act* simply requires water allocation plans to 'specify the monitoring and reporting (which is to occur at least once in every seven years) to be carried out by the Minister to ensure, as far as practicable, that the objects of this Part are achieved in the implementation of the plan'.[566] Yet again, no such plans have been made.[567] In other words, the *RiWI Act* does not contain any statutory duties to monitor and report on compliance with water licences. While the Act authorises the Regulations to prescribe or impose monitoring and reporting as a general condition included in all licences,[568] this opportunity has not been seized.

Instead, monitoring and reporting conditions are left to the discretion of the Minister determining the licence conditions.[569] Such monitoring may have as its object 'any water resource and its ecosystem', or 'the environment in which the water resource is situated'.[570] This power was utilised when granting the current North Dandalup Dam water licence according to which 'the licensee must submit a surface water/dam monitoring review prepared by a surface water professional' every three years, which 'is to contain a complete history of monitoring data and detailed analysis of impacts from extraction'.[571] The licensee is also obliged to 'submit a surface water/dam monitoring summary prepared by a surface water professional' every year, which 'is to contain a summary of all monthly data and analysis of impacts from abstraction'.[572] The operation strategy contains duties to monitor and report as well. For surface water resources, the operator/licensee is under an obligation to submit to the Department, inter alia, summaries of 'net water abstraction from surface water sources' and of 'monthly riparian and surface water environmental release volumes' on a yearly basis.[573] The information in the Appendix below must be a result of these obligations. Also, the operator/licensee is obliged to identify, document, and report any breaches of the strategy along with the remedial action taken to the Department within 10 working days of the monitoring result becoming available.[574] While these duties must provide comprehensive information for verifying compliance with EWPs and general environmental objectives, none of the information is publicly available. As in 2006, there seems to be no public record of the operation of and compliance with EWPs.[575] The only information available is basic data on the monitoring of surface water levels and flow,[576] which is not easy to interpret for a layperson. Indeed, the Explanatory Notes to the DoW's Water

[559] Ibid 49-51.
[560] Ibid 50 (Table 16).
[561] *Water Agencies (Powers) Act 1984* (WA) s 9.
[562] Ibid s 9(1)(a)-(b).
[563] *Water and Rivers Commission Act 1995* (WA) s 10, as repealed by Water Resources Legislation Amendment Bill 2006 (WA) s 189.
[564] Gardner (2006), above n 8, 231, citing A. Roberts and A. Gardner, 'Challenges for the Management of Water Resources in Western Australia: A Legal Response to Findings of the Public Sector Performance Report, 2003' (2005) 22 *Environmental and Planning Law Journal* 40, 52-53.
[565] Gardner (2006), above n 8, 231.
[566] *Rights in Water and Irrigation Act* 1914 (WA) ss 26GW(3), 26GX(3), 26GY(3).
[567] Gardner (2006), above n 8, 232.
[568] *Rights in Water and Irrigation Act* 1914 (WA) s 15(1), (5), app to sch 1 cls 9-10.
[569] Ibid s 7(1), (5).
[570] Ibid ss 7(1), (5), 15(3) app to sch 1 cl 9.
[571] *North Dandalup Dam water licence*, above n 301.
[572] *Water Resources Management Operation Strategy 2012*-2017, above n 305, 9-10.
[573] Ibid.
[574] Ibid 10.
[575] Gardner (2006), above n 8, 232-3.
[576] 'River Level Monitoring' on Department of Water, Government of Western Australia, *Maps & Data*, *Monitoring and Data* <http://water.wa.gov.au/maps-and-data/monitoring/river-level-monitoring>.

Information Reporting system states that '[d]ata can be easily misinterpreted and misapplied', [577] and they particularly emphasise the difficulty of establishing baseline environmental values through the system information.[578] Even if one succeeds, then it is not particularly useful without knowing the water requirements of the rivers or ecosystems and having a prior baseline condition to compare against. In other words, the publicly available information does not enable detection of non-compliance with EWPs.

