Water, Nature and Law in the City: Paper prepared for LegalWise Water Law Forum, Friday 19 June 2020

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1. This paper concerns evolving law and policy applying to urban rivers, wetlands and waterways ('urban waterways'). Axiomatically, water law is part of that picture. But the urban context intensifies questions of interaction between legal regimes applying to water, land and management of other resources, such as biodiveristy. By extension, the city often exposes issues of fragmentation of legal regimes applying to land and resources. In part, this is because cities are intensively used spaces, subject to many contests and conflicts.

2. In this paper I will consider legal and policy developments around water and waterways in Melbourne. My intention is to set out observations on waterway management directions in these urban and peri-urban settings.

3. Consciously I approach the task of considering urban waterways as socio-ecological features. This has also been expressed as waterways' treatment as 'natural infrastructure' or 'green infrastructure'. This perspective reflects the nature of EJA's interests and policy approaches to urban waterways reform in partnership with community organisations.

Urban waterways: Melbourne

4. Across many, if not most, Australian cities waterways comprise among the largest remnant natural or 'naturalistic' spaces. This is often the case despite rather than because of the course of urban design and development.

5. In Melbourne, the natural landscape setting means that the city was constructed on an extensive delta, with elaborate riverine system to the east and basaltic and plains waterways to the west. Melbourne is situated naturally on a 'meeting point' of natural systems and this is reflected also in the high degree of diversity of ecological systems represented in this region. Urban and peri-urban Melbourne have expanded out across these landscapes.

6. The highly modified nature of riverine and wetland environments in urban Melbourne is a story of their loss or impairment of ecological function. The Yarra delta for example is largely now lost, except for the river channel itself and small modified wetlands such as Albert Park. Not only does the urban space sit over the top of catchments and floodplains but additionally the course and flow of these natural features have been extensively re-directed and drained (including underground) and flow regimes attenuated by water supply operations. Indeed, in southern Victoria the Yarra system is characterised by the highest degree of take or diversion (at around 50% of natural flows).

7. All of this 'is what it is'. Law and policy in relation to waterways in Australian cities are changing. This change is occurring across multiple legal domains. It is incremental but nonetheless significant. I will focus on water and planning aspects.

Yarra Birrarung Act

8. The most significant attempt to shift governance, law and policy relating to urban waterways in Victoria is evident in the *Yarra River Protection (wilip-gin Birrarung murron) Act 2017*

('Yarra Birrarung Act'). There is a growing body of commentary on this legislation.[1] The principal statutory instruments to be prepared under that legislation, the Yarra Strategic Plan (including a Land Use Framework), is currently the subject of a planning panel process.[2]

9. The Yarra River legislation sets up a scheme for integrated management of the river corridor (not catchment), with strong reference to its Aboriginal and bi-cultural lore and history, as well as environmental, recreational and amenity imperatives. The scheme establishes a strategic planning framework. Its primary focus is on land-use planning, not water management.

10. The planning framework under the Yarra Birrarung Act is intended to operate alongside the Healthy Waterways Strategy[3] and the latter document has land-use and watering implications. In respect of the Yarra system these include implications for environmental watering and for stormwater management which touch on water law in a broad sense.

11. Interestingly, the Yarra Birrarung Act is not clear as to implications for water management and actions operating under water law. As I have argued elsewhere,[4] the Yarra scheme can be read as open directly to encompassing matters concerning water management, including as a consequence of its attention to the Yarra *River*[5] (as well as expressly to land under or adjacent to the river) and to ecological health.[6]

12. Furthermore, despite not yet being finalised, the Draft Yarra Strategic Plan[7] prepared by Melbourne Water includes at least one express reference to watering action on Yarra River land (at Bolin Bolin Billabong)[8] and the inference that watering actions are to be entertained or required elsewhere. For example, the Draft Plan proposes 're-engagement' of floodplains[9] in the rural reaches of the river corridor which by implication suggests watering actions.[10]

13. The Yarra legislation also privileges operation of the HWS and the *Water Act* generally in their application to land affected by strategic planning under the Yarra Act.[11] The Yarra Strategic Plan must not be inconsistent with a 'regional waterway strategy' (of which the

