# Business Case 2025 – 2034

**Healing Bilya** Restoring the Peel-Harvey Waterways -Protecting our greatest Economic Asset

10 Year, \$110 million Restoration Program









PHCC recognise, acknowledge and respect Noongar People as the Traditional Custodians of lands within the south-west of Western Australia. For over 45,000 years Noongar Clan Groups of the Bindjareb, Whadjuk and Wiilman language groups have dwelt here, tended the land and been sustained by its natural resources. Their spiritual, cultural and intellectual connections to the land are strong and provide opportunities to enhance management of the Region's natural resources

### This report should be referenced as:

PHCC (2024) Healing Bilya, Restoring the Peel-Harvey Waterways – Protecting our greatest economic asset.

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### PHCC

Danielle Eyre, Lead Author, PHCC Jane O'Malley, CEO, PHCC Paddi Creevey, Chair, PHCC Peter Zurzolo, Deputy Chair, PHCC Sue Fyfe, Secretary, PHCC

### Other

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Southern End of the Peel-Harvey Estuary - Image PHCC Cover Image: Peel-Harvey Estuary (Australia Day) - City of Mandurah

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### Chair's message



The Western Australian Government has pioneered estuary environmental protection for almost 50 years. The first Estuarine and Marine Advisory Committee was established by EPA to conduct the Peel-Harvey Estuarine System Study in 1977.

The current framework for estuary protection includes Healthy Estuaries WA and the Bindjareb Djilba Estuary Protection Plan. These have clearly established the current condition of the Estuary and provide a pathway for recovery of the ecosystem, based on the new Gabi Warlang Bidi (Peel-Harvey Water Quality Improvement Plan, 2024).

PHCC is ready to build on these achievements and commence the landscape scale restoration identified in these documents.

Recent condition monitoring is showing an increasingly urgent need for action to prevent a second ecological collapse. The required action is well understood and needs to be funded and implemented now.

Paddi Creevey OAM Chair, PHCC September 2024

# Abbreviations and terminology

Abbreviation	Description
EPP	Environmental Protection Policy; <i>Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992</i> ; <u>https://www.epa.wa.gov.au/policies-</u> guidance/environmental-protection-peel-inlet-harvey-estuary-policy-1992
WQIP	Water Quality Improvement Plan; Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System – Phosphorus management (November 2008); <u>https://www.epa.wa.gov.au/policies-guidance/water-quality- improvement-plan-rivers-and-estuary-peel-harvey-system-%E2%80%93- phosphorus</u>
BDPP	Bindjareb Djilba A plan for the protection of the Peel-Harvey Estuary https://www.wa.gov.au/system/files/2020- 12/Peel Harvey Estuary Protection Plan Bindjareb-Djilba.pdf
GWB	Gabi Warlang Bidi – Water Quality Improvement Plan for the Peel-Harvey estuary system (draft, 2024)
HEWA	Healthy Estuaries WA
	https://estuaries.dwer.wa.gov.au/
Bilya	Noongar word for rivers
Djilba	Noongar word for estuary
Waterways	All of the rivers, streams, drains, wetlands, lakes and estuaries that make up Bindjareb Djilba
Jobs	We use different terms to convey different information about jobs and employment. Environmental work is seasonal in nature and mostly entry-level so many positions will be casual and will include a training component. Existing jobs: current full-time employment
	Headcount: number of individuals employed
	Program FTE: estimated number of 12-month full time employment contracts that will result from the program of work
	Jobs supported: modelled number of positions each financial year including multiplier effects

# Version Control

Version	Description
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- 2 Cost Benefit Analysis \$110 million environmental restoration of the Peel-Harvey Waterways, Natural Decisions, April 2024

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# **1 EXECUTIVE SUMMARY**

The Peel-Harvey Waterways are showing signs of another ecological collapse, similar to what happened in the 1980's. The Dawesville Cut, completed in 1994, flushed the Peel Inlet and reset the ecosystem at the time. But the effects didn't reach the lower part of the Harvey Estuary and have not lasted, as our waterways are struggling with declining rainfall, land clearing and ongoing nutrient pollution from agriculture and urban development.



The health of the estuary and its waterways is essential to support all aspects of the region's economy, ecological and conservation values, lifestyle and wellbeing of its community. A collapse of the waterways will damage the local economy, cost local jobs, and put local businesses at risk. If that happens, it will put further pressure on the cost of living and the effects will be felt by families in the Peel region and beyond.

Science is clearly showing worrying signs of the decline of the health of the waterways. Data on water quality, nutrients, sediments, oxygen levels, salinity and temperature, seagrass meadows, algae, fish, birds, and dolphins all show worsening conditions in the waterways.

<u>Bindjareb Djilba (Peel-Harvey estuary) Protection Plan</u> (2020) and the draft Peel-Harvey Water Quality Improvement Plan (2024) identify key problems and their causes. They provide a collaborative, evidence-based framework for actions to restore the health of the Waterways. PHCC is identified to deliver or support over 20 actions, including those in this Business Case. PHCC recognises the leading role that the Department of Water and Environmental

"Allowing a business as usual approach to catchment management is forecast to intensify problems."

Valesini, F., Hipsey, M.R., Cronin-O'Reilly, S. and Huang, P (2023). Balancing estuarine and societal health in a changing environment.

https://aquaticecodynamics.github.io/peel-book/synthesis-overview.html

Regulation has in the management of waterways. We applaud the comprehensive framework that the Western Australian Government's Bindjareb Djilba Estuary Protection Plan provides, under the broader direction of the Healthy Estuaries WA program.

PHCC also recognises the unique importance, and vulnerability of Bindjareb Djilba among all of the estuaries in the State. It has such significant environmental, economic and social values that it has a dedicated State Environmental Protection Policy and a standalone Estuary Protection Plan. To meet the objectives of Bindjareb Djilba, long term landscape scale restoration is urgently needed.

PHCC is seeking \$110 million dollars to deliver a 10-year restoration program to improve the health of the waterways (Figure 1). This restoration program is scalable and can be initially funded for \$44.7 million over four years. It will provide a return on investment of at least \$1.43 for every dollar spent and will help protect the economic value of our most important asset.

PHCC is an incorporated not-for-profit, community natural resource management organisation that has been delivering restoration programs across the catchment for over 20 years. PHCC have the local presence, networks, partnerships, infrastructure, knowledge and overall capacity to deliver this program. We will work with key partners to complement DWER's current programs.

The actions in the 10 year restoration plan are:

- 2750 ha River Restoration (weed control, planting, pest and feral animal control)
- 3050 km Fencing for stock exclusion
- 210 ha of Revegetation of priority areas
- 25 stormwater retrofits, biofilters and constructed wetlands
- Habitat restoration and fish restocking

The restoration activities will improve the amenity and recreational value of Bindjareb Djilba and waterways that will benefit the entire community.

The program will directly employ more than 500 people and add almost \$400 million to the local economy. Another \$300 million will be added from goods and services purchased locally. The total value-add to the economy will be \$700 million over 10 years (Figure 2).

A 10-year program is imperative to ensure the best return on investment as it will have much better economies of scale than multiple short-term programs (Figure 3). Funding for at least four years at a time will be critical for long term sustained outcomes.

The program will be delivered on the Swan Coastal Plain portion of the catchment, west of the Darling Scarp (Figure 4). It is the lower reaches of the rivers closer to the estuary where restoration will result in the greatest improvements.

Community members will work on restoration activities. Local Noongar people will be employed, building significant capability and capacity for Noongar enterprises and contributing to self-determination and economic development. Restoration activities also give opportunities for cultural participation and leadership for Noongar people help meet Closing the Gap targets and outcomes listed in WA's Aboriginal Engagement Strategy 2021-2029.

Monitoring success is an important component and River Health assessments (2020-24) will establish baseline condition and subsequent improvements.

After nearly 100 years of managing a declining estuary and lower rivers, we need to make a choice. If we want to maintain the values of our waterways, business as usual will not do. We must accelerate our efforts and resources. We know what, where and how this 10-year, staged restoration program will complement DWER's efforts and others so desperately trying to protect our most valued and important asset.

This business case clearly demonstrates the value and importance of a long term program of ecological restoration to support and complement the measures being undertaken by Government through the Bindjareb Djilba (Peel-Harvey Estuary) Protection Plan.

It seeks \$110 million (ex GST) over ten years, with an initial commitment of \$44.7 million over four years from the Western Australian government.



Figure 1 Program overview



Figure 2 Healing Bilya employment impacts over 10 years



Figure 3 Indicative budget profile



Figure 4 Surface water catchment and Waterways



Figure 5 Conceptual summary of works and locations



Figure 6 Summary of key environmental, estuary response and socio-economic changes in the Waterways from the early 1800s to 2020.<sup>1</sup>

<sup>&</sup>lt;sup>1</sup> Valesini, F., Hipsey, M.R., Cronin-O'Reilly, S. and Huang, P (2023). Balancing estuarine and societal health in a changing environment.

https://aquaticecodynamics.github.io/peel-book/synthesis-overview.html





# River Restoration Revegetation

2750 ha \$35 million ~250 Jobs\*

\$mil ha 2750 hectares of land adjacent to priority waterways will be restored through weed and pest control and planting native species, to help 100 restore the health of our waterways. Replanting native vegetation helps to provide a buffer for waterways, filtering out litter 345 and pollutants including nutrients and stabilising the soil surface. Water flowing into streams through vegetation on the banks carries less nutrients and sediments into the downstream environment. The program will enable restoration of 750 ha of very degraded waterways, 800 ha of moderately degraded waterways and 1200 ha of 379 reasonably good quality waterways. When more native vegetation is planted in the catchment of creeks, streams and 379 rivers and around wetlands it creates a better microclimate: the air, ground and water are cooler and less water is lost as evaporation in hot weather. This is better for animals living around the waterways and also better for the downstream estuary 350 because there is more fresh clean water flowing in, helping to flush out nutrients and prevent harmful algal blooms. 350 Removing woody and annual weeds Removing and controlling pests including feral pigs, foxes, cats and exotic plants Removing rubbish and litter 223 Stabilising banks to reduce erosion Constructing safe and stable access points for people Planting local native species and enabling natural regeneration (once weeds 236 removed) 2.3 194 \* Jobs refers to program FTE, which is the predicted number of 12-month full time employment contracts over 10 years. The headcount may be higher (if positions are part-time or short term) or lower (if employment contracts continue over more than one year). This count does not include modelled direct 10 194 and indirect employment and economic outputs.





# River Restoration Fencing - Stock Exclusion

3050 km \$36 million ~250 Jobs

Yr	km	\$mil	
1	333	4	3050 km of fencing will enable priority waterways to be fenced (~20 metres either side) keeping stock out and improving the health of the waterways.
2	333	4	Keeping stock out of the watercourses means the watercourses have better water quality, better habitat and more biodiversity, and also improves the rivers and estuary downstream. This means we will have healthier, more productive rivers flowing into the
3	333	4	Estuary and in turn a healthier, more productive Estuary for all to enjoy – protecting our lifestyles and livelihoods.
4	333	4	Fencing will be offered to land managers across all tenures (private and public) and those that opt in will have the benefit of funding to keep stock out of waterways. Stock crossings and off-stream watering points will be provided where needed, so that farmers who choose to be part of the program retain access for water for their stock.
5	333	4	but in a safer more consistent manner than ad-hoc stream access. Landholders will be responsible for the ongoing maintenance of fencing.
6	333	4	<ul> <li>Stock like cattle and sheep add manure that pollutes water, damage the vegetation on the banks of the watercourse by trampling them and also graze on the plants on the banks</li> </ul>
7	333	4	<ul> <li>Nutrients from fertiliser and manure feed harmful algal blooms, and when they break down they cause fish kills. Nutrients also flow down the rivers into the estuary</li> <li>Stock damage the watercourses by trampling the banks, causing erosion and</li> </ul>
8	333	4	also causing sediments to build up downstream. Once erosion starts in watercourses it can undercut the banks and cause more of the vegetation to be washed away
9	192	2.3	<ul> <li>Keeping stock out allows the native vegetation to recover, to provide habitat for fauna</li> </ul>
10	192	2.3	







River Restoration

**Revegetating Priority Sub-Catchments** 

210 ha \$3.4 million ~25 Jobs

Yr	ha	\$k
1	10	200
2	10	200
3	25	400
4	25	400
5	25	400
6	25	400
7	25	400
8	25	400
9	25	375
10	15	225

210 hectares in priority areas in the catchment will be revegetated with native plants, helping to restore the landscape around the waterways.

Revegetating these areas in the catchment helps to create pockets of healthy bushland. Water flowing across the landscape into the waterways is cooler and cleaner if it is filtered by native vegetation, so there is less fertiliser and sediment entering the estuary from the rivers and streams. Deep rooted plants will also absorb the nutrients that are stored in the soil that are draining into our waterways. This means we will have healthier, more productive rivers flowing into the Estuary.

Areas in the landscape where there is a large catchment feeding into waterways in poor condition will be targeted. It is more cost effective to restore moderately degraded land so 160 ha will be targeted to bring it back to very good health. The 50 ha of restoration of very degraded land will take more effort, particularly in a drying climate. Revegetation will include a diverse range of plant species from trees, shrubs and understorey to provide more habitat and biodiversity – good for our waterways and our birds and animals.

- Replacing exotic or introduced plant species with deep rooted native plants helps the catchment to function better
- Healthy native vegetation also stores more carbon, helps with drought resilience and climate change, and encourages water to be retained in the local landscape
- Species that have been planted for pasture and fodder have shallow root systems and need more fertiliser to grow. They have short seasonal life cycles leaving the land bare for part of the year, and they don't provide as much habitat value
- Native plants provide places for birds to roost and nest, shade and shelter for small marsupials and reptiles, food, and somewhere to hide from predators









Yr	\$mil	Reintroducing habitat to our Rivers will help our waterways be healthy and
1	0.1	productive.
2	1	During dry seasons, deeper pools in our waterways are important refuges for fauna species as the rivers and streams dry up and shallower pools become disconnected from each other. Deeper refuge pools are important for the survival of the fauna species, so they need to be healthy to support higher populations of animals.
3	1.6	Replacing woody debris like logs and branches in streams will make more habitat available: providing a place for birds to perch when they are hunting fish, and basking places above the water for reptiles. It also provides shelter, shade and hiding places for frogs, turtles, fish, and crustaceans,
4	1.6	as well as all the invertebrates like dragonfly larvae that are important to healthy functioning waterways.
5	1.6	
6	1	
7	1	
8	1	
9	1	Restocking our waterways with native species
10	0.1	There are some species of native fauna that have almost disappeared from the rivers and streams that flow into the estuary, including black bream, freshwater cobbler and pygmy mussels. These species can be grown in hatcheries and restocked into the restored waterways.

Restoring the populations of fish allows the ecosystem to function better and for people to enjoy fishing in the rivers, and restocking the mussels and native crustaceans like gilgies help to maintain the healthy food web that should be present in wetlands and rivers.