The only other potential source of monitoring data is the proponent's reports prepared under the EIA provisions of the *EP Act*.[579] Such reports include, inter alia, reports on the monitoring of the implementation of a proposal under ministerial conditions.[580] While the *EP Act* does not contain a duty to monitor and evaluate project approval conditions – indeed, such a duty 'is not a common feature of legislative requirements for development'[581] – it does confer on the Minister for Environment the power to review such conditions by monitoring the implementation of a proposal, which may lead to them being changed or a new EIA required.[582] Remarkably, according to Bates, WA is the only state in which post-EIA monitoring traditionally has 'been accorded any notable priority'. [583] The purpose of such monitoring is, however, first and foremost to identify non-compliance, [584] rather than facilitate adaptive management. If implementation conditions provide that the proposal must be implemented subject to the requirements of a decision-making authority, as in the case of the North Dandalup Dam (the EPA),[585] then this authority may also monitor or cause implementation to be monitored.[586] This means that the EPA may monitor or cause to be monitored the implementation of the North Dandalup Dam proposal with regard to the ERMP commitments.[587] Sadly, a lack of both human and financial resources in most jurisdictions means that formal monitoring of the success or outcome of the EIA process is unlikely.[588] Thus, not surprisingly, '[o]ne of the failures of most EIA systems relates to a lack of post-decision monitoring'.[589] Without such monitoring it is hard to identify and avoid mistakes and shortcomings of the EIA process.[590] For this reason, to a great extent, non-compliance measures depend on public complaint and criticism to bring issues to the attention of decision-makers.[591] Again, this emphasises the importance of civil enforcement mechanisms.

Monitoring and reporting requirements may be imposed on the proponents themselves through ministerial approval conditions.[592] Indeed, it is a condition of the North Dandalup Dam approval that the proponent design and undertake 'an ecological study and monitoring programme…to assess stream flow-related requirements of local fish and other aquatic fauna…and to detect changes in their populations which might be related to the operation of the dam'. [593] Furthermore, that this information is 'used for planning future water supply projects and in managing North Dandalup River flows in ways most beneficial to aquatic fauna'.[594] The EMP implements these commitment in sections 3.6 and 11.1. [595] Section 3.6 sets out the environmental data concerning aquatic fauna in terms of the general impact of dams, the existing quality of the North Dandalup River, and the specific predicted impacts of the North

[577] Department of Water, 'Water information reporting (WIR) system – Explanatory notes' (Government of Western Australia, 2013) 1 <http://kumina.water.wa.gov.au/waterinformation/WIR/Reports/Publish/Explanatory%20Notes.pdf> ('*WIR Explanatory notes*').
[578] Ibid 2-3. See further, generally, 5.
[579] Gardner (2006), above n 8, 233.
[580] Gardner (2006), above n 8, 233.
[581] Bates (2013), above n 185, 423.
[582] *Environmental Protection Act 1986* (WA) s 48; Bates (2013), above n 185, 416.
[583] Bates (2013), above n 185, 422; Godden & Peel, above n 540, 175.
[584] *Environmental Protection Act 1986* (WA) s 48(1); Bates (2013), above n 185, 416.
[585] *Ministerial Statement for the North Dandalup Dam*, above n 251, Condition 1; *Environmental Protection Act 1986* (WA) s 3 (definition of 'decision-making authority').
[586] *Environmental Protection Act 1986* (WA) s 48(2).
[587] *Ministerial Statement for the North Dandalup Dam*, above n 251, Condition 2.
[588] Bates (2013), above n 185, 422.
[589] Ibid 422.
[590] Ibid 423.
[591] Ibid 422.
[592] Bates (2013), above n 185, 416.
[593] *Ministerial Statement for the North Dandalup Dam*, above n 251, Commitment 8.
[594] Ibid.
[595] *North Dandalup Dam Environmental Management Plan*, above n 107, 7.

