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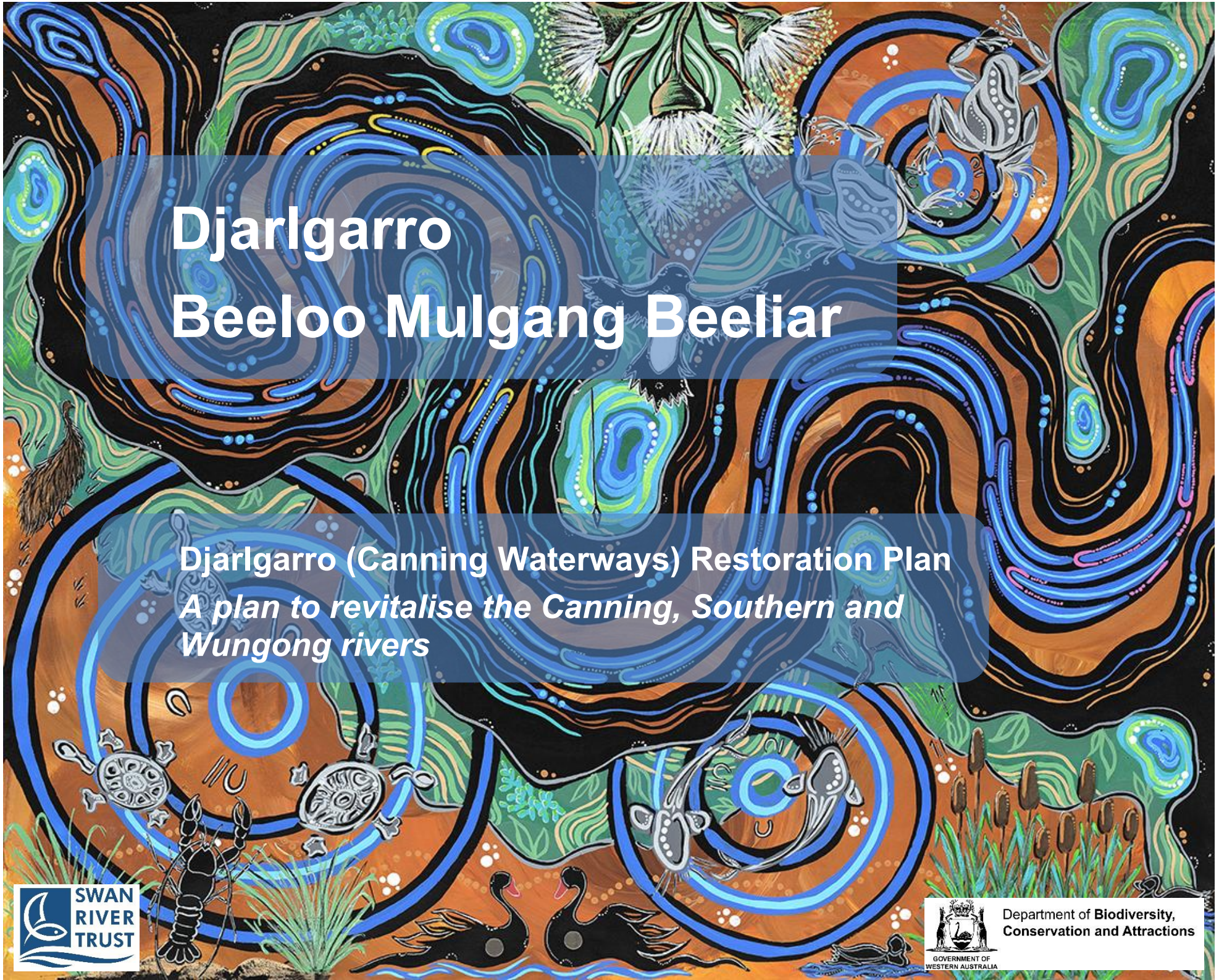
Djarlgarro
Beeloo Mulgang Beeliar
Djarlgarro (Canning Waterways) Restoration Plan
A plan to revitalise the Canning, Southern and Wungong rivers
SWAN RIVER TRUST
GOVERNMENT OF WESTERN AUSTRALIA
Department of Biodiversity, Conservation and Attractions