# Stormwater **Retrofits,** biofilters & constructed wetlands

**25 Retrofits** \$10 million ~60 Jobs

Yr	\$mil	
1		At least 25 Stormwater Retrofits, biofilters and constructed wetlands will be implemented in partnership with local Governments to improve the health of the waterways.
2		In older suburbs, stormwater systems capture the runoff from suburbs in roadside drains and pipe it straight into watercourses like our rivers and Estuary with no filtration. This brings pollutants including litter, nutrients from garden fertilisers, as well as fuel, oil and
3	1	rubber residue from roads and vehicles into the rivers and the Estuary. It can also bring sediment (sand and mud).
4	1.8	Local Governments are committed to designing and implementing water sensitive urban design, biofilters and constructed wetlands. The City of Mandurah, and the Shires of Murray, Serpentine-Jarrahdale and Waroona will work the PHCC to identify priority capital work programs, to help improve the health of our waterwaye, Local Covernments will
5	1.8	identify, plan, design and implement the works as well as the ongoing maintenance, value adding an additional ~\$10 million to this portion of the program.
6	1.8	<ul> <li>Redesigning and rebuilding old stormwater systems reduces the pollution that enters the waterways and helps make the flow of water into the environment more natural</li> </ul>
7	1.2	<ul> <li>Stormwater basins that discharge into waterways without treatment can be retrofitted to become 'living drains', so that they treat the water to remove pollutants, and allow the stormwater to return to the environment in a way that doesn't damage watercourses</li> <li>Redesigning stormwater systems with water sensitive design principles creates better public open spaces that are more visually appealing and can be used for regreation.</li> </ul>
8	1.2	
9	1.2	<ul> <li>Incorporating native plants into stormwater systems also improves biodiversity values, adding native plants that provide habitat for fauna</li> </ul>
10		







# Aboriginal Employment Program

# \$10 million ~420 Jobs

Noongar On Country Employment

### \$mil Involvement of First Nations (Noongar) People is fundamental to our program, enabling their aspirations of active leadership and participation in planning, design and delivery, to increase capacity and capability leading to long term employment 0.1 opportunities. PHCC has a strong track record of working with First Nations people. The program aligns with 1.1 PHCC's Aboriginal Participation Plan and will build on long standing and respectful relationships with our Bindjareb and Wiilman Communities. 1.1 Our community is excited about being involved in a long-term restoration program that will help to heal country and build training and knowledge. This aligns with their aspirations, strategies and existing plans for consultation, engagement, capacity building, legal and ethical responsibilities, 1.1 due diligence, protocols and procedures. A 10 year works program will be delivered by Aboriginal Community Controlled Organisations (ACCO) and enterprises, contracting to PHCC 1.1 The budget will provide the investment required in business and enterprise support to ACCOs, businesses and sole traders leading to development of sustainable enterprises with good governance and organisational capacity 1.1 It will provide support for individuals to gain workplace foundation skills and transition from education or unemployment to sustained employment This will provide long term employment for our local Noongar community, particularly for 1.1 Rangers graduating out of DBCA's Aboriginal Ranger program. As skills grow, field officers will be supported to move to field specialist/coordinator and manager roles 1.1 Testimonial - Franklyn Nannup, Winjan Aboriginal Corporation "Winjan Aboriginal Corporation would like to acknowledge the support PHCC has provided to Winjan. PHCC understand the desire of local Aboriginal community, which is to increase capacity for employment 1.1 of local people and has supported skills, training and on-country activities to assist in this outcome. PHCC has been working closely with the local Bindjareb Noongar community for over 25 years, through their land management activities and training programs which have ensured that local Aboriginal people are 1.1 part of the on country works across this region."





Yr	\$mil	
	0.5	Delivering a 10-year, \$110 million program needs to be done in collaboration with the right partners. PHCC does not own or have management order over any land, and the success of the program lies in a collaborative delivery
	0.5	framework.
	0.5	recognised via multiple awards, including winners of the 2012 WA Environment Awards for 'Community Achievement'; 2015 finalists in the Banksia Awards; and 2009 United National of Australia, World Environment Day Awards (Community Award).
4	0.5	Detailed references are available from 60 partners, covering State and local government, community groups, academic institutions, First Nations Associations and organisations and industry providing individual letters outlining each organisations relationship with the PHCC,
5	0.5	services provided, collaborative actions and commitments to future collaboration. This extensive and diverse range of partners and stakeholders continues to grow.
6	0.5	Letters of support from key organisations needed to deliver this program are provided in the Appendix. These demonstrate the support of relevant collaborators including Water Corporation (land access, approvals, financial and in-kind support), Local Governments (planning, design, approvals, financial support), and Aboriginal organisations.
	0.5	The budget includes provision for
8	0.5	<ul> <li>Indigenous knowledge sharing, two-way science and co-design in planning works</li> <li>Communications including scientific, technical, local and general public audiences</li> <li>Technical advisory groups and subject matter experts</li> </ul>
9	0.5	<ul> <li>Community and stakeholder engagement</li> <li>Governance, insurance, risk, project, financial and audit structures and processes</li> <li>Monitoring and evaluation</li> </ul>
	-0.5	Reporting
10	0.5	
and the second sec		



# Employment Outcomes

OTTIPUTK



### 160-200 Jobs

**110–140 Field Officers\*** On ground restoration works

**30–35 Field Specialists** Coordinate and supervise onground works programs

12–15 Contract Management Coordinate and administer/manage contracts

**12–15 Program/Operations Management** Coordinate overall program deliverables including monitoring and evaluation

\*Predominately Noongar Works Program

### Year 4–7 (4 yrs)

### 300-360 Jobs

210–250 Field Officers\* On ground restoration works

**50–60 Field Specialists** Coordinate and supervise onground works programs

18–22 Contract Management Coordinate and administer/manage contracts

**25–30 Program/Operations Management** Coordinate overall program deliverables including monitoring and evaluation

\*Predominately Noongar Works Program

### Year 8–10 (3 yrs)

### 140–180 Jobs

**100–120 Field Officers\*** On ground restoration works

**20–30 Field Specialists** Coordinate and supervise onground works programs

**10–12 Contract Management** Coordinate and administer/manage contracts

**12–15 Program/Operations Management** Coordinate overall program deliverables including monitoring and evaluation

\*Predominately Noongar Works Program

# 2 BACKGROUND and RATIONALE

## 2.1 International Importance – Ramsar Site 482

The *Bilya* and *Djilba* that have been known as the Peel Inlet and Harvey Estuary<sup>2</sup> are part of an internationally recognised Ramsar wetland, containing two major nationally recognised tourism destinations, and the surrounds are home to 5% of the WA population. The critical condition of the health of the estuary has been well-documented, with severe concerns of a potential ecological collapse that would create devasting and long-term negative environmental, social and economic impacts.

The Western Australian Government recognises the importance of the estuary and the significance of its current poor condition in the Bindjareb Djilba (Peel-Harvey Estuary) Protection Plan (BDPP), which is the only one of its kind in the State. This comprehensive and strongly evidenced plan is in place, with government and community endorsement. PHCC with partners has been effectively delivering solutions that are having positive effects, but the scale of these efforts is proving to be insufficient to arrest the decline and the looming collapse. This Business Case presents recently generated data on the economic value of the estuary, the most cost-effective options for investment and clear recommendations for urgent, short, medium and long-term actions. A functional system of wetlands, streams, and rivers culminating in the estuary waterbody supports many of the environmental, social and economic values of the Waterways (Figure 7).



### Figure 7 Ecocentric functions of the Waterways

<sup>&</sup>lt;sup>2</sup> In this document and others, we acknowledge the hurt and sorrow of Noongar people when the Country of Bindjareb people is labelled with the name of a colonial figure that was instrumental in the Pinjarra Massacre in 1834. We refer instead to the *Bilya* (rivers) and *Djilba* (estuary), or 'the Waterways', except where we are quoting others. Until we can change our name officially, we refer to ourselves only as PHCC.

This business case proposes a collaborative approach to the management of the Waterways, complementing the work of the Bindjareb Djilba Protection Plan Policy and Planning Coordinating Committee. Across Government, community and industry this program would manage the delivery of a \$110 million, 10-year program to implement actions identified in Bindjareb Djilba.

The Bilya and Djilba are in poor ecological condition and continuing to decline. Extensive monitoring in the estuary is demonstrating poor water quality and ecological indicators. Eutrophication (nutrient pollution) remains a concern. The diversity and abundance of valuable species is declining, and there is an increase in nuisance species that thrive in poor conditions.

The estuary has previously experienced a prolonged period of poor ecological health, which was partly remedied by the construction of the Dawesville Channel. Without significant intervention, it is likely that the estuary will suffer a second, and possibly more severe, ecological collapse. There is clearly more at stake now than there was at that time, with fewer of the wetlands and estuaries in the south west of Western Australia in good condition, with much higher population density in the region, and with the effects of climate change becoming apparent.

This Business Case proposes a suite of ecological restoration activities in the lower catchments of the Waterways, including the Serpentine, Murray and Harvey Rivers, to reverse the declining ecological condition of the Waterways before it becomes irreversible.

We propose an extensive program of river restoration through controlling weeds and feral animals, fencing to exclude stock and vehicles from sensitive areas, stabilising erosion on river banks and revegetating with native species that will be resilient to climate change. We also propose to restore aquatic habitat within the Waterways by reinstating refuge pools and adding climate adaptations like 'fish hotels', and restocking the rivers with species of fish and crustaceans that have all but disappeared. We will revegetate priority terrestrial areas within the catchments, where that will have benefits to aquatic ecological values.

We also propose to improve the quality of rural drainage and urban storm water, through converting channel drains to living streams and constructed wetlands and retrofitting water sensitive urban design in older residential areas. These structures will help to optimise hydrological cycles and biodiversity values.

This program will be delivered through a partnership with Aboriginal people, ensuring that cultural values are identified and protected, and providing opportunities for Aboriginal Controlled Community Organisations and Aboriginal enterprises to participate and benefit. The program also includes monitoring and analysis to ensure that ongoing management actions are evidence based and communicated to other stakeholders.

The program is intended to occur over a wide area covering the catchments of the Waterways, and over a long period of time to ensure that they are sustainable and effective. The proposed funding profile allows for on ground works to peak in years 3 - 6, allowing effective planning, preparation and follow-up actions to ensure outcomes.

The consequences of continuing decline in ecological condition are dire. Without a reduction in nutrient pollution and increased efforts to restore the catchments the water quality, the species and ecosystems and the ecological services provided by the Waterways will become compromised. Landscapes and natural areas that are valued by the community for their diversity and complexity, so close to a large proportion of the population of Western Australia, will become more polluted. Defining features of biological diversity, resilience, and sustainability will be lost. Water will be unpleasant, unhealthy, and in places, unsafe for human contact. Iconic and keystone species including dolphins, crabs, bream, shorebirds and samphire marsh could disappear, and the ecosystem will be dominated by nuisance species like seagulls, blowfish and couch grass. Algal blooms will proliferate, filling shallow areas, fouling fishing gear and boats, and causing odour and fish kills when they die off and decompose.

The Western Australian Government has already formulated and endorsed the management response to the current ecological conditions in the Bindjareb Djilba (Peel-Harvey Estuary) Protection Plan (BDPP). This plan was implemented in 2021 with a budget of \$5 million over four years. There remains a need to build on this achievement and commence the landscape scale restoration actions.

The Gabi Warlang Bidi: water quality improvement plan for the Peel-Harvey estuary system (WQIP) is in preparation by DWER to support the BDPP. It will provide the science, evidence for actions and further guidance for management.

Without additional funding to implement BDPP and the new WQIP in full, the previous and existing investments in protection and restoration of the Waterways will not achieve their full potential and there is a risk that they may be wasted. Funding BDPP at its full scale will increase the effectiveness of the actions being undertaken and the resulting successful outcomes.

This business case seeks \$110 million for PHCC to deliver those measures identified in BDPP that will stop the ongoing ecological decline of the Waterways and reverse that trajectory towards recovery.

PHCC is proposed as the recipient of the funding. We are the regional natural resource management organisation, with direct relevant experience, knowledge, capacity and stakeholder relationships to work in the catchment. We are non-government and not-for-profit, resulting in efficiency and flexibility, with the demonstrated ability to lead productive partnerships with all stakeholders.

The Waterways are valuable to Western Australia for their ecosystems and biodiversity, and for the economic return they provide at local and state scale.

The Waterways are impacted by nutrient pollution, increasing population density, and climate change. The condition of key ecological indicators is concerning. Action is required to prevent larger scale problems from developing.

The policy, planning and regulatory actions of the State Government are not enough to address the problem alone, and catchment scale restoration is required to complement these. The economic value of the Waterways is such that restoration will return a positive net value. Not acting now will see the cost of remedial actions increase dramatically.

# 3 PROJECT PURPOSE

## 3.1 What's at stake?

The *Bilya* and *Djilba* (rivers and estuary) around Mandurah are internationally recognised for their diverse ecological values, and support a wide range of economic, recreational, social and cultural values. The Waterways are an economic driver within the Region. Since the ecological collapse of the Waterways in the 1980's due to excessive nutrients, the Dawesville Channel has been constructed and has allowed tidal flushing of the Waterways to keep nutrients at lower levels and restrict the growth of harmful algal blooms. The condition of the Waterways improved but continued environmental impacts in the catchment have resulted in continued decline in ecological condition. Reduced streamflow, continued nutrient pollution, and development in the catchment have all contributed cumulatively to the current situation where water quality is declining, biodiversity measures are declining, and there has been a return of the visible symptoms of algal blooms and fish kills. More detail on recent monitoring outcomes is provided in section 3.4. In the absence of another viable engineering solution, improved environmental management is required to first halt the declining trajectory, and then start to restore ecological values.

## 3.2 History

There is a long and complex background of environmental interventions, policies, regulation and other forms of management that have occurred in the Waterways in an effort to address the declining water quality and subsequent environmental impacts in the estuary. Despite significant effort in policy and regulation, and a large scale engineering solution in the form of the Dawesville Channel, the condition of the Waterways continues to decline.

Threats and pressures that affect the Waterways have escalated since the Dawesville Channel was constructed. There is now a much higher population living in the catchment, new industries have established, more vegetation has been cleared, and climate change has seen a significant decrease in rainfall and consequently freshwater inflows. A renewed effort is required.

## 3.3 Current state

This program has been designed within the current Australian and Western Australian legislative and policy context by experienced practitioners with a deep understanding of the Waterways. It is complementary to many current State, Australian and international policy directions and will either directly deliver, or contribute to, the outcomes of a substantial number of government priorities.

At a state level, this program is clearly aligned with a wide range of policies and strategies in the Environment, Water, Climate Change, Planning and Regional Development portfolios (Figure 21). Identification of other State, national and international contexts have been included, as they are relevant to seeking additional funding from the Australian government and other funding bodies for this program, including through an election campaign or in response to new initiatives.

This program is designed to directly mitigate impacts on the Waterways. The program has been designed with reference to the outcomes of the Peel Harvey Water Quality Improvement Plan – Phosphorus (2008) and the Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992.

The plan also delivers the outcomes of Bindjareb Djilba (Peel Harvey) Estuary Protection Plan that have not already been allocated to portfolio agencies or are not fully funded in those agencies' budgets. There are 23 actions and sub-actions in the Plan where PHCC is listed as the lead or support stakeholder. Of these, PHCC is currently funded to deliver a portion of the total work required under three actions (Table 1). Funding for one of the actions ends in June 2025, and for the other two in December 2025.

Action	Scale	Budget	End Date
Healthy Estuaries WA			
1: People, partnerships and project delivery		\$144,000	December 2024
2: Sustainable agriculture	77 farms	\$200,000	December 2024
3: Water in the landscape	40 km fencing	\$540,000	December
	12 ha reveg		2024
5: Science for management		\$20,000	December 2024
HEWA total		\$904,000	
Bindjareb Djilba Protection Plan			
C1: Reduce nutrient losses to waterways by optimising fertiliser use to agronomic need through soil testing, agronomic advice, and extension in partnership with farmers and the fertiliser industry.	70 farms	\$231,000	June 2025
C7: Assist farmers and other landowners to exclude stock from rivers, streams and drains to reduce erosion and the input of sediment and organic matter to the estuary and its tributaries.	40 km fencing	\$540,000	December
C17: Reinstate the ecological function of key rivers and streams through river restoration works and revegetation of the river and stream margins.	12 ha reveg		2023
BDPP total		\$771,000	

Table 1 Actions currently funded to PHCC under Healthy Estuaries WA and BDPP

The Plan timeframe of 10-30 years may not show any significant changes in water quality of the estuary. Significant changes could be seen in 20-50 years. It is a long-term plan. On a small scale, changes could be detected in loads within a 10-year time scale. The journey however has to start otherwise the problems will get worse.

Water Quality Improvement Plan for the Rivers and Estuary of the Peel-Harvey System – Phosphorus Management, 2008 (Summary, p vi).

https://www.epa.wa.gov.au/sites/default/files/Policies and Guidance/Peel Harvey WQIP151208.pdf

In 2023, the estuary and its waterways are still showing warning signs of deteriorating water quality. With reduced river flows, saline water intrusion is extending the estuarine reaches of the rivers even further – leading to hypersalinity and loss of freshwater habitat. Parts of the main body of the estuary are in good condition due to the increased marine circulation. However, the Harvey Estuary's southern end and the estuarine reaches of the Serpentine, Murray and Harvey rivers are severely and regularly affected by algal blooms, the presence of toxic algal species, sulfur-rich sediments, deoxygenation events and fish kills.