Dandalup Dam.[596] The EMP recognises that dam construction in WA contributes to a decline in species diversity and leads to lower and less variable flows to the detriment of fauna diversity.[597] The quality description of the North Dandalup River provides baseline data for biological monitoring of the Dam's impact,[598] which means that, contrary to the case of the Estuary, it should be possible to establish the impact of the Dam and the drying climate on the riverine ecosystems over the years.[599] The likely or anticipated specific impacts of the Dam include a further reduction in species diversity and richness, and a shift in the community to be more representative of still or low flow environments, the extent of which depends on, inter alia, the release regime of the Dam.[600] It also shows that the Dam was expected to have a negative impact on the riverine ecosystems and biodiversity, but the North Dandalup Dam proposal was estimated to have the 'least significant impact on the natural environment' of the four options considered.[601] Section 11 contains the actual environmental monitoring programme,[602] the purpose of which is 'to determine any changes which might take place during the development and operation of the project' and includes vegetation and fauna monitoring.[603] The only clear monitoring duties are to 'keep the EPA informed of the progress of these [further] studies, and…consult with it prior to the implementation of any strategy',[604] to compare baseline descriptions of the vegetation along four permanent transects with observations in future years during scheme operation,[605] and to implement a vertebrate fauna monitoring programme, which would 'assess the impacts on amphibians, birds, reptiles, small and medium size mammals'.[606] At the time, the proponent was developing a monitoring system, which was likely to include 'monitoring of stream velocities on a regular basis',[607] the status of which is unknown. The proponent also committed to discuss with CALM, the EPA and other appropriate authorities before modifying the programme on the basis of monitoring results.[608] Finally, the proponent made a general commitment to update the EPA on 'progress with implementing the various aspects of the EMP…on an annual basis, with a post construction report to be completed, including data, following the first six months of operation'.[609] However, again, none of the above information is required to be published and is, therefore, not publicly available. In the event of non-compliance, the EPA may exercise any power conferred upon it under the law and is under a duty to report it to the Minister.[610] In addition to judicial review, the Minister may order the proponent to take the relevant steps to comply with such conditions and prevent, control, or abate environmental harm caused by any non-compliance.[611] These administrative enforcement measures are, however, subject to agency and ministerial discretion, which in any event are not revealed to the public.

In conclusion, there is no general statutory duty to monitor and report on the management of water resources, including the implementation of EWPs. Such duties have been delegated to proponents through the water licence or ministerial statement, which seems to be common practice.[612] As a result, the duty to monitor and report is subject to ministerial discretion and the outcome is not publicly available. This is significant because such information is a precondition for the use and functioning of civil enforcement mechanisms, which are particularly important in today's reality of limited agency resources and, seemingly, reluctance to uphold compliance. Robertson has documented these issues with regard to the *RiWI Act*, albeit in relation to groundwater management.[613] It should be noted that, still, the implementation of duties embodied in EMPs seem to be subject to financial and political considerations. While the

[596] Ibid 15-9.
[597] *North Dandalup Dam Environmental Management Plan*, above n 107, 15.
[598] Ibid, 16-7.
[599] *North Dandalup Stream Fauna Study*, above n 108, 6.
[600] *North Dandalup Dam Environmental Management Plan*, above n 107, 18.
[601] *Next Major Water Supply Source for Perth (post 1992)*, above n 67, 6, 54.
[602] *North Dandalup Dam Environmental Management Plan*, above n 107, 35-8.
[603] Ibid 38.
[604] Ibid 36.
[605] Ibid 37.
[606] Ibid 37.
[607] Ibid 36.
[608] Ibid 38.
[609] Ibid.
[610] *Environmental Protection Act 1986* (WA) s 48(2a).
[611] *Environmental Protection Act 1986* (WA) s 48(4).
[612] See, eg, Bates (2013), above n 185, 423.
[613] Robertson, above n 434, 224.