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[1] Katie O'Bryan 'New law finally gives voice to the Yarra River's traditional owners' The Conversation, 25 September 2017, https://theconversation.com/new-law-finally-gives-voice-to-the-yarra-rivers-traditional-owners-83307; Katie O'Bryan 'The changing face of river management in Victoria: the Yarra River Protection (wilip-gin Birrarung murron) Act 2017' (2019) 44 *Water International* 6-7 769; Bruce Lindsay 'Higher and distinctive standards for urban river protection? Special purpose "river laws" and land-use planning' (2020) 37 *Environmental and Planning Law Journal* 3 322; Rebecca Nelson 'Sick city streams: new approaches to legal treatments' (2020) 43 *Melbourne University Law Review* 2 748

[2] Engage Victoria 'Help us shape the final 10-year strategic plan for the Yarra River', https://engage.vic.gov.au/help-us-shape-final-10-year-strategic-plan-yarra-river

[3] Melbourne Water *Healthy Waterways Strategy* (2018), including 'Co-Designed Catchment Program for the Yarra Catchment', https://www.melbournewater.com.au/about-us/strategies-achievements-and-policies/healthy-waterways-strategy

[4] Lindsay 'Higher and distinctive standards for urban river protection? Special purpose "river laws" and land-use planning', 343-344

[5] *Yarra River Protection (wilip-gin Birrarung murron) Act 2017* (Vic), subs 1(a), 3 ('Yarra River land')

[6] *Yarra River Protection (wilip-gin Birrarung murron) Act 2017* (Vic), subs 5(a)

[7] Melbourne Water 'Draft: Yarra Strategic Plan – A 10 Year Plan for the Yarra River Corridor' (2020)

[8] Melbourne Water 'Draft Yarra Strategic Plan', 57

[9] Melbourne Water 'Draft Yarra Strategic Plan', 45, 50

[10] Also wetland restoration expressly set out at Melbourne Water 'Draft Yarra Strategic Plan', 30, 36

[11] *Yarra River Protection (wilip-gin Birrarung murron) Act 2017* (Vic), s 45

HWS takes the form for the Yarra and greater Melbourne), unless such inconsistency is expressly endorsed by Melbourne Water.

14. This statutory relationship will be relevant in terms of interactions between land and water along the Yarra River, its tributaries, abutting land and key works, such as drainage schemes and WSUD (stormwater control) assets including constructed wetlands. The HWS identifies the prospect of watering actions, as well as other actions intersecting with the domain of water resources management.[12]

15. For example, in respect of the Yarra catchment the HWS sets out actions relating to:

    - Stormwater retention, harvesting and infiltration
    - Increase to the environmental water reserve
    - Improvement to flow regimes
    - Addressing sources of 'flows stress' (such as diversions)
    - Responding to threats to stream geomorphology (physical form)
    - Reducing rural nutrient and sediment runoff

16. In respect of Yarra wetlands water management is to be engaged in:

    - Delivering of environmental water
    - Re-engagement of floodplain wetlands.

17. These actions are set out in performance objectives for the Yarra corridor and catchment.[13] Some language is definitive ('implement', 'reduce'), some aspirational ('identify opportunities'), some prospective and tentative ('investigate options').

18. The programs set out in the HWS are given effect under the statutory waterway management functions invested in Melbourne Water under the *Water Act 1989*.[14] These functions include preparation and implementation of such plans and programs and the carrying out of works and activities. These are directed to environmental considerations.[15] They are also to have regard to Aboriginal and to recreational considerations.[16]

19. The HWS applies to land-use planning as a reference document under policy measures set out in Victoria Planning Provisions.[17]

20. The precise nature of connections between water management, land-use planning and other domains of actions (such as environmental protection and catchment health) were the subject of debate and controversy at the recent YSP panel hearings.[18] Uncertainties regarding these regulatory 'domain boundaries' also arose in terms of interactions and intersections between the two key parts of the Yarra strategic planning structure: the YSP itself and the subsidiary Land Use Framework.