Gabi Warlang Bidi – Peel-Harvey Water Quality Improvement Plan 2024 (draft)

## **3.4 Definition of Problem/Opportunity**

The problem of declining ecological condition in the Waterways creates a need to act now to halt that decline and restore the environment. Apart from the environmental values at risk, there is enormous economic value attached to, and derived from, the Waterways (Figure 8 and Figure 9). An economic evaluation of the Waterways was commissioned by the Peel Development Commission (PDC) and PHCC<sup>3</sup>. This evaluation reported:

- Total Economic Value \$20.8 billion
- Annual economic contribution \$605.7 million
- Approximately 7% of the Region's Gross Regional Product
- Three million visits per year
- 2,086 existing jobs from direct interaction with Waterways
- Annual economic contribution (Gross Value Added) 5 times that of Ningaloo Reef
- <u>Annual</u> economic contribution of approximately \$600 million, equivalent to the <u>total</u> lifetime (30 year) economic output of Optus Stadium<sup>4</sup>.

<sup>&</sup>lt;sup>3</sup> <u>https://peel-harvey.org.au/wp-content/uploads/2023/05/P0043213-Economic-Evaluation-of-Peel-Harvey-Waterways-Final-Report.pdf</u>

<sup>&</sup>lt;sup>4</sup> <u>https://www.deloitte.com/au/en/services/economics/perspectives/economic-impact-optus-stadium.html</u>



Figure 8 Annual economic contributions of the Waterways<sup>5</sup>



### Figure 9 Total economic contributions of the Waterways<sup>5</sup>

The natural capital of the Waterways is comprised of its water, biodiversity and ecosystems. Loss of this natural capital will damage the local economy and threaten local jobs. Addressing the ecological problems now and at scale will prevent the problem worsening, and from potentially becoming irreversible. The cost of restoration now is much less than what would

<sup>&</sup>lt;sup>5</sup> Reproduced from Economic Valuation: Peel Harvey Waterways, April 2023 <u>https://peel-harvey.org.au/wp-content/uploads/2023/05/P0043213-Economic-Evaluation-of-Peel-Harvey-Waterways-Final-Report.pdf</u>

be lost from the economy if the ecosystems comprising the Waterways were to degrade to the point of ecological collapse.

The environmental values of the Waterways include beaches, shorelines and coastal Waterways; coastal and terrestrial ecosystems, habitats and species; aquatic ecosystems, habitats and species; water sources; inland Waterways; Indigenous water; and water quality.

These values have been mapped for Waangaamaap Bilya (Serpentine River)<sup>6</sup> and Bilya Maadjit (Murray River)<sup>7</sup> in River Action Plans (Figure 10 and Figure 11).

Economic values including tourism and hospitality, housing, commercial and recreational fishing, recreational boating and agriculture are generated from these environmental values.

Other values that derive from the environment of the Waterways include health and wellbeing, science, research and education, and heritage, spiritual and cultural values.

As a result of climate change, increasing population and land use changes in the catchment, the environmental values of the Waterways are declining (Figure 12).

There is extensive monitoring data that demonstrates that key water quality indicators and measures of biological and ecological condition are declining over time.

Reports from the Healthy Estuaries WA program clearly demonstrate the extent of the problem in the Waterways. The Estuary Condition Report for Bindjareb Djilba (Peel-Harvey estuary) 2016-19<sup>8</sup> includes four key points:

- 1. The Peel Inlet has good water quality free from persistent symptoms of nutrient enrichment; the Harvey Estuary is poorly flushed and shows poor water quality with summer hypersalinity, high nutrient concentrations and, at times, elevated microalgal densities.
- 2. The estuarine river reaches are in poor health. The Waangaamaap Bilya (Serpentine River) has very high nutrient concentrations that fuel microalgal activity year-round with frequent blooms of potentially harmful microalgae. Oxygen in the bottom waters of the Bilya Maadjit (Murray River) is persistently low and occasional microalgal blooms and fish kills occur.
- 3. Unseasonal flows in summer 2017 delivered excessive organic material and nutrient enriched poor-quality waters to the estuary, leading to fish kills and subsequently an autumn bloom of potentially harmful microalgae in the Murray River.
- 4. Excessive nutrients and climate change impacts are key threats to the health of the Bindjareb Djilba ecosystem. Reducing nutrient losses from the catchments is essential to build resilience and allow the estuary to adapt, especially considering climate change pressures are projected to increase.

<sup>&</sup>lt;sup>6</sup> <u>https://peel-harvey.org.au/publications/serpentine-river-action-plan/</u>

<sup>&</sup>lt;sup>7</sup> <u>https://peel-harvey.org.au/publications/bilya-maadjit-murray-river-action-plan/</u>

<sup>&</sup>lt;sup>8</sup> <u>https://www.wa.gov.au/system/files/2023-07/hewa-bindjareb-djilba-peel-harvey-estuary-condition-report-2016-19.pdf</u>



	Floodway and	Verge		Bank Stability and	Habilat
	bank vegetation	vegetation			Diversity
Excellent	Healthy     undisturbed native     vegetation     No Weeds	<ul> <li>Healthy undisturbed native vegeta/son</li> <li>Verges more than 20m wide</li> </ul>	-Abundant cover: shade, overhanging vegatation - Snage, leat litter, rocks and/or aquatic vegetation in sheam	No erosion or subsidence or sediment deposits banse vegetation cover on banks and verge No disturbance	Three or more hobilat types - some permanent water
	(15 points)	(# points)	(8 points)	(8 points)	(6 points)
Good	Mainly healthy undistubed native vegetation 5 one weeds - No recent distubances	<ul> <li>Mainly healthy undisturbed native vegetation</li> <li>Verget less than</li> <li>20m wide</li> </ul>	<ul> <li>Abundant shade and overhanging vegetation</li> <li>Some cover in the stream</li> </ul>	<ul> <li>No significant explorit, subsidence or subsidence or subsidence or banks</li> <li>May be some solit exposute and vagetation thrinning on vagetation thrinning on</li> </ul>	<ul> <li>Two habitat hypes</li> <li>Some permanent water</li> </ul>
	(12 points)	(4 points)	(4 points)	(4 points)	(4 points)
Moderale	Good vegetation cover but a mixture of native and exolic species - Localised clearing - Uffe recent diffe incent	Good vegetation cover but a mixture of native and exofic species - Veges 20m wide or more	- Some permanent shade and overhanging vegetation - Some instream cover	Cood vegetation cover     Only localised erosion. bank collopse and sedment heaps.     Verget may have spans vegetation	<ul> <li>Manly ane habitat type with permanent water, or a range of habitat with no permanent water</li> </ul>
	(é points)	(4 points)	(4 points)	(4 points)	(2 points)
Poor	- Mainly exofic ground cover - Obvious site disturbance	<ul> <li>Nartow verget, only (&lt;20m wide)</li> <li>Mainly exotic vegetation</li> </ul>	- Channel mainly clear - Little permanent shade or instream cover	Extensive active ension and sediment heaps Bare banks and verges common - banks may be coloaning	<ul> <li>Mainly one habitat type with no permanent water</li> </ul>
	(3 points)	(2 points)	(2 points)	(2 points)	(1 point)
Very Poor	- Mostly bare	-Mostly bore	- Virtually no shade	- Almost continuous	- Sheam
	ground or excitic ground cover (i.e. pathue gardens or weeds but no trees)	ground or exotic ground cover (i.e. parture gardens or weeds but no frees)	or inshearn cover	erasion - Over 50% of banks collapsing - Sediment heaps line or fill much of the floodway - Little or no vegetation	channelized - No pools, riffles or meanders - The stream forms a continuous channel

A Grode Foreshore	C Grade Foreshore
Al: Note: Note: The second se	C1: Searce score frequencies of the searce of the grasses, but the indextrees consist entriety of weaks, manay rances grasses, the trees on any amounts relation of any land species. The trees of the ran of the searce of the searce of the rank of the searce of the rank of the searce of the rank of the r
8 Grade Foreshore	D Grade Foreshore
B1: Degraded - weed infested Weeds have become a significant component of the understorey vegetation. Although native species are dominant, a few have been replaced by weeds.	D1: Ditch - erading There is not enough tringing vegetation to control erosion. Some there and shrubs remain and act to retard erosion in certain spots, but are doomed to be undermined eventually.
82: Degraded - heavily weed intested in the understarcey, weeds are about an abundant as native species. The regeneration of some tree and large strub species may have declined.	D2: Ditch - twely aciding No significant fringing vegetation remains and existion is completely out of control. Undermined and subsidied emboniments are common, and longe sediment plumes are visible along the river channel.
<ol> <li>Degraded - weed dominated Weeds dominate the understary, but many native species remain. Some trees and large shrub species may have declined or disappeared intogether.</li> </ol>	D3: Droin - weed dominated The highly enabled new valley has been fenced off, preventing control of weeds by track. Premnial Grap-lived weeds have become established. The inver has become a simple drain, similar or identifical to a typical major urban drain.



	Floodway and Bank Veg	Verge Vegetation	Stream Cover	Bank Stability and Erosion	Habitat Diversity	Rating
A1	15	8	8	8	6	45
A2	12	8	8	8	6	42
A3	12	6	8	6	4	36
B1	12	4	6	6	4	32
B1-B2	-				-	28
B2	6	4	4	6	4	24
82-B3	-					20.5
B3	3	2	4	6	2	17
B3-C1	-		-			16
C1	3	4	2	4	2	15
C1-C2	-		-	-		13
C2	3	2	2	2	2	11
C2-C3					- 1	9
C3	3	0	0	2	2	7
D1	3	2	0	0	0	5
D2	3	0	0	0	0	3
D3	0	0	0	0	0	0

River Action Plan - River reaches assessed using DWER *River Restoration Manual* (WRC, 1999) methodology - standardized Pen-Scott Method for grading foreshore conditions to determine priority areas for restoration.



Figure 10 Waangaamaap Bilya (Serpentine River) Action Plan



Figure 11 Bilya Maadjit (Murray River) Action Plan

This reach is approximately 4 km long (Figure 35). Both banks of the river are privately owned and most landowners still have and are executing their riparian rights. Both banks are predominantly Rural with some Urban on the left bank.



Figure 12 Images of Bilya Maadjit from the River Action Plan

The Water quality snapshot: Bindjareb Djilba (Peel-Harvey estuary) 2021-22<sup>9</sup> highlights include:

- 1. The estuary catchment had a very wet winter in 2021, with higher than average rainfall in July that flushed nutrients from the catchment into the Waterways. This increase in nutrients resulted in higher algal growth in the Murray and Serpentine rivers in winter, spring and summer, including cyanobacteria ('blue-green algae') that can be harmful to human health.
- 2. Microalgal blooms were also present in the estuary basins in winter; however, these did not persist into spring and summer. This was likely because high river flows helped flush nutrients towards the ocean and dark tannin-stained water reduced the light available for algae growth. However, the high nutrient concentrations fuelled the growth of nuisance green macroalgae ('seaweed').
- 3. A fish kill event occurred in March 2022 in the Serpentine River. This was probably linked to very low oxygen levels overnight, caused by excessive microalgal growth.

The Bindjareb Djilba estuary protection plan<sup>10</sup> also provides a clear picture of the extent of ecological problems in the Waterways. There are 13 sub-catchments where water quality is regularly monitored: seven have a high or very high nitrogen status and 10 have a high or very high phosphorus status (Figure 13), reproduced from Bindjareb Djilba Protection Plan with permission from DWER).

<sup>&</sup>lt;sup>9</sup> <u>https://www.wa.gov.au/government/publications/water-quality-snapshot-bindjareb-djilba-peel-harvey-estuary-2021-22</u>

<sup>&</sup>lt;sup>10</sup> <u>https://estuaries.dwer.wa.gov.au/estuary/peel-harvey-estuary/bindjareb-djilba-peel-harvey-estuary-protection-plan/</u>

The estuary protection plan calculated an interim water quality index for 12 locations in the Waterways and provides a score from A (good) to E (poor) based on four key water quality indicators (chlorophyll  $\alpha$ , dissolved oxygen, total nitrogen and total phosphorus) (Figure 14). The inlet (west, central and east) locations, Harvey estuary (north, central and south) locations, and lower Murray and Serpentine River locations receive a rating of A or B, reflecting the flushing influence of the Dawesville Channel. The upper and middle Murray River and middle Serpentine River locations are rated C, and the upper Serpentine is rated D. These ratings reflect the persistent nutrient inflows from the catchment, along with lower volume of inflow, leading to eutrophication, stratification, high concentrations of algae, low dissolved oxygen, and fish kills.

About 70 species of fish are found in the estuary, including marine and estuarine species. The Fish Community Index, developed at Murdoch University for estuaries in the south west of Western Australia, shows that the estuary generally performs poorly, with less species diversity, a larger proportion of detritivores and generalist species, and an over-representation of the species that are tolerant of poor water quality (Figure 15).

These indicators all demonstrate the extent of the current and future problems with water quality in the Waterways. The opportunity exists for these problems to be addressed, to halt the decline in the ecological, social and economic values of the waterways to avoid a second ecological collapse.

# Catchment nutrient inputs

Nutrient status (2016-18) and long-term nutrient trends for total nitrogen and total phosphorus (based on 11–15 years of data up until 2018)



### Figure 13 Catchment nutrient inputs

Reproduced with permission from Department of Water and Environmental Regulation 2020, *Bindjareb Djilba* (*Peel-Harvey estuary*) *Protection Plan*, <u>https://www.wa.gov.au/government/publications/bindjareb-djilba-peel-harvey-estuary-protection-plan</u>


Figure 14 Water quality index results for Waterways locations

Reproduced with permission from Department of Water and Environmental Regulation 2020, *Bindjareb Djilba* (*Peel-Harvey estuary*) *Protection Plan*, <u>https://www.wa.gov.au/government/publications/bindjareb-djilba-peel-harvey-estuary-protection-plan</u>



#### Figure 15 Fish Community Index

Reproduced with permission from Department of Water and Environmental Regulation 2020, *Bindjareb Djilba* (*Peel-Harvey estuary*) *Protection Plan*, <u>https://www.wa.gov.au/government/publications/bindjareb-djilba-peel-harvey-estuary-protection-plan</u>

# 3.5 Rationale for Intervention

### 3.5.1 Action is required now

Serious problems are developing in the Waterways. The ecological condition of many of the component parts of the Waterways is currently poor and most key indicators are declining (Figure 16).

Of the many values represented in the Waterways, the condition of the aquatic ecosystems, habitats and species, inland Waterways, Indigenous water, and water quality underpin most other values, and at the same time they are under the most pressure.

Without intervention, ecological condition will continue to decline, and it is likely that effects will become cumulative, exacerbating the rate of decline. The Waterways are likely to reach an ecosystem tipping point, at which time the water quality and biodiversity of the Waterways will become significantly impacted. Apart from the environmental impact, and the loss of significant ecological value in an internationally recognised and protected wetland, there will be economic impact to the region, and the flow on economic impacts to the State will be significant.

It is certain that the extent and cost of remedial works to address the environmental and human health impacts will be far greater than the cost of this program, and it is also certain that these costs will increase exponentially with time.

It is also certain that the unit cost of habitat restoration will increase over time as it becomes necessary to restore more values from a more degraded starting point, and to include more land, including land that is more difficult or costly to manage.



Figure 16 Waangaamaap Bilya (Serpentine River) Unallocated Crown Land, summer 2024.

### What will happen if we don't act?

Without addressing ongoing decline in water quality, Western Australians will not be able to swim, fish and enjoy the Waterways, and living near the water will become undesirable because of the odour of rotting algae, dead fish and oozing mud. We will not be able to enjoy clear sparkling water, with plenty of dolphins, crabs, table fish, pelicans, ospreys, and migratory shorebirds.

No-one will want to cruise the waterways or visit the waterfront cafes and restaurants.