information generated or received by the relevant agencies and departments may be obtained under the *FoI Act*, the above also illustrates that 10 years on, Principle 9 of the National Water Initiative on EWPs, which proposes the establishment of a register of new and existing environmental water and annual reporting on the operation of EWPs,[614] has still not been implemented.[615]

5. Key points and reflections

The key points drawn from the above analysis on the basis of our research questions are that:

1. There is no legislated duty to restore waterways and wetlands, including providing EWPs to maintain significant ecological values. Instead, such duties may be imposed in subordinate instruments, such as water licences, operating strategies, ministerial statements of approval, and EMPs.
2. If imposed, EWPs are usually set in operating strategies and EMPs, which means that they, generally, have limited legal effect due to the nature of the instruments and/or its practical enforcement difficulties.
3. There is no general duty on responsible agencies to monitor and report on EWPs. This duty has been delegated to the proponents. This shifts the burden and cost of monitoring and reporting to the proponent, which may seem reasonable and attractive from a financial perspective considering the limited resources of government agencies. It, however, means that authorities rely on information provided by the proponents and that a public request for such information has to go through the proponents, who may not be very interested in providing it, especially not if it shows non-compliance (notably, the *FoI Act* applies to the Water Corporation[616]).[617]

The current framework does not provide sufficient EWPs to maintain ecological values and the EWPs provided seem hard to enforce. EMPs are not ideal instruments for setting EWPs due to their limited legal effect; even ministerial statements of approval may be forgotten or discarded over time. Moreover, environmental assessments on an ad-hoc basis are likely to overlook the cumulative impacts of single decisions.[618] The Peel-Harvey Estuary seems to constitute an example. While the flow of the North Dandalup River was not considered crucial to the Estuary, as it only provided around 2.6% of total inflows to the Peel Inlet, it was significant enough to undertake a commitment to substitute such reduction by flows from the Harvey Diversion Drain. However, this commitment seems to have been forgotten, or disregarded during the Stirling-Harvey Redevelopment Scheme proposal, as it was found that there were no EWRs downstream of the new Harvey Dam. Similarly, the other dams in the catchment, including South Dandalup and Serpentine Dams, may not individually have posed a threat to the Estuary, but the cumulative impact of all these dams is bound to be significant.[619] Strategic assessments and statutory water allocation plans have an important role to play in this regard, as they provide an overarching policy or plan for development and exploitation of resources to guide projects, and would, or at least have the power to, assess the cumulative impact of actions carried out under such plans.[620] Indeed, the State Policy principles provide that either regional or sub-regional management plans under Division 3D of the *RiWI Act* will consider the '[c]umulative effects on the environment of potential water source developments and other land uses', and are also supposed to show 'how EWPs will be explicitly incorporated into planning and environmental decisions'.[621] But, again, these provisions have not been utilised, not even non-statutory plans to this effect exist in the Peel-Harvey Catchment.[622] Although Division 3D was not inserted until 2000, i.e. after approval of both North Dandalup and Harvey dams, it was the

[614] *Intergovernmental Agreement on a National Water Initiative*, above n 13, [84]-[85].
[615] Gardner (2006), above n 8, 233.
[616] *Re Gallop and Water Corporation* [1999] WAICmr 36; *Water Corporation v McKay* [2010] WASC 210.
[617] While not implicating the Water Corporation, we did not receive a reply to our request on monitoring and reporting information concerning the North Dandalup Dam.
[618] Bates (2013), above n 185, 566; Peel & Godden, above n 191, 684; Ralf Buckley, 'Cumulative Environmental Impacts: Problems, Policy and Planning Law' (1994) 11 *Environmental and Planning Law Journal* 344.
[619] See, also, Peel & Godden, above n 191, 685.
[620] Bates (2013), above n 185, 353.
[621] *Environmental Water Provisions Policy for Western Australia*, above n 9, 6.
[622] 'Kwinana Peel Region' on Department of Water, *Planning for the future*, *Water allocation plans* <http://www.water.wa.gov.au/planning-for-the-future/allocation-plans/kwinanapeel-region>.

water allocation planning structure prior to this amendment.[623] As noted by Bates, 'death by a thousand cuts' is 'nowhere more evident in environmental management than in our attitudes to the expendability of biodiversity in favour of economic development'.[624] Naturally, EWPs should remain in operating strategies, but it is likely to ease enforcement and it seems only appropriate to include them in the water licence itself as well alongside water entitlements. The above analysis has revealed several other important issues.