Swan River Trust and Department of Biodiversity, Conservation and Attractions

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June 2026

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This document was prepared by Kelly Fulker, Managing Director, Fulker & Associates. Special thanks to DBCA staff including Peter Adkins, Debbie Besch and Alison McGilvray for their significant contributions to this document.

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WARNING: The Djarlgarro Plan includes photographs and quotations from people who have passed away.

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Acknowledgments

Acknowledgement of Country

We acknowledge Whadjuk Noongar people as the Ancestral Custodians of the Kwongan (Swan Coastal Plain), Western Australia. We honour their continuing connection to land, waters, environment and community, and give thanks for the ongoing custodial role they undertake. We pay our respects to their Ancestors, Elders, and generations yet to come.

Indigenous Cultural Intellectual Property

Traditional and cultural knowledge in this report is the cultural and intellectual property of the Whadjuk Ancestral Custodians. Written consent from the Whadjuk Aboriginal Corporation must be obtained for use or reproduction of any cultural material within this document.

The Noongar language is diverse, and this is reflected in the various dialects and spellings used. Different Noongar communities may have their own unique words and ways of spelling. This diversity is a testament to the rich culture and heritage and the deep connection each community has to their specific region and traditions.

The term Noongar may also be spelt differently, reflecting the discrete ways of pronouncing it. Throughout the Plan the spelling ‘Noongar’ has been used, except where quoting another document.

Working Group and Subcommittee

The Swan River Trust and the Department of Biodiversity, Conservation and Attractions (DBCA) would like to thank the following organisations for their participation as part of the Canning Waterways Working Group and the Djarlgarro Subcommittee overseeing development of the Djarlgarro Beeloo Mulgang Beeliar (The River of the Three Peoples) (‘the Djarlgarro Plan’).

Armadale Gosnells Landcare Group (AGLG)

City of Armadale

City of Canning

City of Gosnells

City of Melville

City of South Perth

Department of Planning, Lands and Heritage

Department of Primary Industries and Regional Development

Department of Water and Environmental Regulation

Perth NRM

South East Regional Centre for Urban Landcare

Water Corporation

Whadjuk Aboriginal Corporation

Thank you in particular to Pat Hart (OAM), Chair of AGLG, whose foresight and unwavering dedication has driven protection of Djarlgarro (the Canning River) over the last 30 years.

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Djarlgarro Subcommittee

A subcommittee of four members of the Whadjuk Aboriginal Corporation's Cultural Advice Committee was nominated to develop the Djarlgarro Plan with DBCA. These members are all recognised knowledge holders under the South West Native Title Settlement, as Whadjuk Ancestral Custodians. The subcommittee members were Greg Ugle RIP, Karen Morich, Terry Morich and Joe Collard. DBCA is especially grateful for their contribution and generosity in sharing their ancestral knowledge and weaving this throughout the Djarlgarro Plan.

Artwork

"Country always inspires me in all my art, its beauty, its stories, past and present.

I paint from the heart and love to paint flora and fauna in all its forms as well as childhood memories of being on Country.