This will impact on the economic benefits that flow from the waterways including real estate, tourism, and commercial and recreational fishing.

### 3.5.2 A positive Benefit: Cost Analysis

The base case for this business case is for continued investment at current levels, through State agencies, and continued work funded by a range of grants to non-Government organisations. The current investment level is lower than the required full budget to deliver all the actions that are contained in the various policy documents and management plans that cover the Waterways.

PHCC contracted Natural Decisions Pty Ltd to conduct a Benefit Cost Analysis (BCA) for the Waterways, using the INFFEWS<sup>11</sup> (Investment Framework for Economics of Water Sensitive Cities) tool developed by the Cooperative Research Centre for Water Sensitive Cities<sup>12</sup>. The BCA was conducted on seven practices that have been previously modelled for effectiveness at improving water quality, and have been identified in the (draft) Water Quality Improvement Plan by DWER:

- 1. Best practice agriculture fertiliser management
- 2. Best practice agriculture soil amendment
- 3. Best practice agriculture dairy effluent management
- 4. Best practice agriculture intensive animal industry (piggery, feedlot and holding yard) effluent management
- 5. Septic tank removal
- 6. Stock exclusion and riparian revegetation
- 7. Targeted replanting of grazing land

The total quantum of each of these actions that will result in the required reduction in nutrient loads into the estuary has been calculated by DWER using a hydrological and nutrient model that meets the national standard for catchment modelling. The model is accurate, detailed and contemporary (2020).

The BCA included assumptions about the effectiveness of each practice, made on a very conservative basis. The BCA has accounted for some barriers to implementation of restoration activities, noting that there are some competing interests in agriculture and in residential property development, uncertainties associated with the effects of climate change, and that

<sup>&</sup>lt;sup>11</sup> <u>https://watersensitivecities.org.au/investment-framework-for-economics-of-water-sensitive-cities-inffews-benefit-cost-analysis-tool/</u>

<sup>&</sup>lt;sup>12</sup> Homepage - Water Sensitive Cities Australia (wscaustralia.org.au)

ecological remediation works have a significant lag time (in some cases over several decades). This business case does not depend on full implementation of all actions to demonstrate a positive benefit cost ratio.

This BCA demonstrates that the benefits of action exceeded costs for all the practices that were assessed, with a positive Net Present Value (NPV) and Benefit-Cost Ratio (BCR) of greater than one (Table 2). For the actions proposed in this business case, namely stock exclusion fencing and ecological restoration of the waterways and grazing land, a BCR of 1.43 means that investment of \$110 million will have a benefit that is conservatively valued at \$157.3 million. This business case does not propose to fund the best practice agriculture actions (practices 1 to 4 in the above list), as they are allocated in BDPP to DWER and DPIRD to continue. These practices are currently being implemented through the Healthy Estuaries WA program, the Bindjareb Djilba Estuary Protection Plan, and the SoilWise program.

Option	Benefits	Costs	NPV	BCR
		\$Millions		
1: Best-practice agriculture (practices 1-4)	282.38	40.93	241.45	6.90
2: Targeted alternative investments (practices 5-7)	357.52	270.08	87.44	1.32
3: Combined options 1 & 2 (practices 1-7)	521.52	338.69	182.83	1.54
4: Business case (75% practice 6 & 25% practice 7))	153.66	107.52	46.14	1.43

Table 2 Net Present Value (NPV) and Benefit: Cost Ratio (BCR) over 20 years

This BCA demonstrates a positive Benefit-Cost Ratio (BCR) of 1.43. The BCA represents the minimum BCR that is predicted and Monte Carlo sensitivity testing indicates the results are robust. The BCA was completed using the best available information including only well-defined monetised benefits and did not incorporate unquantified monetised benefits such as real estate value<sup>13</sup>, or non-monetised benefits including ecosystem services and human health and well-being. In other global examples of ecosystem restoration and ecosystem services valuation in developed countries a BCR of up to 17 has been calculated, with most scenarios reporting BCR of greater than 5. When human health and well-being is specifically considered, a BCR of up to 27 has been calculated.<sup>14</sup> Case studies of opportunity costs of not restoring ecosystems in South Africa have identified losses of between 16 and 50 times the annual value of those ecosystems<sup>15</sup>.

In the context of emergency management, there is extensive data that demonstrates that spending on disaster prevention, preparedness and mitigation is far more effective than spending on disaster response and recovery. Recent Australian examples have shown that the cost: benefit ratio for disaster prevention, preparedness and mitigation is around 1:4.

It is likely that the BCR associated with ecological restoration of the Waterways is far greater than 1.43, and there is a very high degree of confidence that the BCR is positive.

<sup>&</sup>lt;sup>13</sup> A Net Present Value for real estate near waterways in Mandurah was calculated at \$3 billion in 2008 (Economics Consulting Services, Peel Waterways: An Economic Valuation, 2008)

<sup>&</sup>lt;sup>14</sup> https://www.london.gov.uk/sites/default/files/11015viv\_natural\_capital\_account\_for\_london\_v7\_full\_vis.pdf

<sup>&</sup>lt;sup>15</sup> Crookes and Blignaut, 2019

### 3.5.3 Additional benefits

Although jobs have not been included as a benefit in the BCA, they were quantified in the 2023 economic evaluation which identified over 2,000 existing full-time equivalent jobs supported by direct interaction with the Waterways.

This program will result in additional jobs in the region. At its peak, the program will support over 110 direct jobs per year and over 75 indirect jobs per year (in years 3-6)<sup>16</sup>. Most of this employment will be in the burgeoning restoration economy, where future demand is forecast to exceed capacity. Economic drivers of the restoration economy include WA's Native Vegetation Policy and Carbon Farming and Land Restoration Program, as well as Australian initiatives in the Nature Positive Plan such as the Nature Repair Market. The extent of the restoration economy in WA was estimated to be at least \$720 million per year, and 5,100 jobs (for the 2020-21 financial year)<sup>17</sup>. A significant proportion of these jobs will be Aboriginal people engaged in Caring for Country.

### 3.5.4 An experienced and capable proponent

The PHCC has been operating as the peak Natural Resource Management (NRM) group across the 1.12 million hectare catchment for over 21 years. Since 2018 PHCC have delivered 39 projects worth \$17,910,148 (to 31 December 2022), with 4% of expenditure across the organisation going directly to First Nations people and organisations for goods and services, with support from 7735 volunteers. In the ten (10) years prior (2008 – 2018) PHCC delivered a further 64 projects worth \$22,265,124.

PHCC's successful partnerships across government, community groups, academic institutions, First Nations associations and organisations and industry enable collaborative outcomes, value adding to deliverables and increasing capacity and capability within the region, particularly First Nations People.

Between 2018-2023 as a contracted delivery partner through the Australian Government's National Heritage Trust, PHCC delivered five key projects focused on Greening Farms, the Peel-Yalgorup Ramsar site, Threatened Ecological Communities and Threatened Species (including black cockatoos) with a combined contract value of \$9.51 million. Key activities delivered through these projects included:

- 300,000 seedlings planted
- 200 Events/Workshops
- 10 First Nations Rangers trained/participating in on-grounds activities
- 28 monitoring regimes established/maintained
- 73 habitat structures installed
- 17 days collecting seed

PHCC is a contracted regional Delivery Partner to deliver four new projects in the third iteration of the National Heritage Trust from 2024-2028 with a project value of \$6.5 million. Projects are

<sup>&</sup>lt;sup>16</sup> Peel Development Commission, 2024, Healing Bilya Remplan Input/Output Modelling

<sup>&</sup>lt;sup>17</sup> <u>https://wabsi.org.au/wp-content/uploads/2023/11/WA-Restoration-Economy-Report-2-2.pdf</u>

focused on the Peel-Yalgorup Ramsar site, Threatened Ecological Communities and Threatened Species (including black cockatoos, numbats, and Banksia and Tuart woodlands).

PHCC is also contracted through the Healthy Estuaries WA and Bindjareb Djilba Protection Plan State Government funded programs to deliver up to 24 hectares of revegetation and 80 kilometres of stock exclusion fencing as part of stream restoration projects on farm drains and Waterways. Healthy Estuaries WA funding ceases at the end of 2023-24, and BDPP funding ceases at the end of 2024-25.

PHCC has established services in place that enable us to deliver on projects. We have three regional office spaces as well as a location in the Perth CBD, and an effective operations team, scope of knowledge and skills, project design capacity, demonstrated implementation skills, funds leverage and management (Figure 17). Internal controls are excellent with Project Steering Committees and organisational processes including Work Health and Safety in place. A fleet of vehicles including a mobile research unit, river health assessment and community engagement trailers and a 'tiny lab on wheels' are in place and available for use during project delivery (Figure 18 and Figure 19). Involvement of Noongar People is fundamental to our delivery program, from enabling their aspirations to active leadership and participation in planning, design and delivery, with a particular aim to continue the trajectory of increased capacity and capability leading to employment opportunities.

PHCC has a well established framework of strategic and operational guidance that covers the Waterways as well as the broader catchment area. PHCC also has a comprehensive organisational management framework including governance, leadership, probity, risk management, financial performance, work health and safety, diversity and inclusion, community engagement, innovation and high performance (Table 3).

Table 3 PHCC	Operating framework
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PHCC Strategic Directions 2024-26 https://peel-harvey.org.au/strategicdirections/strategic-directions-2024-26/

Peel-Yalgorup System Ramsar Management Plan 2009 https://peel-harvey.org.au/wp-content/uploads/2012/01/Peel-Yalgorup-System-Ramsar-Site-Management-Plan-PHCC.pdf

Bindjareb Boodja Landscapes 2025 https://peel-harvey.org.au/wp-content/uploads/2015/05/Final-NRM-Strategy1.pdf

Waangaamaap Bilya (Serpentine River) Action Plan 2020 https://peel-harvey.org.au/wp-content/uploads/2021/03/Serpentine-RAP-V4-FINAL.pdf

Bilya Maadjit (Murray River) Action Plan 2022 https://peel-harvey.org.au/wp-content/uploads/2022/11/Murray-RAP Final Nov-2022entire reduced.pdf

Hotham-Williams River Action Plan 2020 https://peel-harvey.org.au/wp-content/uploads/2020/10/Hotham-Williams-RAP-Final.pdf

Hotham-Williams NRM Plan 2015-2025 https://peel-harvey.org.au/publications/hotham-williams-nrm-plan/

### Figure 17 PHCC staff



Figure 18 Baseline monitoring for river health assessments



Figure 19 Conducting river health assessments

### 3.5.5 Closing the Gap

This program has been designed to deliver many of the objectives of the Closing the Gap agreement, particularly Outcome 15: Aboriginal people maintain a distinctive cultural, spiritual and economic relationship with their land and waters.

There are many sites of Aboriginal significance in the proposed location of the program and Bindjareb Noongar people maintain a very important relationship with the Waterways. The Bring Together Walk Together Aboriginal Partnership Framework<sup>18</sup> was developed by Bindjareb Elders and DWER to create and foster strong engagement with Traditional Owners in the Bindjareb Djilba Protection Plan, and clearly articulates the central and important place of water in the cultural and spiritual identity of Bindiareb Noongar people.

This program will be implemented by PHCC according to our Aboriginal Participation Plan<sup>19</sup>, and our strategy of always recognising, acknowledging and respecting Noongar People as the Traditional Owners who have always lived here, cared for the land and waters, and been sustained by its natural resources (Figure 20). Noongar people will have a central role in program implementation and delivery.

Program delivery will also support other outcomes of the Closing the Gap agreement, including Outcome 7 relating to youth education and employment, and Outcome 8 relating to economic participation and development.



Figure 20 PHCC Noongar Procurement Framework

<sup>&</sup>lt;sup>18</sup> https://www.wa.gov.au/system/files/2023-07/bring-together-walk-together-aboriginal-partnership-framework.pdf <sup>19</sup> https://peel-harvey.org.au/wp-content/uploads/2021/06/2021 NPP Final.pdf

### 3.5.6 State, national and international initiatives

This program is closely aligned with key State and national policies and plans and supports the achievement of objectives across a range of policy areas. It also contributes to international aspirations and a number of United Nations conventions (

Summary of Alignment to key State initiatives		
Peel Harvey Water Quality Improvement Plan – Phosphorus (2008)	EPA	
Gabi Wonga Bidi – Peel Harvey Water Quality Improvement Plan v2 (draft)	(DWER)	
Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992	EPA	
Bindjareb Djilba (Peel Harvey) Estuary Protection Plan	DWER	
State Planning Policy 2.1: Peel-Harvey Coastal Plain Catchment	DPLH	l V S
Perth and Peel @ 3.5 million	WAPC	
Perth and Peel @ 3.5 million: environmental impacts, risks and remedies	EPA	
Peel Development Commission Strategic Plan: Regional Investment Blueprint to 2050	PDC	
Summary of Alignment to additional State initiatives		
Native Vegetation Policy for Western Australia (2022)	DWER	
Environmental Factor Guideline: Inland Waters (2018)	EPA	
Wetlands Conservation Policy for Western Australia (1997)	DBCA	
Water Notes: Wetland Buffers (2000)	WRC	
Guideline for the Determination of Wetland Buffer Requirements (2005)	WAPC	<u>ر</u>
Position Statement: Wetlands (2001)	WRC	
Western Australia Climate Change Policy	DWER	
Climate Adaptation Strategy	DWER	
Diversify WA	JTSI	
Aboriginal Empowerment Strategy	DPC	
WA Regional Development Framework	RDC's & DPIRD	
WA Primary Industries Plan 2020-24	DPIRD	
Summary of Alignment to national initiatives		
Nature Positive Plan	DCCEEW	
Australian Ramsar management Principles	DCCEEW	
Migratory waterbird agreements	DCCEEW	
Regional Landcare Partnerships	DCCEEW	
National Water Initiative	DCCEEW	
Future Drought Fund	DAFF	♥
Summary of Alignment to international initiatives		
United Nations Sustainable Development Goals		
United Nations Decade on Ecosystem Restoration (2021-2030)		5-1 2
United Nations Convention on Biological Diversity; Kunming-Montreal Glo Framework	obal Biodiversity	Ser.
Ramsar Convention on Wetlands of International Importance		
World Economic Forum Global Risks 2024		
WA Primary Industries Plan 2020-24		

Figure 21 Alignment with State, national and global initiatives

# 4 INVESTMENT PROPOSAL

# 4.1 Business Case Objectives

As outlined in section 3.4, an ecological collapse has already started in the Waterways. If action isn't taken now, that collapse will become irreversible and the resulting economic damage would be far more than the cost of restoration.

This business case seeks \$110 million for PHCC to deliver a range of on-ground works that will stop the ongoing ecological decline of the Waterways and reverse that trajectory towards recovery. The objectives of the program are to:

- Halt the decline in the ecological, social and economic values of the Waterways to avoid a second ecological collapse
- Restore the ecological, social and economic values of the Waterways
- Protect the ecological character of the Peel-Yalgorup Ramsar wetland

The measures include river restoration, habitat restoration, fish restocking, biofilters and constructed wetlands, and a significant on Country works program to be undertaken by Traditional Owners. It also includes monitoring and analysis to ensure that ongoing management actions are evidence based and communicated to other stakeholders.

The measures will occur over a wide area covering the catchments of the Waterways, and over a long period of time to ensure that they are sustainable and effective.

The measures are consistent with the Bindjareb Djilba (Peel-Harvey Estuary) Protection Plan and represent the full scale of works proposed in that plan but not currently funded by budget allocations to State Government agencies (Figure 22). The activities proposed in this business case complement, without duplicating, the activities undertaken by State Government agencies.



Figure 22 Actions listed in Bindjareb Djilba Estuary Protection Plan

Actions outlined in red are those included in this business case for PHCC to undertake.

PHCC is proposed as the recipient of the program funding. The organisation is the regional natural resource management organisation, with direct relevant experience, knowledge, capacity and stakeholder relationships to work in the catchment. The organisation is non-government and not-for-profit, resulting in efficiency and flexibility, with the ability to lead productive partnerships with all stakeholders and with a demonstrated track record delivering large scale projects within complex programs.