First, there seems to be a lack of ecological data to initiate a duty to restore. With regard to the North Dandalup River, as well as the Harvey River, such information should be available through the monitoring and reporting data required by the ministerial approval statement, EMP, water licence, and operating strategy. If this is not the case, then this constitutes non-compliance with the duties contained in these instruments, and if it has been obtained, then it seems clear that it has not been used for the purpose of adaptive management. This is evident by the fact that EWPs were set for both North Dandalup and Harvey Dams to fulfil social water requirements rather than environmental, which have not been adjusted in favour of the environment in response to further information on extraction impacts, which should have been obtained, and the drying climate since 1991 and 1999, respectively. As for the Peel-Harvey Estuary, a factor of inaction seems to be a lack of knowledge about its EWRs as well as baseline data to trigger the duty to restore under the Ramsar Management Plan, albeit non-binding. The authors acknowledge that ecological studies are costly and that it seems to be a general issue that government departments and agencies lack both financial and human resources. In 2008-09, the average cost of a surface water assessment was $76,735, and four to five assessments were conducted for allocation planning per year and approximately 12 for licensing.[625] The Water Resource Assessment branch of the DoW is responsible for such assessments in addition to assessing climatic impacts and provide advice on water licence applications in areas without a water allocation plan.[626] At the time, seven full-time equivalent staff members were employed to fulfil these functions.[627] The Economic Regulation Authority instigated an inquiry into water resource management and planning charges upon reference from the WA Government in 2009 with the objectives of improving effectiveness, efficiency and cost recovery of the DoW's functions as well as streamlining assessments.[628] The authors also recognise that the DoW has seen significant cuts in recent years. The Montana Method for determining environmental flows may provide some relief in this regard, as it is a relatively quick and easy method compared to other excellent, but resource-demanding holistic methods, such as the Service Provision Index (SPI), which links environmental flows, ecosystem services and economic value, [629] or the Downstream Response to Imposed Flow Transition (DRIFT) method.[630] Based on average annual stream flow studies,[631] the Montana Method is a fixed percentage method.[632] As a fixed percentage method, naturally, it has its limitations. The appropriate fixed percentage depends on local conditions, including the hydraulic parameter and geometry of the channel in question.[633] Thus, a modified Montana Method to suit local conditions was adopted in New Zealand as an 'interim measure only until a more defensible

[623] *Harvey Basin Surface Water Allocation Plan*, above n 86, 7.
[624] Bates (2013), above n 185, 475.
[625] Department of Water, 'Annual report 2008-2009' (Government of Western Australia, September 2009) 12, 16-7 ('*DoW Annual report 2008-2009*'); Quantum Management Consulting & Assurance, 'Department of Water's Processes – Report for the Economic Regulation Authority Inquiry into water resource management and planning charges' (Final Report, 12 March 2010) 53-4 ('*ERA Inquiry into water resource management and planning charges*').
[626] *DoW Annual report 2008-2009*, above n 625, 26; *ERA Inquiry into water resource management and planning charges*, above n 625, 52.
[627] *DoW Annual report 2008-2009*, above n 625, 26; *ERA Inquiry into water resource management and planning charges*, above n 625, 52.
[628] *ERA Inquiry into water resource management and planning charges*, above n 625, 4, 69.
[629] Louise Korsgaard, Roar A. Jensen, Torkill Jønch-Clausen, Dan Rosbjerg and Jesper Sølver Schou, 'A service and value based approach to estimating environmental flows' (2008) 6 *International Journal of River Basin Management* 257.
[630] C.A. Brown and A. Joubert, 'Using multicriteria analysis to develop environmental flow scenarios for rivers targeted for water resource development' (2003) 29 *Water SA* 365; Jackie King, Cate Brown and Hossein Sabet, 'A scenario-based holistic approach to environmental flow assessments for rivers' (2003) 19 *River Research and Applications* 619.
[631] Tennant, above n 355, 6-7.
[632] Loar and Sale, above n 356,18.
[633] Ministry for the Environment, 'Flow guidelines for instream values – Volume B' (Report No. ME 271, Government of New Zealand, 1998) 104. See, also, Donald J. Orth and O. Eugene Maughan, 'Evaluation of the "Montana Method" for recommending instream flows in Oklahoma streams' (1981) 61 *Proceedings of the Oklahoma Academy of Science* 62.