Water is for healing and growth, and so is being on Country, but if you can't be on Country, painting it is the next best thing." Local Whadjuk / Badimia Contemporary Aboriginal Artist, Gertrina Hayden, 2024

Acronyms

ASS	Acid sulfate soils
AOP	Authorised Officer Program
BCCG	Bannister Creek Catchment Group
DBCA	Department of Biodiversity, Conservation and Attractions
DCA	Swan Canning Development Control Area
DFES	Department of Fire and Emergency Services
DoH	Department of Health
DTMI	Department of Transport and Major Infrastructure
DoW	Department of Water
DPIRD	Department of Primary Industries and Regional Development
DPLH	Department of Planning, Lands, and Heritage
DWER	Department of Water and Environmental Regulation
ICIP	Indigenous Cultural and Intellectual Property
KSW	Kent Street Weir
LIP	Light Industry Program
LGs	Local Governments
MBOs	Monosulphidic black oozes
NNC	Non nutrient contaminant
OAG	Office of the Auditor General
RPS	River Protection Strategy
SERCUL	South East Regional Centre for Urban Landcare
SPP2.9	State Planning Policy 2.9 Water
SCWQIP	Swan Canning Water Quality Improvement Plan
WAPC	Western Australian Planning Commission
WSD	Water sensitive design
WQIP	Water Quality Improvement Plan

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Djarlgarro Beeliar (Canning River) in Brentwood. *Photo – DBCA*

Whadjuk message

Perth is on the riverbank.

Whadjuk people's life and our connection to the river was always along the riverbanks. We know the river. We know where it comes from, where it goes and what life it holds. We know how it can be angry too!

Yet, up until the 80s, Aboriginal people didn't have input into what happens on the river.

In creating this Plan, we went through a lot of historical and ancestral information. It makes us proud to see this come out in the document – clans, sites, creatures, old names and original vegetation. Our own quotes are used throughout and the Whadjuk voice is strong.

Because of this, the river is more now – you've learned more now.

We've been through a lot to create this Plan.

We've worked together and argued together through political turbulence, the referendum, and the changes to the *Aboriginal Cultural Heritage Act*. Through it all, we've been listened to and guided to come up with our own plans. To create something quite unique.

And we've done all of this work by the riverbank.

There are over 130 actions in this Plan, and many of these are cultural Whadjuk actions. These are the things we need to do for our city. Not just us, or you, but for everyone. For our kids.

Whatever we call our river, it has a life, and we should protect it. That is what this Plan will begin to do.

Greg Ugle RIP, former Chair of the Whadjuk Aboriginal Corporation's Cultural Advice Committee and member of the Djarlgarro subcommittee. *Photo - DBCA*

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Swan River Trust message

I am pleased to present *Djarlgarro Beeloo Mulgang Beeliar (The River of the Three Peoples) (the 'Djarlgarro Plan)',* a ten-year plan to revitalise the Canning, Southern and Wungong rivers. Proudly developed in partnership with Whadjuk Ancestral Custodians, community groups, natural resource management (NRM) groups, and State and Local government agencies, the Djarlgarro Plan is an essential reference document for implementing the *River Protection Strategy for Derbal Yirragan Djarlgarro (Swan Canning river system).*

The Canning waterways are culturally, ecologically, economically, and spiritually significant to Western Australians. They are one of the largest freshwater systems in the Perth area and provide a critical refuge for people, plants, and animals in a changing climate.

However, the Canning waterways face many challenges. A drying climate, diffuse source pollution, sedimentation, and the degradation of foreshore habitats threaten our river ecosystems. Working together can help address these pressures and increase the system's resilience as we move towards a shared vision for the waterways.

Building on the excellent work of Whadjuk Ancestral Custodians, community groups, NRM groups, and Local and State government agencies, this Plan provides the strategic coordination needed to maximise the beneficial impacts of our collaborative river restoration activities.

This is an aspirational plan. Many of its actions will require additional resources to be delivered. A collaborative, partnership approach is required for its implementation.

I thank all those who contributed to the preparation of the Djarlgarro Plan and participated in the stakeholder engagement process. The Swan River Trust looks forward to working with its partners to implement this Plan to protect and enhance the Canning waterways for future generations.

David McFerran, Swan River Trust Chair

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The Sacred Water Carpet Snake

According to oral tradition, Waugal is how we call the carpet snake, and there is a Dreamtime story about Waugal. A long time ago in the Dreamtime, Waugal lived at Mandiakan Spring at Beverley.