# 4.2 Benefits to be Delivered

The benefits that will be delivered by this program are significant and include environmental, economic and social benefits.

Benefits are related to the ecosystem services provided by the Waterways, which include:

- Provisioning services (food and water)
- Regulating services (climate, flood mitigation, pest and disease resistance, pollination and seed dispersal)
- Supporting services (air quality, nutrient cycling, energy capture)
- Cultural services (education, knowledge, recreation, spiritual and cultural benefits).

Benefits that relate to the environmental values of the Waterways include:

- Improved water quality
- Stabilised hydrological processes
- Reduced erosion, scouring and sedimentation
- Biodiversity protection and conservation including:
  - Species
  - Vegetation associations
  - Habitats
  - Ecological communities
  - Wetlands
  - Ecosystems
- The program will result in improved water quality in the Waterways. Parameters that will be improved include many with significant effects on biodiversity, human health, aquatic fauna, and amenity values (Figure 23). Water will have lower nutrient concentrations, specifically phosphorus and to a lesser extent nitrogen, and lower chlorophyll-α concentration (which is an indicator of algal blooms). Water will have dissolved oxygen concentrations, and biological and chemical oxygen demand measures that support biodiversity. Stratification of the water column on the basis of salinity, density, temperature or oxygen will be reduced. Organic carbon in sediments will return to a profile that represents healthy biogeochemical cycling of decaying natural organic matter (humic and fulvic acids, tannins and cellulose) and primary productivity in the Waterways, and not inputs of synthetic hydrocarbons or high flushes of terrestrial derived materials. Better water quality will result in fewer harmful algal blooms and fish kills.



Figure 23 River restoration benefits Top image: Waangaamaap Bilya (Serpentine River) Unallocated Crown Land, summer 2024 Bottom image: Indicative cross-section of restored river

The program will support and enhance biodiversity in the region, including local species, vegetation associations and ecological communities. Terrestrial, riparian and aquatic species will benefit. There are a number of species, communities and ecosystems that are listed as threatened under international conventions, occurring within the program area including the Peel-Yalgorup Ramsar wetland, migratory birds protected under treaties with China, Japan and South Korea, and critically endangered species such as the Eastern curlew, Western Ringtail possum, and black cockatoo species.

Ecosystem services deliver benefits to human health and wellbeing that are difficult to quantify without significant research effort. In general, benefits of healthy ecosystems translate into reduced population and public health costs, with estimates from international and Australian studies in the range of 1:10 to 1:27. Other ecosystem services provide safe and clean places for people to live and work, through functional regulation of weather, hydrological cycles, air quality, nutrient cycling and primary productivity.

Hydrological cycles in particular are beneficial to humans and to biodiversity, continuously providing temperature regulation, fresh clean water, nutrient and carbon cycling, and required for primary production through photosynthesis.

Benefits that relate to the economic values of the Waterways include:

- Tourism
- Sustainable commercial fisheries
- Agricultural sustainability

- Housing and real estate
- Growth in the restoration economy

Some of these benefits have been outlined in section 2.

Sustainable fisheries will benefit from this program. The commercial fisheries of blue swimmer crabs and sea mullet in the Waterways have an economic value of around a million dollars per year and have been independently certified as sustainable by the Marine Stewardship Council (MSC). The recreational fishery has also been certified by the MSC in the past however the certification has been withdrawn by Recfishwest. The ecological health of the Waterways is fundamental to the commercial fisheries.

Agricultural sustainability will be increased, with wider adoption of sustainable agricultural and horticultural practices that will benefit soil health, soil carbon stores, and local hydrology. Local climate moderation from healthy biomass also contributes to increased agricultural productivity. Adoption of new land management practices also encourages and fosters innovation in agriculture and horticulture.

Benefits that relate to the social values of the Waterways include:

- Human health and wellbeing (including visual and functional amenity); and
- Closing the Gap targets.

Human health effects from exposure to harmful algal blooms are well known. Most direct effects occur through exposure to water containing harmful cyanobacteria which produces toxins that can irritate the skin and eyes. Harmful algal blooms can also cause gastrointestinal illness through eating contaminated shellfish. Nervous system effects including numbness, tingling or burning sensation, speech disturbance and drowsiness have also been linked to the neurotoxic compounds present in harmful cyanobacteria blooms. Absence of these effects allows people to use the Waterways for recreation and enjoyment without negative health effects.

Less well quantified but likely to have a far greater impact on human health is the contribution that natural areas provide to population health, with research finding that urban 'blue space' (environmental water features) promote human health and wellbeing more effectively than 'green space' (terrestrial environments)<sup>20</sup>. There is considerable evidence for the health benefits of green space, with a 2018 metanalysis identifying quantifiable outcomes including blood pressure, cortisol levels, heart rate, type II diabetes, heart-related mortality, and overall mortality. In population-level studies, exposure to nature is also associated with lower risk of mental illness or psychiatric disorder including dementia.

A recent study in WA, focused on use of urban lakes, assessed quality of the environment and its correlation with increased health and wellbeing. It found that people reported less fatigue and increased energy levels with increasing use of the environment near lakes and wetlands and confirmed a positive relationship between physical health and biodiversity<sup>21</sup>.

<sup>&</sup>lt;sup>19</sup> White, MP, Elliott, LR., Gascon, M,. Roberts, B,. Fleming, LE. (2020) Blue space, health and well-being: A narrative overview and synthesis of potential benefits. Environmental Research, Volume 191:110-169. ISSN 0013-9351. <u>https://doi.org/10.1016/j.envres.2020.110169</u>

<sup>&</sup>lt;sup>21</sup> E Rodgers, personal communication, 22nd April 2024

The outcomes of this program that will contribute to Closing the Gap targets have been identified in section 2.5.5.

Disbenefits associated with this program include loss of some areas of pasture grazing land to revegetation, and loss of stock access to rivers and streams for water. These disbenefits are far outweighed by the ecological function that will be restored at a catchment scale and will be managed at individual landowner scale through the introduction of alternative grazing pasture and fodder, and alternative water points.

Reconfiguring traditional stormwater drainage with biofilters, living streams and constructed wetlands may have disbenefits associated with their relatively more complex design compared to traditional piped and channelled drainage systems. Such systems need to be designed and maintained specific to their location and may require new skills and work practices to be adopted. As these systems have become the standard for newer residential developments, the skills and experience to deliver them are now present in the supply and employment markets. These requirements are offset by the other benefits that water sensitive urban design provides through biodiversity, habitat and public amenity.

# 4.3 Stakeholders

This program has a wide range of stakeholders, most of whom have been involved in the design process to date (Figure 24).

State Government stakeholders include the Departments of Water and Environmental Regulation (DWER), Biodiversity, Conservation and Attractions (DBCA), Primary Industries and Regional Development (DPIRD), and Planning, Lands and Heritage (DPLH), as well as Water Corporation and PDC.

Local government stakeholders include the City of Mandurah and City of Rockingham, and the Shires of Murray, Waroona, Harvey, and Serpentine-Jarrahdale.

Bindjareb Noongar Elders and community are a key stakeholder group.

Other stakeholders include tourism operators and organisations (Visit Mandurah, Sea West), fishing industry (Mandurah Licensed Fishermen's Association and Recfishwest), and local businesses (Peel Chamber of Commerce and Industry).

In August 2022, PHCC and PDC held a stakeholder workshop to discuss this business case. Stakeholders in attendance included PHCC, PDC, DWER, Water Corporation, DPIRD, Bindjareb Elder, Shire of Murray and City of Mandurah.

In October 2022, PDC along with PHCC and Shire of Murray engaged a consultant to undertake an economic analysis of the Waterways to support this business case. The consultant and a working group met five times during 2022, 2023 and 2024 to progress the economic valuation.

Following completion of the economic valuation, PDC consulted with local Members of Parliament (Hon. David Templeman MLA, Member for Mandurah; Lisa Munday MLA, Member for Dawesville; and Robyn Clarke MLA, Member for Murray-Wellington) as well as the Department of Treasury and the Minister for Regional Development.

PDC also held a regional investment blueprint priority workshop in May 2023. Regional stakeholders identified restoration of the Waterways as the highest priority for the region for the next five years<sup>22</sup>.

The Business Case has also been discussed with key stakeholders including Hon Simone McGurk MLA, Minister for Water; staff of State Government departments and entities, the Bindjareb Djilba Policy and Planning Committee, the Peel Alliance, Senator the Hon Sue Lines, Senator Louise Pratt, and Senator Karen Grogan.



Many stakeholders have provided letters of support and these are included in the Appendix.

Figure 24 Timeline of consultation and stakeholder engagement

# 4.4 Interdependencies

This program is dependent on adequate funding over a sustained period.

The program is also dependent on actions being undertaken by other stakeholders including State government entities, local governments and private landholders. These actions are mainly those that are underway in the implementation of BDPP or the Healthy Estuaries WA program, and regulatory reform in the Environment portfolio.

Secondary to activities being undertaken by other government entities, PHCC will be dependent on securing timely approvals to undertake work on government land or infrastructure assets, and for certain activities where permits are required. This may include access agreements for Crown or other land, native vegetation clearing permits (or exemptions)

<sup>&</sup>lt;sup>22</sup> https://www.peel.wa.gov.au/wp-content/uploads/2023/08/PDCBlueprint23 LR.pdf

for management of *Typha* spp, permits to modify the beds and banks of watercourses to remediate channel morphology, and fauna permits for survey, translocation and restocking. There are also Aboriginal Heritage approvals required, and while PHCC has significant expertise in engaging Aboriginal people in program design and delivery, the administrative processes of Aboriginal heritage clearances can be lengthy even when Aboriginal people will be undertaking the on-ground works.

The program will also need to be managed adaptively, with potential for increased knowledge and technology as well as changing environmental conditions through climate change, additional social and economic pressures such as providing more housing in the peri-urban areas, and water scarcity. It is likely that during the term of the program, some activities will become less effective while others become more effective, and that advances in science and technology will occur during the program that should be adopted. This is expected to occur relatively early in the program with respect to innovations in remote sensing, artificial intelligence (AI) and environmental DNA (eDNA).

PHCC is also subject to decisions occurring at the Australian government level, with base funding for the organisation through the Natural Heritage Trust Regional Landcare Program focused on Matters of National Environmental Significance. It must be noted that the level of funding provided to PHCC for the 2023–28 period is significantly lower than the previous (2018-23) period, and most of that funding is quarantined for use on Matters of National Environmental Significance. It is also noted that there may be potential for new funding sources through the Nature Positive Plan, should funding be allocated in the Australian budget. Conversely, it is possible that implementation of the Nature Positive Plan will result in significant additional demand for organisations like PHCC, as well as State government entities, without providing additional funding.

# 5 STRATEGIC OPTIONS IDENTIFICATION AND ANALYSIS

# 5.1 Long List of Options

There is a range of actions that can be taken by Government and others in response to the declining ecological condition of the Waterways. These actions could be combined into various scenarios with the outcomes being:

- 1. scaling back the current level of activity and investment
- 2. continuing the current level
- 3. increasing activity and investment across some or all of the possible actions

Scaling back the current level of activity and investment is not considered to be a viable option now, as current activity is resulting in ecological decline that is becoming unacceptable. Continuing to allow the Waterways to suffer worsening water quality and declining ecological character presents significant risks to both the Australian and State governments, with potential human health impacts as well as the reputational risk of breaching obligations under international conventions and national legislation.

The actions that can be taken in response to declining ecological conditions can be further described according to their mechanism:

- A. Policy and regulation
- B. Agricultural practices
- C. Ecological restoration practices
- D. Urban practices
- E. Infrastructure and engineering solutions

These options are presented in Table 4.

Table 4 Options to maintain or increase current level of activity and investment

Actions	Maintain	Increase
Policy and	Existing EPP	New EPP
regulation	Existing (draft) WQIP	Not feasible
	Existing Estuary Protection Plan	Fund all actions
	Existing allocation statements	New allocation plans
	Existing regulation	Additional regulation
	Existing planning frameworks	New planning frameworks

Agricultural practices	Reduce diffuse sources of nutrients in priority catchments	Reduce diffuse sources of nutrients at whole of catchment scale		
	Reduce new point sources of	Adaptive agricultural management		
	nutrients in priority catchments	Regenerative agriculture		
		Replacing pasture with native perennial species, or alternative stockfeed		
		Retro-fitted best practice horticulture, irrigated agriculture and intensive animal industries for existing premises		
		Agricultural innovation (vertical farming, zero discharge)		
		Agri-environment compensation schemes		
Ecological restoration	Riparian revegetation on private land	Targeted riparian revegetation on Crown land		
practices		Strategic, catchment scale revegetation to establish deep-rooted perennial native vegetation communities		
		Environmental water requirement studies to determine groundwater and surface water allocations		
Urban	Water use efficiency and water quality	Expand reticulated sewer network		
practices	governments	Alternative water supply and consumption frameworks		
	Water sensitive urban design (WSUD)			
Infrastructure and engineering	Improve drain water quality and hydrological cycles	Constructed wetlands or bio-engineered nutrient stripping channels (phytoremediation)		
solutions		Major engineering solutions to increase fresh water flow: bypass upstream dams, increase discharge of scheme water from dams		
		Major engineering solutions to increase flushing with seawater: second channel to ocean, pumped ocean intake structure		
		Major water quality treatment systems		
		Innovative water treatment systems (e.g. clay based)		

### 5.1.1 Policy and regulation

There is already a significant body of policy and regulation across the portfolios of planning, water, and environment relevant to the Waterways.

The Environmental Protection (Peel Inlet – Harvey Estuary) Policy 1992 is a statutory policy under the Environmental Protection Act 1986, Part III s31(d). This policy mandated reduction in phosphorus inputs to the estuary, which was implemented through the 2008 Water Quality Improvement Plan. The existing BDPP identifies stronger environmental protection through a contemporary statutory framework to achieve water quality improvements through revising the EPP or replacing with an appropriate alternative. The Environmental Protection Authority may elect to draft a new EPP to replace the 1992 version, to be approved by the Minister for Environment; EPPs are not widely used in WA and the feasibility of enacting an additional EPP is unknown given the current environmental reform agenda and focus on streamlining assessments.

Water Quality Improvement Plans are non-statutory; the previous WQIP for the Rivers and Estuary of the Peel-Harvey System – Phosphorus Management was prepared by the EPA in 2008. A new WQIP is in draft form and is expected to be released during 2024. Further updates to the WQIP are considered not feasible because the current draft has not yet been implemented. This program is intended to be complementary to the new WQIP, funding the significant on-ground works that are required to rehabilitate the estuary and its rivers, beyond those carried out by portfolio agencies.

The existing Bindjareb Djilba (Peel-Harvey Estuary) Protection Plan is a non-statutory plan released in 2020. Actions costed at approximately \$500,000 per year have been allocated to organisations that do not have funding for these actions, including PHCC. Further updates or additional content is not considered feasible until all existing and proposed actions have been funded and implemented.

Allocation of surface water and groundwater resources in the catchment are guided by a range of allocation plans and statements that are not statutory. Where existing allocation plans are outdated, new allocation statements to incorporate most recent data and conditions would support the delivery of the new WQIP and BDPP.

There is significant environmental reform occurring in WA more broadly to implement the *Environmental Protection Amendment Act 2020* and the outcomes of the Vogel-McFerran review. Stage 3 of the planned amendments to the *Environmental Protection Act 1986* will make changes to Schedule 1 of that Act in relation to premises and activities that are regulated. This includes changes to the regulation of intensive livestock and animal and plant processing, which are likely to reduce discharge of nutrient pollution from agricultural activities in the catchment of the Waterways. Timelines for these changes are not known, and it is unlikely that implementation could be brought forward.

There is also significant reform occurring within the planning portfolio, including the *Planning and Development Amendment Act 2023* and associated regulations. Planning relevant to the Waterways is contained in the Perth and Peel @ 3.5 million suite of guidance, and specifically the South Metropolitan Peel Sub-regional Planning Framework (March 2018). BDPP contains recommendations to implement existing state planning policies including the Peel Region Scheme, Priority agriculture and rural land use policy. On the basis that a comprehensive planning framework exists, additional planning policy is not considered feasible. A renewed

focus on implementing the existing planning framework is required, outside of this program proposal.