method was established'.[634] Based on studies of local conditions, the 10-30-60% guidelines were replaced by 30-75-100% thresholds; 30-74% being "poor-fair", 75-99% being "acceptable", and 100% being "optimum".[635] Likewise, the Montana Method may provide an interim measure in Australia using the original guidelines until sufficient data has been collected and analysed for each relevant river. In other words, a precautionary approach should be taken in such cases, which would see at least 30% of the average flow released. The North Dandalup Dam release regime is far below any of these thresholds and, therefore, indefensible from an ecological perspective.

It may be discussed who should bear the financial burden of the necessary studies. In a pre-development context, it seems reasonable to include such investigations in the EIA process, as it, to a certain extent, already is. EIA costs are borne by the proponent. According to King, '[a] mere 1% of the cost of developing a new water resource would fund an extensive research program on a targeted river', but as she also points out, this is often seen as too costly.[636] Similarly, Tennant recommends that the actual cost of providing EWAs to protect the aquatic environment downstream from dams be included as project costs.[637] In the cases of the North Dandalup and Harvey Dams, this was not so much the issue; rather the issue is a disregard for EIA recommendations, EWRs and the commitment to adaptive management, respectively. In a post-development context, it is a bit more complicated. Without clear legal duties on the proponent to determine EWRs and EWPs to maintain a certain condition, and to implement adaptive management, the regulator may be seen as the more appropriate responsible party for degradation. In such case, it may be reasonable for the DoW to sustain the costs of determining EWRs and EWPs.

For these reasons, the authors argue that the responsible agency, in this case the DoW, should be legally obliged to determine the EWRs and EWPs of the waterways and wetlands impacted by water development structures such as dams. In a pre-development context, this duty should be delegated to the proponent. In a post-development context, such as the cases of North Dandalup and Harvey Dams, the outcome of the duty should be implemented through the water licence. As for the limited resources of the DoW, we argue that it is a chicken-and-egg situation: there are no or limited resources for ecological studies because there is no statutory duty mandating resources to be allocated for this purpose. It should not be necessary to argue the need for investment in the State's unique and precious environment, including water resources and biodiversity protection.

Secondly, it is clear that water for human consumptive use has been and still is prioritised over water for the environment. While EWRs for many of the rivers and wetlands of the Peel-Harvey Catchment have been identified, they have not been followed or respected.[638] We acknowledge the political difficulty of affording even the *same* degree of security to EWPs as water access entitlements for consumptive use, especially in a drying climate. But while it may cause significant short-term impacts, until water use is adjusted and alternative sources utilised, it provides significant short and long-term benefits. It also offers additional incentive to discover and implement innovative solutions to the water scarcity issue, including to reduce water use, as already advocated by the DoW.[639]

Thirdly, the fundamental State policy principle of transparency is not being complied with. With no statutory water allocation plans, a limited number of non-statutory allocation plans,[640] and no EWP record, existing EWPs and the basis on which they have been determined are not publicly available. The DoW's position that further releases from both the North Dandalup and Harvey Dams for environmental purposes are a waste of water has not been revealed to the public and is contrary to state policy. While the published Harvey Basin Surface Water