Unbeknown to Waugal, djididjidi *(*willy-wagtail) who lived at Lake Yealering was angry because the waydj (emu) was stealing all his bush foods, dhadja (meat) and mirinydj (other edible foods).

The waydj were so frightened by djididjidi that they ran in all directions before the djididjidi chased them, he bit his beard and smashed his spear into the ground. This caused water to rise and started flooding the land. To stop the water from flooding the land Waugal geeb djirrd woolagad bal (slithered along making a path for the water to follow behind him).

The Waugal came from the East coming down through the Avon Valley region creating the hills and landscape, pushing his body forming the Booneenboro (Perth Waters) and Doontanboro (Melville Waters). He went beyond the horizon taking the water with him and formed the woordan (ocean). Angry and tired, Waugal finally rested at Garungup Cave (Rocky Bay).

By and by, after creating the freshwater springs and pools along the Gwonggan (coastal plain) he entered Wagoorup (the mouth of the Canning River), formed Booragoon, Gabbeedjil, Wadjup, Kalbyamba, Djarlgarro, Burdgarro, Wardoo, Goolommup and Gargangarra (the southern river-bodies of the Canning and Wungong rivers) up and yonder.

Finally golygolyiny (he returned) to his galyagab (tribal homeland) where he now nyina (rests) at Boyagin Rock.

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Preface

For thousands of years, Whadjuk Noongar people have looked after the Canning, Southern and Wungong rivers and associated waterways (referred to collectively as Djarlgarro) according to their traditions and lore. Djarlgarro and its lands, including the rivers, streams, wetlands, groundwater as well as its unique ecosystems, are a connected entity, requiring care, attention, and reverence across all reaches of the river. Whadjuk Noongar people have an ongoing cultural responsibility to care for Djarlgarro – to ensure the rivers and their lands continue to support all life, now and for future generations.

There is no single action, or stakeholder, that can solely address the issues affecting Djarlgarro. A whole of government, whole of community approach is needed. By weaving Whadjuk Ancestral Custodians' knowledge and practice with contemporary science, this Plan aims to protect the bilya (rivers) for future generations.

Djarlgarro Beeloo Mulgang Beeliar (The River of the Three Peoples) (*the Djarlgarro Plan*) contributes to the delivery of the River Protection Strategy for Derbal Yirragan Djarlgarro (Swan Canning river system) (RPS). It collates actions within the catchments of Djarlgarro to help deliver RPS goals, objectives and strategies. The actions are not all funded, but are a collective approach to what is required over the longer-term for protection of the rivers. It is also proudly noted that this is the first restoration plan for the bilya (rivers) developed in partnership with the Whadjuk Aboriginal Corporation. The empowerment of Whadjuk Ancestral Custodians in governance and decision making ensures their place as partners in their Country alongside community groups, NRM groups and Local and State Government agencies.

This empowerment is consistent with the *Swan and Canning Rivers Management Act 2006* that states as one of its objectives *'to recognise the interests of the Nyungah community and other people in the community with an association with the development control area or the Riverpark and to provide for their participation in the management of those areas and the management of activities affecting the ecological and community benefits and amenity of those areas'.*

Dusk on Djarlgarro Beeliar (Canning River); Kent Street Weir. *Photo - Christine Chester*

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Bannister Creek Living Stream site. *Photo - DBCA*

Banksia menziesii. *Photo - DBCA*

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Why do we need a restoration plan?

Djarlgarro is one of the largest freshwater systems in the Perth metropolitan area. They are highly valued for their rich cultural and spiritual values, diverse ecology, recreational and aesthetic opportunities, and the ecosystem services they provide.

By the late 1900s, Djarlgarro Beeliar (Canning River) and most of its major tributaries were dammed by settlers to provide water for farming and emerging communities along the waterways. Since then, major urban and industrial development has resulted in a range of pressures affecting the system's ecological health.