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[12] Melbourne Water 'Healthy Waterways Strategy: Co-Designed Catchment Program for the Yarra Catchment' (2018), 24
[13] Ibid
[14] *Water Act 1989* (Vic), s 189
[15] *Water Act 1989* (Vic), subs 189(1), (2)
[16] *Water Act 1989* (Vic), s 189(2)(b)
[17] VPP, cl 12.03-1S
[18] For example, Melbourne Water submitted matters such as watering actions were 'out of scope' of the Land Use Framework, a point disputed by EJA and by other submitters.

21. Ultimately, these intersections expose the fraught nature of a principal condition in law and policy the Yarra Birrarung legislation seeks to overcome: fragmented management of nature, or more specifically of natural 'entities'. The inordinate challenge of seeking to do so in an urban setting ought not to be under-estimated.

Broader water management

22. The fate of the Yarra Birrarung legislative experiment may well hinge on two more expansive and established regulatory regimes: water regulation (as adverted to above) and environmental protection.

23. The various water resources actions proposed in the HWS and gestured to in the Draft YSP depend for effect on the operations of the wider statutory water law system.

24. The policy-setting arrangements under the Central Sustainable Water Strategy[19] ('Central SWS') will be key in setting Yarra basin-wide priorities for 'use'. Notionally this is to be based on the resource accounting that has recently occurred under the Draft Long-term Water Resources Assessment ('LTWRA'). The LTWRA has shifted the baseline for water accounting into the more contemporary context of the last 45 years, under which shifting climate impacts have become apparent.[20] For the Yarra system, this revised accounting has meant a decline of 16% in water resources as a whole compared to long-term averages.[21] Water resources are already heavily diverted.[22] Proportionately, consumptive (extractive) uses have increased and water for the environment has decreased (by 7%).[23] The LTWRA is not a climate projection however. The decline in water resources could be (arguably is are likely to be) greater than already experienced.

25. From the regulatory perspective, the machinery of water diversions focuses heavily on bulk entitlements for urban water supply. Subsidiary arrangements, such as take under section 51 licences, may be significant, in particular on localised waterways such as certain tributaries of the Yarra. As of right take under section 8 of the Water Act is likely to be relevant to Yarra flows especially in rural areas and consequently cumulative downstream flows. A full accounting for unallocated water (un-exercised water rights) in the Yarra system, alongside review of policy-settings (Central SWS) in the Yarra Birrarung Act era, could be revealing in terms of how serious Victorian water managers are to the long-term ecological health objectives for the Yarra River. This will include evidence to the degree to which they are willing to transfer water into the environmental and/or cultural domain.

26. This type of transfer of water priorities toward the environment, including to floodplain wetlands restoration and other flows management objectives identified in the HWS, will be a key test in the transformative urban project proposed by the Yarra Birrarung Act.[24] The geographic extent of environmental water planning and delivery in the Yarra corridor will be

[19] A new Central SWS is due to be prepared and approved by 2024.
[20] DELWP *Draft Long-Term Water Resources Assessment for Southern Victoria: Overview Report* (2019), 41-45, using average annual flows from 1975-present as the benchmark.
[21] LTWRA, 118
[22] From 50-82% of flows from lower to upper reaches of the Yarra River corridor: DELWP Long-Term Water Resources Assessment for Southern Victoria: Overview Report (2019), 116
[23] LTWRA, 120
[24] Under the Draft Yarra Strategic Plan environmental watering proposals are stated as conditional on funding: Melbourne Water 'Draft Yarra Strategic Plan', 36

an important part of that test. The machinery of environmental water-holding and delivery will have an important role to play. The value of this machinery is both its independence and its strong reference to science.[25] There are existing environmental entitlements in the Yarra system. However, it is not clear from the HWS performance objectives the extent to which 'options' for increasing environmental allocations (by 10/gL per year to 2028) are informed by science or expediency or both. Past experience of actual use (or rather non-use) of environmental water, especially in dry conditions, is not encouraging.[26]

27. This performance objective for watering appears to concern both planned and held environmental water, which is to say not entitlements alone. It is merely aspirational at this stage. 'Recovery' of water for the environment appears to depend on diversification of 'water sources' (beyond dams), the precondition of a functioning water market, and the spectre of climate change.[27] 'Recovery' of water for the environment is haunted by scarcity and cost.