Except for additional funding for actions contained in existing policy documents, and updates to groundwater and surface water allocation plans, this program does not propose any additional policy or regulatory actions. There are already significant actions underway which have not yet been fully implemented and will continue to have effect over the next five years and beyond. Funding for the remaining unfunded actions in the WQIP and BDPP will support these actions and maximise the outcomes that can be achieved. Revisions to allocation plans will also support these actions and result in better environmental outcomes for the Waterways.

There is already a lot of legislation and policy that directly affects the Waterways including a dedicated Environmental Protection Policy, estuary protection plan, and water quality improvement plan.

Apart from reviewing the Environmental Protection Policy, more regulation and policy won't help.

### 5.1.2 Agricultural practices

The current level of effort and funding aimed at maintaining or improving the Waterways is directed at implementing better agricultural practices at some priority areas within catchments. Actions include soil testing to determine fertiliser requirements, changes to fertiliser application practices to minimise nutrient runoff, and use of soil amendment treatments to improve phosphorus retention. Other actions include implementing a code of practice for dairy operations and improved environmental management practices at intensive animal facilities (including piggeries, feedlots and livestock holding yards) to reduce discharges to Waterways.

Excluding stock from riparian areas through fencing is occurring at a limited scale, with funding allocated but not sufficient to induce widespread adoption. Fencing off river and stream banks is effective at reducing nutrient inputs to watercourses from stock, and at protecting Waterways from erosion, but creates a need for alternative water sources for stock and may also result in short term increases in weed infestations and subsequent increased bushfire risk. Where fencing is proposed to exclude stock, additional actions are also required to manage the impacts to farming operations and to support the recovery of riparian areas from stock impacts. There is also a need to determine the appropriate width of riparian protection that can be achieved through fencing, having consideration for the characteristics of the waterway and floodplain in each location.

The current level of funding is insufficient to address nutrient pollution at the whole of catchment scale. It focuses on diffuse sources of nutrients within priority sub-catchments and on new point sources of nutrients. Additional funding through this program would allow improvements to agricultural practices across more of the priority sub-catchments and contribute to longer term sustainable agricultural practices across the entire catchment.

The current level of investment does not encourage or facilitate a more systematic approach in broadscale agriculture through management planning and practice to monitor outcomes and adapt to changing conditions. The outcomes of soil testing, soil amelioration and changes to fertiliser application practices could be monitored to enable adaptive agricultural management, with agronomic advice to farmers guiding longer term changes to farming practices through extension support. Principles of regenerative agriculture could be applied within the catchment for multiple benefits, incorporating actions to enhance and improve soil health, improve water quality and availability, and incorporate biodiverse planting practices. A range of practices such as replacing pasture with native perennial species, or alternative stockfeed, could be applied through the catchment to implement regenerative agriculture.

Further actions to promote adoption of best practices and innovation in intensive agriculture operations are also viable and feasible. The catchments are home to a range of irrigated agricultural properties such as turf farms, and intensive animal industries including dairies, feedlots, piggeries, poultry farms and associated processing operations. While some improvements will result from amendments to the *Environmental Protection Act 1986* as outlined in the policy and regulation section, there are other improvements that could be made to implement best practice and to encourage innovation in reducing nutrient pollution from both diffuse and point sources in the catchment.

Across the European Union, agri-environment compensation schemes are widely employed as a mechanism to compensate farmers for loss of income associated with appropriate, less intensive agricultural production from environmentally sensitive areas. These schemes provide funding to farmers to modify their agricultural practices to support ecological restoration and off-reserve biodiversity conservation. They are complex and costly, as they need to be designed to be effective in conservation outcomes as well as feasible and palatable for farmers to implement. Significant research effort is required to develop the practices before they can be implemented. Agri-environment compensation schemes are not considered viable for the catchment of the Waterways.

Existing policies and plans identify actions to decrease the amount of nutrient pollution coming from agriculture in the catchment and these are well understood and accepted. Existing funding is directed to priority areas in the catchment or pilot scale actions and isn't enough to address the whole catchment.

Radical changes to agriculture aren't practicable, but more funding can increase the uptake of changed practices that are acceptable and understood.

### 5.1.3 Ecological restoration practices

Current ecological restoration practices are focused on revegetation of riparian areas on private land in priority areas within the catchments, and the funding is limited. Extensive areas of the catchment are Crown land, across large terrestrial reserve areas and significant tracts of riparian land. There is riparian management and restoration occurring across some state and local government owned or managed land parcels, but there is very little active land management occurring on unallocated Crown land or unmanaged land. There is a significant amount of unallocated or unmanaged Crown land in the catchment, particularly along the lower Serpentine River, with no funding available for natural resource management.



#### Figure 25 River restoration cross-section

More biodiversity focused measures are included in BDPP, which identifies the need to develop and fund a strategic revegetation and restoration plan. BDPP actions C17 and C18 propose to reinstate the ecological function of key rivers and streams through restoration works along the river and stream margins, and to develop and implement a strategic plan identifying opportunities for revegetation with deep-rooted endemic plant species with consideration to co-benefits such as biodiversity. These actions are feasible and will be effective in improving ecological condition if they are implemented at scale but are not currently funded within BDPP or any other existing programs.

Other actions that are listed in BDPP but not funded include evaluating other approaches such as in-drain vegetation in the catchments, installation of living shorelines to rehabilitate estuary habitats, assessing the value of ecosystem services provided by the estuary, and undertaking environmental water requirements studies to inform water licensing decisions. Each of these actions is feasible and will be effective in improving water quality but is not funded.

In-drain vegetation, listed in BDPP, is considered as an engineering or infrastructure solution and included in that section below.

Undertaking environmental water requirements studies for the rivers and streams in the catchments will support enhanced policy and regulatory actions in relation to water licensing, particularly given the impacts that climate change is having on the water balance of the catchment. Accurate and contemporary understanding of environmental water requirements will also assist with adapting to climate change, and with targeting investment in river and stream restoration to those areas with the highest environmental values such as refuges and breeding areas.

Existing policies and plans identify actions to restore ecological values in the catchment, that will complement changes to agricultural practices. Ecological restoration will help reduce the nutrient pollution entering the waterways and improve the biodiversity values but are not funded.

# 5.1.4 Urban practices

Urban practices are focused on reducing diffuse and point sources of nutrients in urban areas. These practices are well articulated through the concept of water sensitive urban design (WSUD), providing strategies at household, neighbourhood, and local area scales. Practices include improving water use efficiency and water quality management in households and local governments, including public open spaces.

Water sensitive urban design principles include retaining and detaining stormwater locally, allowing for treatment and infiltration of stormwater runoff within local landscape elements to promote hydrological regimes like the conditions in place before urban development occurred. This extends to expanding the reticulated sewer network in priority areas, and to increase the uptake of treated wastewater reuse at local scales.

Water sensitive urban design practices include retaining or reinstating native vegetation to incorporate stormwater treatment functions such as pervious buffer strips, litter and sediment traps, swales, infiltration basins and detention areas, living drains and constructed wetlands. These practices have been implemented in newer urban developments but were not generally included in older areas. They can be employed at local scale within older urban areas to manage nutrient pollution from residential and light industrial areas.

Modern urban design incorporates strategies to reduce pollution through stormwater and to retain natural hydrological cycles. In older areas, water sensitive urban design can be applied to rebuild urban drainage features to improve the quality of water in the local environment and the downstream waterways.

### 5.1.5 Infrastructure and engineering solutions

Many of the principles of water sensitive urban design can be scaled up to manage water quality at catchment scale from peri-urban, rural residential, and rural areas including agricultural land. These solutions focus on improving the quality of water within rural drainage channels, as distinct from urban drainage infrastructure. Practices include constructed wetlands or bio-engineered nutrient stripping channels. There are significant areas of rural and semi-rural drainage channels that have not been designed to have ecological function, and these can be redesigned and modified to promote phytoremediation to improve water quality while also incorporating biodiversity values and habitat. There are two pilot scale programs currently underway in the drain adjacent to the Serpentine River at Karnup and the Waroona Drain which are demonstrating that it is possible to remove phosphorus from drainage water by constructing nutrient stripping channels, however there is a requirement for ongoing monitoring and maintenance. The long-term effectiveness of this approach is yet to be demonstrated.

Other engineering solutions to improve water quality include works to increase the flow of freshwater from the upper catchment through bypassing drinking water catchment dams or otherwise increasing the release of freshwater from the dams. These actions would improve the quality of water and biodiversity within the rivers that enter the estuary, but they would compromise the integrated water supply system for the south west of the state and are not considered viable.

The quality of water within the estuary could be improved by increasing the flow of seawater through the estuary, essentially repeating the construction of the Dawesville Channel. The mechanism for this could be through a pumped ocean intake like that used for desalination plants, or a second channel to the ocean. Seawater introduced into the lower reaches of the Harvey estuary which would have the effect of diluting or flushing the nutrient pollution that is entering the estuary component of the Waterways but would not address the impacts of nutrient pollution on the rivers. This would also have the effect of turning more of the estuarine ecosystem into a marine ecosystem and cause fundamental changes to the biodiversity of the system. Such a solution is also likely to be very costly, with the Dawesville Channel costing \$76 million in 1994 and costing the local government approximately \$1 million per year in ongoing maintenance. A similar infrastructure solution delivered in the current economy is expected to cost significantly more. There are also limited options for locating another channel or a pipeline corridor, with increased residential land development and environmental constraints on clearing native vegetation. There are also current market constraints within the civil construction sector, with shortages of skilled professionals, labour and materials, which would see any large infrastructure solution cost proportionately more than the previous solution.

Another costly and difficult option would be to install water treatment technology within the estuary to remove nutrients. The feasibility of this option would need to be further investigated to determine whether it would be effective and what the quantum of cost would be. In 1984 a water treatment plant at the Meredith Drain using bauxite residue to remove approximately 40 tonnes of phosphorus per year was estimated to cost \$16 million to construct and \$2.5 million per year to operate.

Large scale engineering solutions are complex and very costly and can result in problems that require ongoing maintenance. Smaller scale engineering solutions can be employed at locations where there is a lot of nutrient pollution entering the waterways without incurring such a large cost.

# **5.2 Shortlisted Options**

Of the options presented here, some are impractical or cost prohibitive. Many others are already in progress by Government, to some extent. The remainder of the options presented here have already been identified as the most effective solutions in the existing policy and management documents, Bindjareb Djilba (Peel-Harvey Estuary) Protection Plan and Gabi Warlang Bidi (water quality improvement plan for the Peel-Harvey estuary system). These plans have identified the solutions required but there are no funding arrangements in place for delivery. This Business Case proposes that PHCC is funded to deliver the actions already identified, but not funded, to address the ecological condition of the Waterways (Table 5).

This solution requires the existing actions being undertaken by Government – primarily policy and regulation actions and promoting adoption of improved agricultural practices – to continue at the current level or greater. It does not propose that PHCC takes on these actions or that these actions are reduced in scale. It also does not propose that PHCC takes on actions in relation to land use planning or urban water management.

#### Table 5 Actions proposed under this Business Case

Key:

(eg) P2, C1 action reference numbers from Bindjareb Djilba Estuary Protection Plan	☑ continue under existing arrangements (BDPP + WQIP)
* recommended solution (PHCC)	I not feasible

Actions	Maintain		Increase	
Policy and regulation	Existing EPP + new EPP P2	Ø	More legislation	×
	Existing (draft) WQIP P2	V	Fund all actions P2	*
	Existing Estuary Protection Plan P2	Ø	Fund all actions P2, P12, P13, P14, M8, M9	*
	Existing allocation statements E7	V	New allocation plans E7, E9	V
	Existing regulation P3, P7, P8, P9	Ø	Additional regulation	×
	Existing planning frameworks P3, P4, P9, P10	V	New planning frameworks	×
Agricultural practices	Reduce diffuse sources of nutrients in priority catchments	Ø	Reduce diffuse sources of nutrients at whole of catchment scale	*
P	C1, C2, C3		C4	
			Adaptive agricultural management	*
			C4	
			Regenerative agriculture	*
			C4	
			Stock exclusion and fencing riparian areas C7, C16	*
			Replacing pasture with native perennial	*
			species, or alternative stockfeed	
			C4	
	Reduce new point sources of	M	Retro-fitted best practice horticulture,	Ø
	nutrients in priority catchments		irrigated agriculture and intensive animal	
	68		Industries for existing premises	
			Agricultural innovation (vertical farming, zero	V
			discharge) C5, P3	
			Agri-environment compensation schemes;	×
			stewardship payments	
Ecological	Riparian revegetation on private	*	Targeted riparian revegetation on private and	*
restoration	land		Crown land	
practices	C17		C7, C17, P12, P14	

Actions	Maintain		Increase	
			Strategic, catchment scale revegetation to establish deep-rooted perennial native vegetation communities C18, P11	*
			Environmental water requirement studies to determine groundwater and surface water allocations E7	Ø
			Estuary habitat restoration E7	*
Urban practices	Water use efficiency and water quality management in households and local governments C9, C10, C11	Ø	Expand reticulated sewer network C15, P5	
	Water sensitive urban design (WSUD) C12, C12, C13, C14, P6		Alternative water supply and consumption frameworks C14	Ø
Infrastructure and engineering solutions	Improve drain water quality and hydrological cycles C16	Ŋ	Constructed wetlands or bio-engineered nutrient stripping channels (phytoremediation) C16	*
			Major engineering solutions to increase fresh water flow: bypass upstream dams, increase discharge of scheme water from dams	X
			Major engineering solutions to increase flushing with seawater: second channel to ocean, pumped ocean intake structure	×
			Major water quality treatment plants	×
			Innovative water treatment systems (e.g. clay dosing, filtration, nanotechnology)	×

# 6 **RECOMMENDED OPTIONS EVALUATION**

# 6.1 Options Summary

The recommended options are those that have already been identified as appropriate actions to make catchment-scale improvements to water quality. They do not include options that are outside the existing frameworks for the Waterways.

We propose an extensive program of river restoration, rehabilitating and restocking aquatic habitat within the Waterways, and revegetating priority terrestrial areas within the catchments.

Under the river restoration activity, 2750 hectares of stream and river banks will be restored through 3050 km of fencing to exclude stock and unauthorised vehicles, and a program of feral animal and weed control – principally pigs, deer, *Typha*, arum lily, blackberry, and bridal creeper. Banks will be stabilised to protect existing vegetation and reduce erosion. Around 210 hectares of priority areas in the catchment of the restored Waterways will be revegetated to restore hydrological cycles, improve biodiversity and habitat values, and to reduce nutrient inputs to the wetlands.

Under the habitat restoration and fish restocking activity, woody debris will be reintroduced into Waterways that have been de-snagged, to reinstate fauna habitat and deregulate streamflow. Native fish and crustacean species will be grown in hatcheries and restocked into restored Waterways. Artificial habitat structures including fish ladders and 'fish hotels'<sup>23</sup> will also be constructed within those streams to support restocked populations. Feral aquatic species including carp, yabbies and water hyacinth will be controlled in these priority areas, which will be located to maximise refuge pools during dry periods.

Where stormwater runoff enters the Waterways from urban, peri-urban and industrial areas with inadequate or outdated stormwater management, we propose to retrofit systems with the best contemporary design. Using the stormwater management principles contained within the Stormwater Management Manual<sup>24</sup>, we will work with local governments and the Water Corporation to redesign and construct 25 biofilter systems. These systems, sometimes called living drains or constructed wetlands, incorporate detention structures promoting local infiltration to recharge superficial groundwater, function as biofilters to achieve better water quality, and provide greatly improved local habitat and biodiversity. By identifying priority locations where stormwater entering the Waterways is a source of pollutants and nutrients, this program will result in significant improvements to water quality.