[634] Ministry for the Environment, 105.
[635] Ibid.
[636] Jackie King and Cate Brown, 'Environmental Flows: Striking a Balance between Development and Resource Protection' (2006) 11 *Ecology and Society* 18 <http://www.ecologyandsociety.org/vol11/iss2/art26/>.
[637] Tennant, above n 355, 9.
[638] Davies et al., above n 283, 29-40, 57-108.
[639] *Western Australia's water supply and demand outlook to 2050*, above n 20.
[640] In 2013, 22 allocation plans had been or was being developed, see Department of Water, above n 240, 17.

Allocation Plan explains the environmental water allocation decision that was made in 1998,[641] the following modifications have not been made publicly known. The DoW recognised this need to provide transparency and security for environmental water in 2013.[642]

Finally, the Peel-Harvey Catchment Management Bill 2014 should be mentioned. The Bill was introduced into Parliament in June 2014 and is currently in the Legislative Assembly.[643] The objectives of the Bill are, inter alia, 'to provide for the rehabilitation and protection of the Estuary', 'to provide for the management of the activities that affect the ecological and community benefits and amenity of the Estuary', 'to provide for the needs of future generations in relation to the ecological and community benefits and amenity of the Estuary', and 'to promote and facilitate the good management of the catchment area to meet the objectives referred to [above]'.[644] Disappointingly, the Bill does, however, not mention environmental water or flow, or anything directly about water quantity management. Rather it focuses on targets for water quality management,[645] and thereby, arguably, discards the link between water quality and water quantity and omits to face and address an essential part of the matter.

6. Conclusion

In conclusion, there is not an unqualified legislated legal duty to maintain or restore waterways and wetlands by ensuring adequate water flow in national or state law. This is contrary to the Ramsar Convention framework, which creates international obligations to maintain and/or restore listed wetlands, at least, to the ecological character of their time of listing and to maintain the ecological character of all other wetlands, as far as possible. These duties include providing adequate water to sustain wetlands as functioning ecosystems, including in response to adverse effects of climate change. Although physical possibility and urgent national interests are acknowledged exceptions to these duties, they help establish political expectations and define the scope of domestic authority to legislate for restoration.

The WA water resources reform should state a restoration objective and impose water-planning duties on the Minister for Water to:

- Identify and publish within a defined time (e.g. 1 year) the EWRs needed to maintain or restore the ecological character of all Ramsar listed wetlands, taking account of the water that would naturally, i.e. considering the impact of climate change but before consumptive use, be available to sustain that ecological character;
- Make and approve plans for those listed wetlands within 4 years (an electoral cycle) to establish EWPs that allocate water as closely as possible to the natural regime, as affected by climate change, within ten years or the term of the plan, if less; and
- Use best endeavours to make plans to establish EWPs that maintain the ecological character of all unlisted wetlands affected by water development, as far as possible, especially those that have high biodiversity values.

We also propose that:

- The *EPBC Act* and *Regulations* be amended to:[646]
    a. Make management plans for listed wetlands and the Ramsar management principles mandatory;
    b. Include in the Ramsar management principles a duty to maintain and/or restore Ramsar-listed wetlands and, as far as possible, unlisted wetlands as well as a duty to monitor and report on the implementation of the duty to maintain and/or restore;[647]

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[641] Gardner & Chung, above n 175, 17.
[642] Department of Water, above n 240, 25.
[643] 'Bills of the 39th Parliament' on parliament.wa.gov.au, *Bills*, *Current Bills* <http://www.parliament.wa.gov.au/parliament/bills.nsf/WebCurrentBills?OpenView&Startkey=P>.
[644] Peel-Harvey Catchment Management Bill 2014 (WA) cl 5(1).
[645] Peel-Harvey Catchment Management Bill 2014 (WA) pt 4 div 1.
[646] Peel & Godden, above n 191, 670-1, 673-5.
[647] In *Richardson v Forestry Commission* (1988) 164 CLR 261, Mason CJ and Brennan J found that the external affairs power 'extends to support a law calculated to discharge not only Australia's known obligations but also Australia's reasonably apprehended obligations', see, 295.