28. The scale and extent of take, diversion and reallocation (including environmental reallocation) of water in the Yarra system reinforces the fact of the urban waterway as a *socio-ecological* system.

29. In the YSP panel hearings I referred to the 'living entity' of the Yarra River as on 'life support', as its natural cycles and processes are so heavily disrupted. The issue is more one of 'quality of life'.[28] This 'living entity' concept is an important but undefined one in the framing of urban waterways in the Yarra Birrarung model. It is a model with growing traction.[29]

30. My stream ecologist colleagues suggest a relative (regional) benchmark or reference state of 'least degraded and most ecologically dynamic'[30] for approximation of 'health' for urban waterways. While we are not likely to be equating a 'living entity' with pre-European and therefore ancient river form and character, we are I suspect seeking to establish forms of 'naturalised' flow regimes[31] into urban waterways (including in urban and rural hinterland). The Community Vision and Wurundjeri Water Policy (both of which are to inform the Yarra Plan) support to this approach.

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[25] See eg SKM *Yarra River Environmental Flow Study: Flow Recommendations Report* (2012)

[26] Matt Stafford *An Audit of Seven Environmental Bulk Entitlements – Recommended, Planned and Actual Release of Environmental Water to Victoria's Stressed Rivers* (Environment Victoria, 2008), http://environmentvictoria.org.au/wp-content/uploads/2016/08/Environmental-Flow-Audit-FINAL.pdf

[27] Melbourne Water 'Healthy Waterways Strategy: Co-Designed Catchment Program for the Yarra Catchment' (2018), 24. There appears to be some dissonance in the fact that accounting for water, such as in the LTWRA, does not include sources other than surface or groundwater. For example, desalinated water and water 'discharged' from treatment plants is not accounted for under the assessment framework presently: LTWRA, 36

[28] EJA and YRKA *Submissions to Yarra Strategic Plan Panel*, [6]-[15]

[29] The approach to protection of the Barwon-Moorabool system adopted by the Ministerial Advisory Committee inquiring into management of those waterways similarly places the 'living entity' concept as central: Barwon River MAC *Our Living Rivers of the Barwon: A Discussion Paper for the Future* (2019), https://s3.ap-southeast-2.amazonaws.com/hdp.au.prod.app.vic-engage.files/4615/7067/5475/Barwon_MAC_Discussion_Paper_Summary_Bookmarked.pdf

[30] Walsh et al 'Principles for urban stormwater management to protect stream ecosystems' (2016) 35 *Freshwater Science* 1 398

[31] Ibid

31. The current tentative approach to 'naturalised' water regimes suggested in the Yarra Strategic Plan will require far greater detail and strategic thinking. What appears in the Draft YSP is at best aspirational, at worst minimal and opportunistic. This proposition reflects submissions we made to the panel inquiring into this Plan. Minimally, watering regimes in the Yarra system need more localised, science-driven, updated and binding programs for particular 'reaches' and tributaries.

Environmental protection: stormwater and the perverse hydrology of urban streams

32. If water resources law is to contribute to the project of 'wilip-gin Birrarung murron' (keep Birrarung alive) by way of managing scarcity, particularly enabling flows in water landscapes to mimic natural conditions, it seems a certain amount of heavy lifting has fallen to pollution laws and planning laws to manage precisely the opposite problem: abundance of water degrading urban streams.

33. Stormwater, alongside climate change, is seen at the policy level as the headline threat to healthy urban waterways, including the Yarra Birrarung.[32] It is now well-understood that the pollution problem in the form of stormwater is actually a problem mainly of the volume and nature of flows as much as water quality.[33] The regulatory treatment of water in the context of environmental protection (pollution control) of urban waterways is essentially as 'discharge', as distinguishable from 'resource' (water law) or ecological quality, although the boundaries are not straightforward. For the sake of space, I will not deal here with the other key form of urban water 'discharge' with waterscape consequences, wastewater from treatment plants.

34. The policy and practical impetus to tackling stormwater effects on urban waterways has tended to focus strongly on water quality and transport of contaminants and pollutants – hence the key regulatory response of managing stormwater via the *State Environment Protection Policy (Waters)* ('SEPP Waters') and the subsidiary *Best Practice Environmental Management Guidelines for Urban Stormwater* ('BPEM').