Symptoms of poor river health include algal blooms, low oxygen water, sedimentation and fish deaths. Degradation of foreshore areas, and competition from invasive plants and animals also put local ecosystems under stress, making them even more susceptible to the impacts of a changing climate.

Taking action

To address the complex range of issues affecting the waterways, the Djarlgarro Plan asks many stakeholders to work together to protect Djarlgarro. For this to occur, stakeholders must be empowered to act, guided by an integrated, catchment scale approach to waterway management.

The actions of the Djarlgarro Plan were developed with stakeholders prior to the creation of the River Protection Strategy for Derbal Yirragan Djarlgarro (Swan Canning river system) (the RPS). The Djarlgarro Plan was then adapted to align with the RPS, including adoption of the RPS values framework, objectives, and strategies identified for strategic management of the entire Derbal Yirragan Djarlgarro.

The actions are not simply a collection of activities currently being undertaken, but are a significant step forward to the actions that will protect these waterways into the future. Not all actions are currently funded, and it is planned that a prospectus of potential projects will be developed, to guide future investment in the waterways.

Implementation of the RPS will occur through development of a series of river reach plans. These plans will be co-developed with State and local government agencies, regional Aboriginal corporations and NRM groups. A reach plan is proposed for Djarlgarro Beeliar (Canning River). The Djarlgarro Plan is therefore an important reference document for implementation of the RPS in Djarlgarro.

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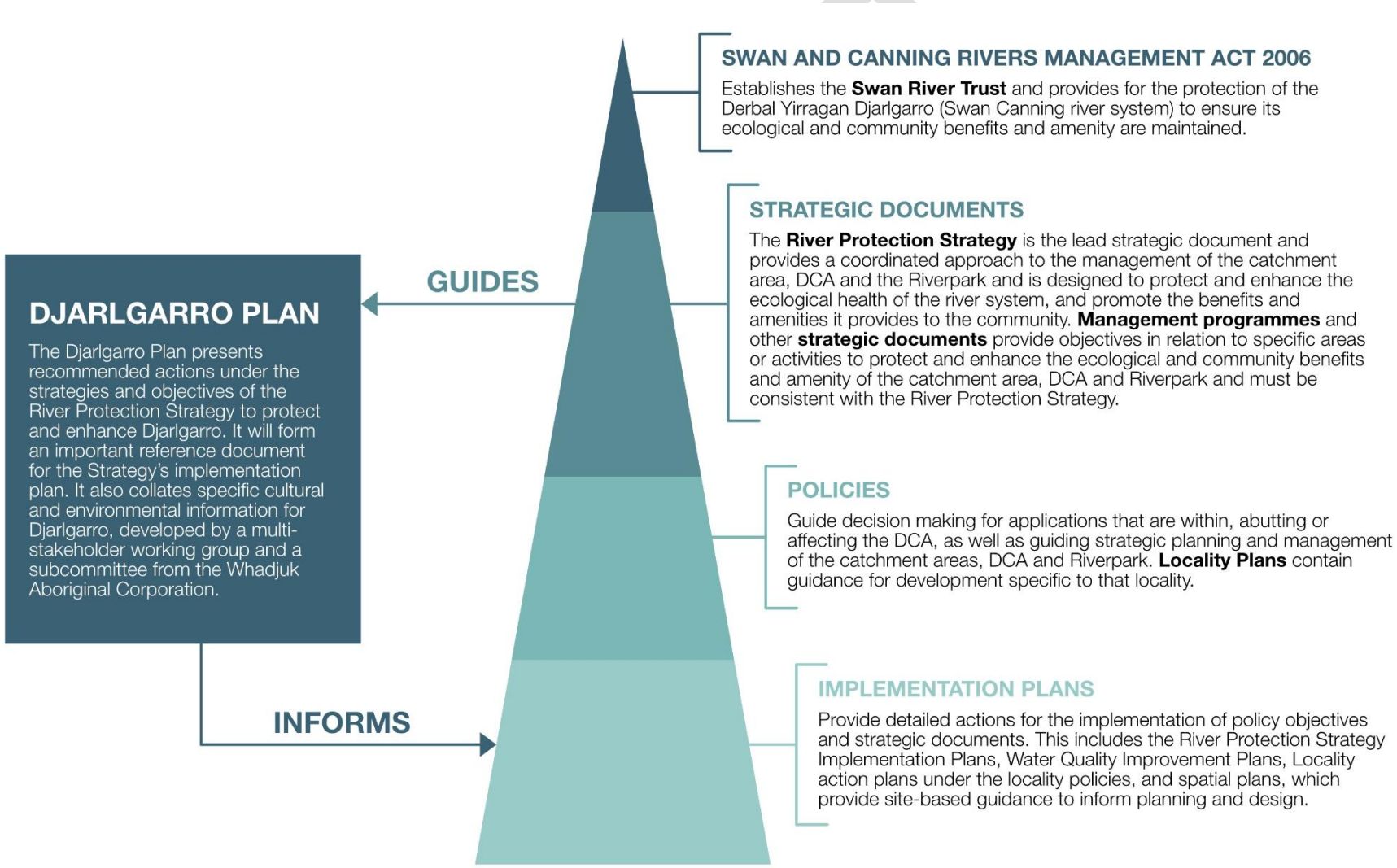
The following diagram shows where the Djarlgarro Plan fits within DBCA's framework and the interaction between it and key DBCA strategies, policies, plans and guidance documents that relate to the management of Derbal Yirragan Djarlgarro. DBCA's framework sits within a much broader suite of legislation, policies and other documents delivered by other stakeholders with a shared responsibility for river management. It is envisaged that implementation of the Djarlgarro Plan will be led through the RPS implementation plans.