It is a priority for PHCC to deliver most on-ground works through a co-designed Aboriginal Works Program, providing opportunities for economic development and meaningful work on Country for Aboriginal people. This program will be run by PHCC but implemented through procurement with Aboriginal Community Controlled Organisations and Aboriginal owned businesses. There is a separate stream for the Aboriginal Works Program which allows for initial investment in capacity building for Noongar people to develop sustainable economic development structures for continued success. This investment also mitigates the risk of low

<sup>&</sup>lt;sup>23</sup> Fish hotels are small wooden pyramid structures that are placed on the riverbed to provide shelter for fish and crustaceans: see <u>https://quendanews.murdoch.edu.au/?p=8281</u>

<sup>&</sup>lt;sup>24</sup> <u>https://www.wa.gov.au/government/document-collections/stormwater-management-manual-of-western-australia</u>

supply in the restoration economy including businesses that supply the required goods and services for this business case.

The program also includes a collaborative management framework so that the activities are coordinated with the other on-ground works, policy and planning actions that are being undertaken by other organizations including State Government departments, Government Trading Entities, local governments and other non-government organizations.

# 6.2 Social and Environmental Impact Analysis

### 6.2.1 Social Impacts

The BDPP clearly identifies the community values associated with the Waterways, which include aquatic ecosystems, fisheries, recreation, aesthetics, and cultural and spiritual values. This program will result in significant beneficial impacts to all identified social values.

The program of activities is in an area that has known social, cultural and historical significance, as well as significant Aboriginal cultural heritage values. Many of these values are linked to the ecological condition of the waterways and the ecosystem services that they provide. Social values that will be improved include the aesthetic qualities of the waterways and their ecological function, providing for better recreation and social activities. Industries and activities including fishing, tourism, events and recreation will benefit from this program. If the program does not occur, these industries will suffer a negative impact as the ecological condition of the waterways declines.

The program will also generate significant employment and business locally through both direct employment and procurement on program activities and indirect or flow-on effects on the regional economy. There will be social benefit through increased employment and business activity, with resulting benefits to the rest of society through reduced poverty and inequality. Most of these benefits are well understood and can be quantified in economic terms. The benefits will be accruing in a region that has a generally higher index of relative socio-economic disadvantage, with consistently lower rates of employment, labour force participation and education, and high rates of development vulnerability in early childhood education<sup>25</sup>. There are low proportions of workers in highly skilled occupations and high value-adding industries, and there is a disproportionate dependence on cyclical industries (such as mining and construction) and low-skilled industries (such as retail and tourism). Other indicators of socio-economic disadvantage in the region include relatively high levels of crime, illicit substance abuse and people living with mental health conditions.

No negative impacts to social and community values have been identified. It is unlikely that this program will negatively affect the way of life or livelihoods of people in the region, any community or group of people within the region, or the social surroundings of the region.

### 6.2.2 Environmental Impacts

This Business Case identifies a range of actions that will have only positive environmental impact. The outcomes and objectives of the program are specific to environmental restoration

<sup>&</sup>lt;sup>25</sup> <u>https://www.mandurah.wa.gov.au/-/media/files/com/downloads/transform/sed-report-2--transform-mandurah--</u> economic-opportunities-att-2-1.pdf

with beneficial results. Environmental Impact Assessment is not required in the same way as in more traditional infrastructure or construction business cases.

There will be no effect on any of the factors typically considered through environmental impact assessments, as it is a pre-requisite for actions to be included in the program that they result in environmental gains. Activities including revegetation, river restoration, stock exclusion fencing and fish restocking are not predicted to cause any negative environmental impacts.

There may be some concern that fencing to exclude stock from waterways may result in weed growth and bushfire risk in the ungrazed corridor. This risk is easily managed by allowing controlled grazing for short periods.

# 6.3 Economic Analysis

This Business Case is supported by several economic analyses.

The then Department of Water commissioned Economic Consulting Services to undertake an economic valuation in 2008. This valuation included commercial fishing, recreational boating, tourism, and the impact of the Waterways on real estate values, and thereby total additional real estate value of the Waterways. The report estimated the total annual value of the Waterways to be between around \$360 million and \$1,350 million, with a net present value of between about \$5,200 million and \$19,930 million using a 7% discount rate.

In 2023, Urbis was commissioned to undertake an economic valuation by PDC. This valuation included the consumptive value of the water, waterfront hospitality and accommodation, health and wellbeing, recreational boating and fishing, waterfront residential value, nutrient runoff services, science and research, commercial fishing, and open space use. The study identified an annual economic contribution of \$605.7 million (which is five times the annual economic contribution of Ningaloo Reef), and 2,086 full-time equivalent jobs. The study also identified a Total Economic Value of \$20.8 billion at 3% discount rate over 50 years. It also identified additional qualitative values of biodiversity, Indigenous culture, bequest, and boat ownership. While there is work underway to quantify some of these elements including biodiversity, other values do not lend themselves to being quantified. It is certain that these benefits have been understated in the economic valuation.

This business case is also supported by the Cost: Benefit Analysis conducted by Natural Decisions in 2024. This analysis demonstrated a positive Cost: Benefit Ratio of 1.34. The analysis was undertaken using the INFFEWS method, and the detailed methodology including assumptions are included in Attachment X.

The INFFEWS Cost: Benefit Analysis is very conservative, taking only quantified monetized values into account and not including significant ecosystem services values including human health and well-being which could not be quantified. Further information on the Cost: Benefit Analysis is provided in section 2.5.2.

The program has a budget of \$110 million, and REMPLAN modelling predicts total output of \$690.97 million.

This is comprised of \$398.73 million direct output and \$292.24 million indirect output. Modelling also predicts that at its peak in years 4-5, the program will support 116.8 direct jobs and 82.8 indirect jobs.

The economic impact of each of the seven activity streams over 10 years has been calculated using REMPLAN.

The seven activity streams are:

- River restoration creeks and streams
- River restoration fencing
- River restoration revegetation
- Fish restocking
- Stormwater
- Aboriginal works program
- Collaboration

Impacts have been calculated as the sum of each modelled output for both the forecast annual employment and expenditure on goods and services by category. For each activity stream, we calculated impact summary output (\$), impact summary employment (jobs), impact summary wages and salaries (\$), and impact summary value added (\$).

This information is presented as direct output (\$), indirect output (\$), peak direct employment (FTE), and peak indirect employment (FTE) (Table 6).

	Direct Output (\$ million)	Indirect Output (\$ million)	Direct Jobs (Peak FTE annually)	Indirect Jobs (Peak FTE annually)
River Restoration	128.58	92.41	41.2	28.8
Fencing	136.15	99.47	32.7	23.3
Revegetation	13.60	9.73	3.4	2.3
Fish Restocking	38.21	27.03	13.7	9.4
Stormwater Retrofit	35.67	26.09	13.6	10
Aboriginal Works Program	36.85	26.36	9.1	6.4
Collaboration	9.67	11.15	3.2	2.5
Total	398.73	292.24	116.8	82.8

Table 6 Summary impact REMPLAN modelling

Employment numbers are based on a work group structure comprising one program manager supported by one contract manager overseeing 2-4 field specialists who each supervise 5 field officers. Program and activity streams have varying numbers of work groups depending on the budget and program stage, where more capacity in program design, management and contracts is required during the ramp-up (1-3) and ramp-down (8-10) years.

# 6.4 Financial Analysis

This Business Case has a total cost of \$110 million excluding GST over ten years, commencing 1 July 2025. It is comprised of six major activities including fencing, river restoration, revegetation, stormwater works, fish restocking and a program of on-Country

works by Aboriginal people. It also includes an annual budget for collaboration and coordination with key stakeholders.

The costs are distributed across ten years with an uneven spending profile, which reflects the time required for the planning and design of on-ground works prior to implementation (Table 7). Significant effort is required in the first two to three years to secure access to land from a wide range of landowners and managers including State Government agencies and trading entities. Once access to land is established, there is a phase of detailed planning where the restoration requirements of each land parcel are refined, followed by logistics such as contracting the required plant stock to be grown over the summer period for winter planting. Earthworks and fencing contracts are also required with works scheduled to occur during appropriate seasonal conditions.

The costs are based on PHCC's extensive experience in delivering ecological restoration works in terrestrial ecosystems and Waterways. This experience includes detailed costing profiles that meet the requirements of the National Heritage Trust's Regional Delivery Partnership arrangements for natural resource management, and that are specific to the region where works will be undertaken.

There is a scale of costs per hectare associated with ecological restoration works that is determined in part by the existing condition of the landscape and in part by the desired condition to be achieved. This program proposes to restore land across a range of existing conditions and to a range of end points. For terrestrial revegetation activities in the catchment, including replacement of introduced grazing pastures with perennial native pastures, cost is forecast to be \$15,000/ha for moderately degraded land and \$20,000/ha for severely degraded land; we do not propose to rehabilitate grazing land that is less than moderately degraded. For riparian restoration, cost is forecast to be \$20,000/ha for severely degraded land parcels and \$13,000/ha for moderately degraded land; we also propose managed natural regeneration of large areas at a relatively lower cost of \$8,000/ha.

No recurrent costs are proposed, with the entire program budget being consumed for operational expenditure over the ten-year period. No impacts to revenue or ongoing costs will result. There will be some costs to landowners associated with maintaining fencing, but they are likely to be a minimal addition to costs that already exist.

There are existing liability costs for routine land management practices that are currently not being undertaken on many Government land parcels. This includes managing unauthorised access, managing feral animals and weeds, and bushfire prevention. Unit costs for these activities tend to increase if they are not undertaken regularly: for example, it is far more expensive to control weeds in a location where no weed control has been undertaken for years than it would be to return to that location regularly to maintain the weed load at a manageable level. Similarly with feral animal control: if the control effort is not maintained then previous gains can be lost when the feral population re-establishes.

This program will result in land parcels owned by Government being improved to the point where the liability for these costs is reduced, even if only theoretical.

Table 7 Detailed	cost l	breal	kdowr
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Activity	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034	Total
River restoration:	100	0.45	070	070	050	050	000	000	104	104	0750 ha
total nectares	100	345	379	379	350	350	223	236	194	194	2750 na
Very degraded <sup>26</sup>	-	70	113	113	150	150	80	74	-	-	750 ha
Moderately <sup>27</sup>											
degraded	40	80	122	122	80	80	51	45	90	90	800 ha
Managed natural <sup>20</sup>	<u> </u>	105	144	1 4 4	100	100	00	117	104	104	1000 ha
regeneration	60	195	144	144	120	120	92	11/	104	104	1200 na
Total budget	\$1,000,000	\$4,000,000	\$5,000,000	\$5,000,000	\$5,000,000	\$5,000,000	\$3,000,000	\$3,000,000	\$2,3000,000	\$2,000,000	\$35,000,000
Fencing:											
total km <sup>29</sup>	333	333	333	333	333	333	333	333	192	192	3050 km
Total budget	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000	\$4,000,000	\$2,300,000	\$2,300,000	\$36,600,000
Revegetation:											
Total hectares	10	10	25	25	25	25	25	25	25	15	210 ha
Very degraded <sup>30</sup>	10	10	5	5	5	5	5	5	-	-	50 ha
Moderately <sup>31</sup>											
degraded	-	-	20	20	20	20	20	20	25	15	160 ha
Total budget											
, in the second s	\$200,000	\$200,000	\$400,000	\$400,000	\$400,000	\$400,000	\$400,000	\$400,000	\$375,000	\$225,000	\$3,400,000
Fish restocking <sup>32</sup>	\$100,000	\$1,000,000	\$1,600,000	\$1,600,000	\$1,600,000	\$1,000,000	\$1,000,000	\$1,000,000	\$1,000,000	\$100,000	\$10,000,000
Ctormulator <sup>33</sup>	¢	¢	¢1 000 000	¢1 000 000	¢1 000 000	¢1 000 000	¢1 200 000	¢1 000 000	¢1 000 000	¢	¢10.000.000
Stormwater	- ф	ə -	\$1,000,000	\$1,800,000	\$1,800,000	\$1,800,000	\$1,200,000	\$1,200,000	\$1,200,000	<del>م</del> -	\$10,000,000
Works on Country	\$100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$1,100,000	\$10,000,000
Collaboration	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$500,000	\$5,000,000
τοται	\$5,900,000	\$10,800,000	\$13 600 000	\$14 400 000	\$14 400 000	\$13 800 000	\$11 200 000	\$11 200 000	\$8 175 000	\$5 925 000	\$109 400 000

All values are ex GST <sup>26</sup> \$20,000/ha

<sup>27</sup> \$13,000/ha

<sup>28</sup> \$8,000/ha

<sup>29</sup> \$12,000/km <sup>30</sup> \$20,000/ha

<sup>31</sup> \$15,000/ha

<sup>32</sup> Fish restocking costs cover establishment costs of hatcheries over two years, with operating costs at peak production in years 3-5, follow up production in years 6-9 and decommissioning in year 10 <sup>33</sup> 25 basins at \$400,000 per basin

# 6.5 Time Planning and Program Analysis

This program has been designed with a 10-year schedule so the outcomes can be achieved in a sustainable manner. Initial planning and procurement for revegetation can take up to 18 months to identify suitable properties, arrange for land access and approvals if required, and to order plant stock. There are seasonal constraints for ecological restoration, where certain activities can only occur when the conditions are right. For some ecosystems, several seasons of restoration work is required to establish the vegetation on a trajectory of growth before the resulting improvements to ecological conditions can be realised.

For these reasons the 10 year schedule is important, but this is generally inconsistent with budget decision making cycles. We recommend initial funding for four years being one financial year plus three out-years, with later budget submission/s to secure the remaining six years. This could be annually to secure rolling four year budgets (Figure 26) or at longer intervals. In this way there is longer term certainty over the program budget so that the long lead time required for ecological restoration planning and implementation does not present program risk.

2025-26	2026-27	2027-28	2028-29	2029-30	2030-31	2031-32	2032-33	2033-34	2034-35
2025-26 to 2028-29: \$44.7 million									
	2026-	27 to 2029-	30: +\$14.4	million					
		2027-	28 to 2030-	31: +\$13.8	million				
	2028-29 to 2031-32: +\$11.2 million								
				2029-	30 to 2032-				
				2030-31 to 2033-34: +\$8.175				million	
						million			

Figure 26 Conceptual funding program

# 6.6 Risk Evaluation

Risk has been evaluated using PHCC's Risk Management practice<sup>34</sup> and a matrix of likelihood and consequence (Table 8) that meets the Australian and international standard<sup>35</sup>. Preliminary risk identification, assessment and mitigation is included in Table 9. Further risk identification and management will occur through detailed program design, during project management, and through the governance structure of the program.

<sup>34</sup> <u>https://peel-harvey.org.au/wp-content/uploads/2018/01/4.3-Risk-</u>

Management\_Endorsed\_2020\_06\_18.pdf

<sup>&</sup>lt;sup>35</sup> <u>https://www.standards.org.au/standards-catalogue/standard-details?designation=as-iso-31000-</u>2018

### 6.6.1 Scale of works

There is risk associated with the scale of works that are proposed, when compared to the current and recent scale of works that PHCC has undertaken. The scale of works requires adequate planning, staff, and resources such as vehicles and equipment, as well as organisational capacity. This risk is mitigated in part through acknowledgement of the requirements, good planning, and in part through organisational capability and capacity. PHCC has a well-founded organisational structure with comprehensive policies and procedures in place to ensure good governance, legislative compliance and effective operation. PHCC is experienced at delivering programs of this nature and has successfully acquitted a number of large grants from the Australian Government for similar programs as well as smaller grants from the Western Australian Government for similar programs. PHCC has established networks with market providers and suppliers in the region, and with skilled staff and consultants on hand. Alternative risk mitigation through staging the work over a longer period is not considered to be a viable approach because of the time critical nature of the work. There are already signs of ecological collapse occurring and it is likely that there will be some lag time before current processes will become apparent in monitoring and before these processes can be reversed. Taking any longer than ten years to complete this work at a less intense rate is likely to offset the beneficial outcomes of the work with declining ecological conditions.

### 6.6.2 Labour supply

There is risk associated with employing suitably skilled and experienced staff, particularly when the budget available for salaries is low and there is a skills and worker shortage elsewhere in competing employment markets. This risk is mitigated through PHCC's position as an employer of choice, where the culture and environment of the organisation is highly valued by prospective employees over the salary that can be offered in industry. The risk is also mitigated through PHCC's existing good networks with other organisations, tertiary education providers, and a pool of volunteers, students and interns who are seeking employment with the organisation. Access to staff is also facilitated by NRM Jobs, an employment service that is targeted to regional natural resource management organisations such as PHCC.