35. The base cause of degrading effects from urban stormwater is runoff from impervious surfaces directly connected to streams, waterways and wetlands. BPEM objectives for the control of nitrogen, phosphorous and sediment loads in stormwater has been a particular focus of policy and decision-makers, not doubt because these are easily quantifiable.

36. We have been successful in tackling some of those problems, including through regulation, but far less successful in combatting arguably bigger problems for urban waterways, which are urban stream hydrographs (flow regimes) and more pernicious forms of pollutants such as heavy metals from roads or industrial areas.[34]

37. In short, every time it rains large volumes of water enter stream from catchments very suddenly via overland flows (often containing harmful materials) and very little is infiltrated

[32] Melbourne Water *Healthy Waterways Strategy*, 34-37

[33] Other relevant degrading effects of land use on streams, such as agricultural uses and riparian vegetation removal, are also regulated under environment protection rules and these also concern upper reaches of urban streams. For the present however, I will focus on stormwater.

[34] Burns et al 'Hydrologic shortcomings of conventional urban stormwater management and opportunities for reform' (2012) 105 *Landscape and Urban Planning* 230; Sharley et al 'Linking land use to pollutants in constructed wetlands: implications for stormwater and urban planning' (2017) 162 *Landscape and Urban Planning* 80

into the soil or lost to evapotranspiration. This is precisely the opposite dynamic of natural stream systems.[35]

38. The BPEM currently remains at the heart of the regulatory response here. However, that response also traverses planning law, water law via the HWS, and building regulations too. It is not confined to the BPEM.

39. The HWS sets targets for stormwater harvesting and the extent of DCI in 'priority catchments' (mainly around townships in the middle and upper Yarra).[36]

40. The SEPP (Waters) requires minimisation of risks to beneficial uses from stormwater, including but not confined to BPEM objectives and municipal stormwater plans.[37]

41. Planning policy and standards under particular provisions introduced under Amendment VC154 in 2018 'strengthen' planning approaches to stormwater management, requiring in particular greater efforts ('maximisation') at infiltration, retention and re-use of stormwater, minimisation of its harms and its contribution to ecological and urban cooling outcomes.[38] These provisions do not apply to all zones (land uses).

42. It is trite to say that the regulatory and practical landscape for stormwater management is complex. It might be said also to be unwieldy and it certain respects repetitive. Both Councils and MW have practical roles, such as in the construction or maintenance of stormwater wetlands. They also have regulatory functions. The institutional relationships around stormwater management are currently the subject of review.[39]

43. In either case, the underlying intention is to engineer means enabling interception of stormwater (water from DCI surfaces) before it gets to urban streams, either at the site level or locality level. The evidence is that we are likely a fair way from stabilising the degrading influences of stormwater on urban streams, let alone turning them around.[40] Planners in my view are beginning to give more sustained and considered thought to the issue.[41]

44. The extent to which environmental protection law contributes effectively to stormwater management is, in my view, as yet unresolved. Indeed it is in a period of considerable flux. Commencement of amendments to the Environment Protection Act 1970, including the 'general environmental duty' reforms, has been delayed for 12 months.

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[35] Walsh et al 'The urban stream syndrome: current knowledge and the search for a cure' (2005) 24 *Journal of the North American Benthological Society* 3 706

[36] Melbourne Water 'Healthy Waterways Strategy: Co-Designed Catchment Program for the Yarra Catchment' (2018), 24

[37] *SEPP (Waters),* cl 34. Risks to beneficial waters in the Yarra system may be gauged in relation to environmental quality indicators under the *SEPP (Waters)* which expressly intend that the Yarra River itself achieves a relatively high level of protection and tributaries are managed in a manner intended to 'drive urban stormwater management plans and waterway strategies to improve water quality.' (SEPP (Waters), p 48)

[38] DELWP *Amendment VC154 Explanatory Report* (2018)

[39] DELWP Melbourne Urban Stormwater Institutional Arrangements Review, https://www.water.vic.gov.au/liveable/stormwater-review

[40] See eg Commissioner for Environmental Sustainability *State of the Yarra and Its Parklands Report* (2018), 71

[41] See eg *Yarra Ranges C176yran (PSA)* [2020] PPV 13. EJA represented a community group in this matter and in part the proposal turned on stormwater infrastructure conventionally designed but less convincing as to whether it was capable of meeting stormwater management objectives especially in relation to flow.