RPS Values

Healthy River System

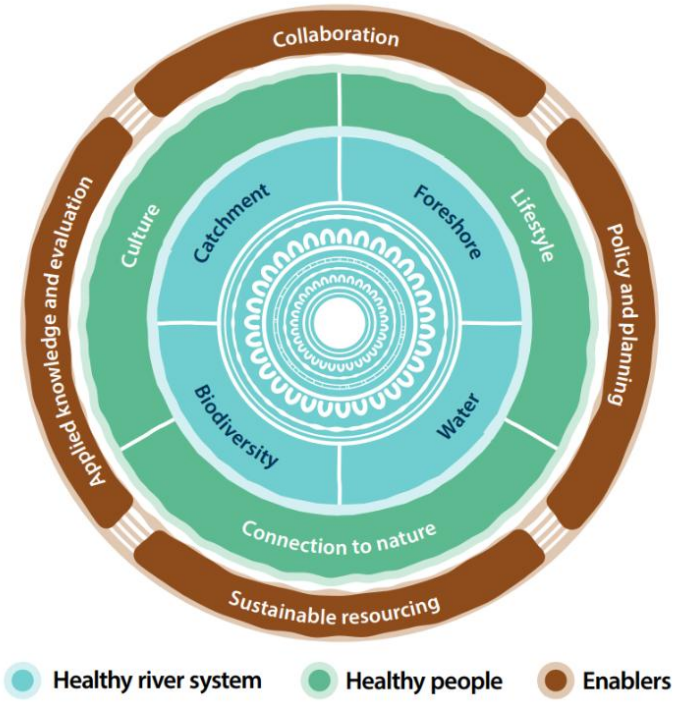
A healthy river system is fundamental to ecological integrity and its intrinsic value is to be protected. The four key environmental values identified in the RPS are **catchment**, **water**, **biodiversity**, and **foreshore**. The strategies associated with these values aim to improve water quality and protect river ecosystems by reducing nutrient, sediment and non nutrient contaminants (NNC) entering the waterways, ensuring flows are adequate to sustain the waterways, and undertaking activities to enhance river ecosystems, wetlands, corridors, and linkages.