    c. Require the national Minister to certify publicly and report to the COP that the State plans comply with the Ramsar obligations and, if they do not, to exercise a step in power to make the EWPs within three years (an electoral cycle).
- The enforcement mechanisms of the *RiWI Act* be enhanced, especially the civil enforcement mechanisms, to allow third party action/public interest litigation with regard to breach of statutory duty and licence conditions.

Amending the *EPBC Act* to include a duty to maintain and/or restore is pivotal to prevent 'States from competing for development through lowering environmental standards in a "race for the bottom"'.[648] There will be great social and economic factors to contend with in fulfilling these duties. Water scarcity for a growing population in a drying climate is a multidimensional problem requiring investment in social and technological change to manage demand and develop alternative water sources. The suggested duties are ultimately procedural, but they mandate restoration decisions. While an Act is unlikely to provide a perfect solution to any issue and 'is usually only as good or as bad as its administration', which the failure to utilise Division 3D of the *RiWI Act* exemplifies; 'legislation [also] has an important symbolic effect'.[649]

[648] Peel & Godden, above n 191, 690, citing Kirsten Engel, 'State Environmental Standard-Setting: Is there a "Race" and is it to the "Bottom"?' (1997) 48 *Hastings Law Journal* 271.
[649] Peter Johnston, 'Law – The servant of environmental hope' in Peter Newman, Simon Neville, and Louise Duxbury, *Case Studies in Environmental Hope* (EPA (WA), 1988) 137, 146.

Appendix

Releases (ML) from North Dandalup Dam																
Year	Monthly total												Total	Percentage of inflow	Total Dec-Mar	Percentage of total releases
	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun				
2006-07	67.5	28.4	-	14.0	51.9	53.5	89.7	84.3	91.5	89.8	94.2	83.6	784.4	11.5	319.0	40.7
2007-08	71.5	20.4	-	-	21.4	69.4	59.8	68.3	72.9	64.7	9.9	-	458.3	3.6	270.4	59.0
2008-09	-	-	2.6	22.1	51.0	52.7	79.2	90.6	81.8	75.0	82.8	84.1	621.9	7.4	304.3	48.9
2009-10	87.8	3.3	-	16.9	32.8	50.6	87.1	77.2	84.8	84.2	87.4	55.1	667.2	3.9	299.7	44.9
2010-11	48.5	39.1	37.6	36.1	36.2	48.7	63.2	53.3	69.2	60.5	54.8	1.9	549.1	126.4	234.4	42.7
2011-12	-	-	-	-	16.5	42.9	70.4	86.3	77.6	74.8	10.3	-	378.8	3.6	277.2	73.2
2012-13	-	-	-	-	12.2	22.6	64.3	41.3	51.2	45.9	24.1	-	261.6	3.5	179.4	68.6
2013-14	-	-	-	-	35.1	75.1	80.7	67.5	78.4	70.3	57.6	-	464.7	5.5	301.7	64.9
2014-15	-	-	-	-	12.6	50.1	78.1	84.2	85.0	74.5	27.5	-	412.0	2.9	297.4	72.2
2015-16	-	-	-	25.0	39.5	51.5	70.5	61.5	62	58.0	37.5	-	405.5	43.7*	245.5	60.5
Average	27.5	9.1	4.0	11.4	30.9	51.7	74.3	71.5	75.4	69.8	48.6	22.5	500.35	21.2	272.9	57.6
Yearly average 2011-16													384.5			
Monthly average 2006-16													41.7			
Monthly average 2011-16													32.0			

Information kindly provided by the Department of Water.

* This number is based on expected inflow rather than actual inflow.

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