45. These changes will, in their current incarnation, see most of the SEPP (Waters) stormwater provisions repealed and the GED intended to do most of the residual work of stormwater regulation under the EP Act scheme.

46. Admittedly, the current SEPP provisions mirror the language of the GED, in terms of minimisation of risk 'so far as reasonably practicable'.

47. The issue is twofold however. 'Reasonably practicable' will likely be measured against a factual or scientific standard ('state of knowledge'), such as the BEPM. It has been foreshadowed that the BPEM will be revised and in any case it is not clear that the current BPEM represents the state of 'best practice' or the relevant 'state of knowledge'. It is not clear, as far as I am aware, what the current 'state of knowledge' is.

48. Secondly, heavy reliance on the GED to achieve systemic risk minimisation to urban waterways does not seem to appreciate fully the highly dispersed and cumulative nature of the harm stormwater inflicts on streams. Stormwater is a classic 'death by a thousand cuts' problem. Solutions can be aggregated in part but then there is only so much open space left in urban areas for mitigation wetlands, certainly in established areas. The fate of NE link is testament to that problem. The much-vaunted analogy between the GED and the OHS duty to provide a safe workplace may be useful but it is not precise and is apt to mislead, specifically in terms of the former duty being protective of 'public goods' (such as waters) rather than persons and the potential difficulty in material connection between duty-holder and benefiting 'entity' (such as a waterway). These challenges are not insuperable but do need careful consideration.

49. The strategic pointy end of stormwater regulation appears to lie in a new form of BPEM or other instrument(s) guiding the 'state of knowledge' and the standard of 'reasonable' risk minimisation. The state of scientific knowledge, in my non-specialist appreciation of the literature in this field, has moved on considerably since publication of the current BPEM guidance in 1999.

50. Alongside direct regulatory treatment of stormwater as a harm there has been the growing attempt to manage and regulate stormwater as a resource. The collection of urban stormwater at the property-scale (for example, via rainwater tanks) or at the local scale (for example, via stormwater basins) has been promoted for at least two decades. These approaches have tended to be effective to certain degrees, such as the limited impoundment of water from impervious surfaces, but constrained by either opportunistic applications (for example, constructed wetlands in greenfield sites) or a low bar (for example, low levels of onsite stormwater capture before discharge off-site).

51. Legal and regulatory complexities over matters such as 'ownership' of stormwater, its lack of fungability (transfer and transaction), and institutional inertia appear to have limited a 'resource management' approach to stormwater,[42] including for urban stream protection. Unlike other key resource issues such as the energy transition to dispersed (rooftop) solar capture, solutions to urban stormwater harms appear not to have been driven significantly by market opportunities (for example, substitution of centralised mains water supply by

[42] See eg Parliament of Australia, Senate Standing Committee on Environment and Communications *Stormwater Management in Australia: Report* (2015), ch 4

dispersed stormwater runoff at the property scale). There are likely to be complex, messy reasons for this.[43]

52. The use of constructed wetlands as a model of stormwater treatment combined with urban-ecological outcomes has likely been a mixed record.[44] This engineering solution has been a favoured one for water authorities and urban planners seeking to achieve multiple benefits from urban expansion, especially but not exclusively in growth corridors.

Taking the urban rivers model forward?

53. New approaches to urban waterways are edging forward. The Yarra Birrarung Act and various initiatives in the Victorian Government's *Water for Victoria* policy[45] are illustrative of this incremental change. Leaving aside the potential for a gulf between good laws or policy and their administration, a problem bedevilling environmental laws in particular, I see two important (but in no way exclusive) points of challenge in taking urban waterway reform forward.

54. On the *integrated planning side* there is the deep-seated normative shift needed to provide some form of equivalence between what we might call 'natural infrastructure' and conventional built infrastructure. Equivalence here is not simply a matter of the same rates of funding or political status. From the legal and policy points of view it is necessary to start with the positive treatment of natural assets and systems, which is to say as matters that are not residual (for example, as secondary or subsidiary water 'users') or as 'encumbrances' on development or use rights. Attaching forms of personhood is one approach to providing this positive expression of natural entities or systems. But it is unlikely to apply in many cases and it can be unwieldy to apply and execute.