### 6.6.3 Financial risks

The cost of delivering these works is significantly larger than most recent similar projects but not significant in comparison to typical infrastructure projects. Risks associated with finance and cost arise through the potential for underfunding, diluted funding, or funding discontinuation. The program requires a commitment to funding the full extent of the works for benefits to be fully realised. There is a risk that if the program is funded for an initial period and then not funded for the remainder, the investment made in the initial period will be lost. The works require a sustained effort over a long period of time and benefit realisation will be slow to begin before accumulating in the later years of the program. It is likely that actions and outputs being completed in the first few years will not demonstrate outcomes, which may lead decision makers to cut the program short. Adverse financial conditions globally or nationally, unrelated to the program, would increase this risk.
### 6.6.4 Environmental risks

The program is subject to variation in the natural environment including weather and seasonal conditions, and events such as bushfire, flood, cyclone, invasive species, pests or diseases, pollution or hazardous materials. These variations could result in delays or underachievement of outcomes, causing on-ground work to fail or not have the desired effect. Perverse outcomes could result from poorly executed work including erosion, increased bushfire risk, or introduction of pests or diseases.

This risk is mitigated through PHCC's expertise in planning and implementing this type of program. That experience is locally place-based, contemporary and directly relevant to the activities planned. Detailed project plans including operational risk assessments and contingency plans will be prepared using internal expertise and experience. Planning over longer time periods builds in opportunity for adaptive management so that operations and schedules can be adjusted to manage changing circumstances.

### 6.6.5 Supply risk

There is risk associated with the limited number of suppliers in the restoration economy supply chain, and the increasing market demand for their services. Required supplies include fencing materials, mulch, native seeds, plant stock (seedlings, tubestock and more mature stock), basic raw materials (gravel, limestone, crushed rock), and other consumables (plant guards and stakes, labels, herbicides, tools). Services that are usually contracted to suppliers include weed control, earthworks and ground preparation, and fencing, and in larger programs seeding and planting is usually contracted out.

The risk is mitigated in part through maintaining good relationships with suppliers and knowledge of market availability, along with good procurement and finance processes. Effective forward planning processes that are facilitated by long term project planning and secure funding also allow for long term supply contracts to be developed to ensure supply and good value for money in procurement.

### 6.6.6 Stakeholder risk

There are risks associated with stakeholder perceptions of the program and organisation, and stakeholder actions including lack of commitment, engagement or support. These risks may materialise through low levels of landowner participation, land manager consent or approvals to undertake works, or through passive or active opposition to the program within Government.

The risk will be mitigated through a measured collaborative approach to establishing program governance and coordination, to ensure that stakeholder input during project design leads to the desired outcomes. Risks associated with a lack of confidence that the program can be achieved will be addressed by leveraging existing relationships and trust, engaging with whole of government to ensure all perspectives are understood. The program design is wholly consistent with and complementary to existing Government direction and actions, and good communication with a focus on outcomes and mutual benefit will further reduce the risk.

	Consequence					
		Insignificant	Minor	Moderate	Major	Catastrophic
	Almost certain	Medium	High	Extreme	Extreme	Extreme
	Likely	Medium	High			
Likelihood	Possible	Low	Medium			
	Unlikely	Low	Low	Medium		
	Rare	Low	Low	Medium	Medium	High

#### Table 8 PHCC risk assessment matrix

#### Table 9 Preliminary risk assessment

	Risk	Likelihood	Consequence	Maximal risk rating	Mitigation measures	Residual risk
1	Inability to scale up operational capacity to achieve the scale of the program	Possible	Major	High	Robust organisational structure and procedures in place that will support expanded operations including finance, procurement, work health and safety.	Medium
					Program of this scale has been planned for several years.	
					Operational facilities and resources in place and able to be fully utilised; able to be replicated quickly to expand capacity.	
					Proponent has long term local knowledge and expertise including existing detailed river action plans.	
					Detailed budget adequate to scale of program works, informed by relevant and recent experience.	
					Strategic alliances with existing and developing organisations including suppliers, experts, and Aboriginal businesses and Corporations.	
					Likelihood reduced to Unlikely; Consequence reduced to Moderate	
2	Discontinuous, withdrawn or uncertain funding	Likely	Major	Extreme	Clear program outline and long-term program plan includes budget for ten years.	Medium
					Detailed budget adequate to scale of program works, informed by relevant and recent experience.	
					Strategic alliances with existing and developing organisations including suppliers, experts, and Aboriginal businesses and Corporations.	

	Risk	Likelihood	Consequence	Maximal risk rating	Mitigation measures	Residual risk
					Collaborative stakeholder engagement. Governance framework that includes funding decision makers. Likelihood reduced to Unlikely; Consequence reduced to Moderate	
3	Inability to recruit and retain technical and project management talent for program roles in the current employment market.	Possible	Major	High	Existing staff capability and retention. Positioned as an employer of choice. Efficient employment processes. Access to a pool of volunteers and students seeking work. Likelihood reduced to Unlikely; Consequence reduced to Moderate	Medium
4	Natural environment, seasonal and/or climatic conditions decrease revegetation and restoration success	Possible	Moderate	High	Apply contemporary and locally relevant science and practice in restoration to achieve best outcomes. Use previous findings and experience to inform design parameters such as restoration method, timing, density, species selection; adapt restoration practices as evidence builds. Likelihood reduced to Unlikely; Consequence reduced to Minor	Low
5	Market competition for resources	Likely	Moderate	High	Self-supply some inputs, with existing good relationship with other suppliers. Long term program plan with secure funding will allow long term supply contracts to be developed Likelihood reduced to Unlikely; Consequence reduced to Minor	Low
6	Stakeholders do not support and engage, e.g. because of: -Lack of confidence that program can be delivered -Perceived risk to future resourcing of own teams Land managers unwilling to participate	Likely	Moderate	High	<ul> <li>Ensure measured, collaborative approach to establishing governance and coordination.</li> <li>Leverage existing interagency relationships and trust; continue to engage with whole-of-government lens.</li> <li>Maintain focus on outcomes and mutual benefit.</li> <li>Strong community engagement framework, existing network with relevant local land managers, good program design, and reputation for organisational excellence.</li> <li>Likelihood reduced to Possible; Consequence reduced to Minor</li> </ul>	Medium

## 6.7 Recommended Solution

The recommended solution is for PHCC to undertake a 10-year program of ecological restoration in the Waterways (Table 10). The total cost of the recommended options is \$110 million, excluding GST. This is proposed to be spread unequally over ten years, with peak activity and budget occurring in years three to six. Administration of Royalties for Regions funding through PDC is recommended, with governance through PDC and policy and technical advice through DWER.

Ecological restoration should include restoration of riparian areas through fencing and revegetation along waterway corridors, a pilot program of catchment revegetation, aquatic habitat restoration and restocking, and stormwater basin retrofitting to water sensitive urban design standards. The 10-year program should be undertaken by PHCC with a significant proportion of the work being done by Aboriginal businesses and employees in the region. The program also includes funding for collaborative management, where PHCC works cooperatively with other stakeholders to maximise outcomes.

ACTIONS	SCALE	4 YEAR BUDGET	TOTAL BUDGET
		(\$ ex GST)	(\$ ex GST)
River restoration	2750 hectares	15,000,000	35,000,000
Fencing	3050 kilometres	16,000,000	36,000,000
Revegetation	210 hectares	1,200,000	3,400,000
Fish restocking	3 species	4,300,000	10,000,000
Stormwater	25 wetland basins	2,800,000	10,000,000
Noongar Works	100 participants	3,400,000	10,000,000
Collaboration		2,000,000	5,000,000
		44,700,000	109,400,000

Table 10 Summary of recommended solution

# 7 IMPLEMENTATION ANALYSIS

## 7.1 Procurement Strategy

Purchasing and procurement will be conducted through an open, impartial, equitable and transparent process in line with PHCC's Procurement policy and governance frameworks. Local industry will receive a full, fair and reasonable opportunity to participate in the process. Where possible, the PHCC will engage with PDC's Local Content Adviser to maximise the program's Local Content outcomes.

## 7.2 Risk Management

Throughout the life of the program, risk will be continuously evaluated and managed using PHCC's well established risk management framework. Preliminary risk identification, assessment and mitigation has been undertaken and this will be completed in detail during implementation. Further risk identification and management will occur through detailed program design and through the governance structure of the program.

## 7.3 Governance Arrangements

PHCC has robust organisational governance arrangements in place, including controls to manage risks such as fraud and corruption, conflict of interest, cyber security, modern slavery, and compliance. The PHCC Board and CEO will have responsibility for the delivery of the program.

A governance structure comprising decision making representatives from the funding body will be established with logistics and executive support provided through PHCC. We propose that the funding is administered through PDC to PHCC from the Royalties for Regions Fund. A governance structure would therefore include PDC as decision maker, as well as DWER on an advisory basis. Reporting would occur regularly through PDC to the Minister for Regional Development. As this proposal is an important component of the Bindjareb Djilba Estuary Protection Plan, we also propose to report regularly through the Bindjareb Djilba Policy and Planning Committee and the Minister for Water.

This program will also have technical and scientific collaboration through a committee or panel structure including nominees from relevant State Government departments and trading entities, local governments, and industry and community sector organisations.

## 7.4 Stakeholder Engagement

This program will have a focus on collaboration to underpin the delivery of actions across the full suite of landholders and land managers, and the policy areas that are involved. A detailed stakeholder management and communication framework will be developed.

# 8 **RECOMMENDATION**

This business case clearly demonstrates the value and importance of a long term program of ecological restoration to support and complement the measures being undertaken by Government through the Bindjareb Djilba (Peel-Harvey Estuary) Protection Plan and the Australian Government under the Nature Positive Plan.

It seeks \$110 million (excluding GST) over ten years from a range of sources:

- 1. An initial commitment from the Western Australian government administered from Royalties for Regions funds through Peel Development Commission, of
  - a. \$44.7 million (excluding GST) over four years commencing 2025-26, and
  - b. An annual rolling funding commitment to extend program delivery for another year to secure funds for years 2029-30 to 2034-35;
- 2. A matching commitment from the Australian government commencing 2025-26 administered through the Regional Investment Framework; and
- 3. Philanthropic funding to make up the balance of \$110 million (excluding GST).

# 9 **APPENDICES**

## Letters of support from stakeholders

Shire of Serpentine-Jarrahdale



### Shire of Murray

Ref:	Shire of Murray
14 August 2024	
5	
Jane O'Malley	
Chief Executive Officer	
58 Sutton Street	
Mandurah, WA 6210	
Door loop	
Dear Jane	
Business Case 2025-34 - Healing Bilya greatest economic asset	<ul> <li>Restoring the Peel-Harvey Waterways – Protecting out</li> </ul>
The Shire of Murray is proud to extend its s	strong support to the Peel-Harvey Catchment Council (PHCC
and their business case, recognising it as	a crucial initiative for safeguarding and enhancing the health
or the Peel waterways.	
The Peel waterways hold international sign	nificance, serving as vital habitats that attract migratory birds
From a state and regional perspective, the	ey are not only ecological treasures, but also a major driver o
tourism, business and population growth.	. They play a critical role in the economic prosperity of the
region, drawing both people and investmen of our community, providing invaluable spa	It to the Peel area. Socially, the waterways are the foundation aces for recreation, fishing, and other activities that define out
way of life.	and other defines of
The waterways are however under signif	ficant ecological risk, and without continued investment and
focused attention, their future is in jeopar	rdy. The changing climate is exacerbating these pressures
underscoring the urgent need for increas	ed focus and investment in preserving and restoring these
natural assets.	· .
The Shire of Murray community has rated	the protection and enhancement of the rivers and estuary as
one of its highest priorities. This is clearly r	reflected in our Shire's Plan for the Future and Environmenta
Sustainability Strategy, both of which place	e a strong emphasis on actions to safeguard the waterways.
Actions proposed by the PHCC will comple	ement and add value to many of the Shire's planned waterway
capital works. We are committed to collab	porating closely with the PHCC to ensure that our combined
efforts maximize the positive impact on wa	ter quality, health, and the overall condition of the waterways
Yours faithfully	
1-1-	
1. Verek	
service	
Dean Unsworth	
Dean Unsworth Chief Executive Officer	
Dean Unsworth Chief Executive Officer	
Dean Unsworth Chief Executive Officer	
Dean Unsworth Chief Executive Officer Community - Lifestyle - Opportunity	
Dean Unsworth Chief Executive Officer Community · Lifestyle · Opportunity	and Pittiatra WA 5208

#### Shire of Waroona

'AROON/ SEA TO SCAR Our ref: komgmk O22792 File: EM.5 9 July 2024 To whom it may concern, RE: Healing Bilya - Restoring the Peel-Harvey Waterways - Protecting our greatest economic asset. The Shire of Waroona offers its in- principle support for the 'Healing Bilya - Restoring the Peel-Harvey Waterways - Protecting our greatest economic asset' business case and overall objectives. As the outcomes to be delivered by this initiative will greatly improve the health of our regional and local waterways. As there is a need to halve nutrients entering the system to avoid further decline in the estuarine conditions, the Peel-Harvey Catchment Council (PHCC) has been working closely with local governments in the Peel Region and the Department of Water (DoW) to implement recommended actions in the regional Water Quality Improvement Plan. Resulting in several projects being completed to date in different areas of the catchment. The need to continue this work has been identified by the PHCC as a priority for the region with an estimated cost for the third stage of the FNS project at approximately \$5.4 million, spanning over a projected 5-year timeframe. 'Filtering the Nutrient Storm' though Stormwater retrofitting, will add value and align with the Shire of Waroona's Strategic Community Goals to "Protect and Enhance the Natural Environment for Future generations to come". Providing the foundation for the Shire of Waroona's capital works programs, informed by our Environmental Management Strategy's objectives to deliver: Water-Wise and Water Quality improvement initiatives; Climate Change Mitigation actions; . Sustainable Development projects; and ٠ Promote Community Education and Eco-Tourism in the Peel region. As key components in our program of works include work to improve water quality and canopy cover throughout the water network. Providing both habitat and improving water quality in the Peel Harvey catchment. Please feel free to contact me the undersigned if you have any further queries. Kind regards, Mark Goodlet **Chief Executive Officer** T (08) 9733 7800 • E warshire@waroona.wa.gov.au • www.waroona.wa.gov.au 52 Hesse Street, Waroona WA 6215 • PO Box 20, Waroona WA 6215

#### City of Mandurah



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#### Peel Development Commission



### **Peel Alliance**





PO Box 625 Pinjarra WA 6208 0424 508 038 www.peelalliance.org.au

4 October 2024

Jane O'Malley Chief Executive Officer Peel-Harvey Catchment Council 58 Sutton Street Mandurah WA 6210

#### Dear Jane

Business Case: Healing Bilya – Restoring the Peel-Harvey Waterways – Protecting our greatest economic asset

Peel Alliance is pleased to extend its support to the Peel-Harvey Catchment Council (PHCC) for its business case *Healing Bilya* – *Restoring the Peel-Harvey Waterways* and its objectives.

The Alliance is a formal collaboration between the five Peel Councils of Serpentine-Jarrahdale, Mandurah, Murray, Waroona and Boddington, together with PHCC, Peel Community Development Group (PCDG) and Regional Development Australia (RDA) Peel. A significant objective of the Alliance is to facilitate the economic development, ecological integrity and social well-being to benefit the people and environment of the Peel Region.

The Alliance is deeply concerned about the declining health of the Peel-Harvey Waterways, which are critical to our overall environment, social wellbeing and economic prosperity. We appreciate the significant amount of work that has been undertaken by PHCC to identify priority, evidence-based actions to address the decline of the waterways, as outlined in the business case.

The Peel-Harvey Waterways are on the brink of an ecological collapse, and we strongly support urgent funding and collaboration by all stakeholders to undertake urgent restoration activities before it is too late.

We wish you every success on securing funding and delivering the proposed restoration activities.

Yours sincerely

Cr Mike Walmsley Chair