55. My organisation, EJA, has been closely involved in the legal and policy advocacy relating to the Yarra River. We quickly turned our attention also to other circumstances of urban waterway management. In 2018-19 we undertook a project[46] to consider how the waterways of Melbourne's west can better be protected and improved. One aspect of this project was to closely align the discourse of nature and infrastructure, with a particular focus on the incised rivers and plains stream of the West. One part of the model we advanced was establishment of a 'green infrastructure authority', amendment of the VPA Act in order that natural assets are more directly integrated into its mandate, and a process of declaration of major 'green infrastructure projects' analogous to 'major transport projects'.

56. On the *water management side*, there is substantial momentum in the notion of waterway 'health', as an ecological concept which also traverses cultural and social values. However, it is not clear (or rather it seems equivocal) that water legislation is really committed to this paradigm. I think this equivocation is evident for instance in the form of the environmental water reserve ('EWR') which underpins water planning at present. The EWR functions primarily as a policy, not a scientific, device, as it is based on volumes of water either

[43] For example, the competing interests within water institutions or industries to function as water supply authorities with commercial imperatives (to sell water and water services) and waterway managers and/or environmental regulators.
[44] Hale et al 'Balancing biodiversity outcomes and pollution management in urban stormwater treatment wetlands' (2019) 233 *Journal of Environmental Management* 302
[45] Victoria Government *Water for Victoria* (2016), ch 5
[46] See EJA *A New Deal for the rivers and Waterways of Melbourne's West* (2018), https://www.envirojustice.org.au/a-new-deal-for-the-rivers-and-waterways-of-melbournes-west/

provided as water-holdings (the 'environment as user' in regulated systems) or 'above cap' and therefore in excess of commitments to consumptive use (it is residual in form). Application of water to 'health' is mainly based on expediency of what can be put in this 'pool'. Despite the application of scientific models, such as FLOWS modelling, to waterway health, these tools are informational, not regulatory. Unlike Commonwealth water law, Victorian water law, including the EWR as applied to urban waterways, has no 'best available science' mandate. The closest Melbourne Water for example gets to this type of science-driven approach is its obligation to perform its waterway manager functions *with regard to maintaining* the EWR according to the EWR objective.[47]

57. In 2019-20 we worked with newly formed 'Friends of the Barwon' to undertake a 'river reform' project for the Barwon River system. Like the 'waterways of the west', Barwon River reform was in the context of a government-initiated policy process. Neither Ministerial Advisory Committee has reported publicly yet. The fate of water management on the Barwon and Moorabool systems is particularly pressing to community groups associated with those waterways. One of the focal points of our proposals for river reform there is to link the EWR for those waterways much more closely and transparently to a scientific basis for waterway health (using the FLOWS method). In doing so it was our view that we could drive change over time toward ecological health for these waterways and, in so doing, drive innovation in water management, including supply (sources) and demand (uses). Geelong and its region are going through those debates now.[48]

58. I would willing concede that the achievement of 'healthy' urban rivers and waterways is a so-called 'wicked' problem. For the long-term benefit and well-being of those of us who live in cities, as well as for nature itself, my view is that it is feasible and desirable to re-frame how we live with urban waterways – indeed, we seem to be progressing tentatively down that path. It is also feasible and desirable to tackle more honestly and effective the everyday machinery of law, policy, regulation and decision-making that is needed to make this change. If so we may able to implement progressively a situation in which the city and nature are not viewed as separate and dichotomous. We may even begin to move toward cities that are a new type of natural space.

[47] *Water Act 1989* (Vic), subs 189(2)(a). Adverse impacts on the EWR are also a mandatory consideration on the Minister in granting other water interests, including bulk entitlements: *Water Act 1989* (Vic), s 40(1)(d)(iv), but no particular weight is given to this consideration over others.
[48] Barwon Water *Water for Our Future*, https://www.waterfuture.barwonwater.vic.gov.au/