Healthy People

The waterways provide a multitude of benefits to the social, mental, physical and spiritual wellbeing of the community. The three key values identified in the RPS are **lifestyle**, **culture** and **connection to nature**. The strategies associated with these values aim to foster community connection to the waterways and increase Whadjuk Noongar participation in river management. It also focuses on increasing community knowledge, understanding and participation in waterways protection and management.

Enablers

The RPS identifies a series of key 'enablers' needed to protect the healthy river system and healthy people values. These are **sustainable resourcing**, **collaboration**, **policy and planning**, and **applied knowledge and evaluation**. The strategies associated with these enablers enhance coordination and collaboration across all stakeholders involved in river management. They also aim to ensure management decisions are based on appropriate knowledge, sufficient resourcing is obtained, and policy and planning protects and enhances the waterways.



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Plan framework

The actions in the Djalgarro Plan have been aligned with the 11 objectives, 37 strategies and 31 targets of the RPS as shown in the following infographics. Note that the three culture strategies and one of the collaboration strategies in the Djarlgarro Plan were written by the Djarlgarro Subcommittee and differ from the RPS. The Djarlgarro Plan maps the local issues and over one hundred actions to help successfully achieve the desired RPS targets, objectives and strategies for Djarlgarro.

Kayaking on Djarlgarro Beeliar (Canning River). *Photo - DBCA*

HEALTHY RIVER SYSTEM

CATCHMENT

Manage the catchment to protect biodiversity, ecological integrity, waterways and wetlands.

- Update and implement Water Quality Improvement Plans.
- Implement and maintain water sensitive design.
- Identify pollution sources and reduce contaminants.
- Implement targeted infrastructure retrofits.
- Retain and restore natural vegetation, waterways and wetlands to create ecological linkages.
- Prevent sediment mobilisation.
- Promote sustainable management practices.

Increase in net canopy cover.

Annual nutrient load targets met in the Avon Catchment and all Swan Canning catchments.

Plant at least five million local plants.

Engage with 180,000 community members to increase knowledge about protection of the river system.

WATER

Manage water quality and quantity to support ecological and cultural values.

- Monitor water quality, contaminants and ecological health and review targets.
- Determine and provide appropriate water regimes.
- Improve the accuracy of flow gauging.

Water quality concentration targets are met in the estuary and catchments.

Improve protection of cultural and ecological values through the quantification and provision of water flows.

Non-nutrient contaminants in water, sediment and biota are monitored.

BIODIVERSITY

Protect and enhance local biodiversity and build resilience to climate change.

- Improve understanding of biodiversity and improve management of threats.
- Retain, enhance and extend areas for biodiversity.

Fish communities' condition grades are maintained or improved.

Seagrass condition and distribution is maintained or improved.

No significant (>100 fish) native fish kill events caused by toxic algal blooms, anoxia or pollution events.

Increase in wildlife refuges and sanctuary areas.

Targets for the effectiveness of oxygenation are met.

FORESHORE

Enhance and revegetate foreshores and implement adaptive foreshore management practices.

- Understand and manage impacts of climate change, erosion and inundation.
- Investigate and implement innovative and collaborative approaches to foreshore planning and management.
- Retain, increase and improve natural vegetation within foreshore areas.

Foreshore spatial plans (e.g. master plans) are prepared and implemented.

Riverpark shorelines are restored, renewed or upgraded, based on identified priorities.

Please note: Targets in the blue shapes are Swan Canning river system wide, not just for Djarlgarro.

HEALTHY PEOPLE

LIFESTYLE

Enhance culture, community lifestyle and connection by providing appropriate places in the river system to socialise, recreate and relax.

- Improve community access, enjoyment and connectivity.
- Support sustainable tourism, commercial offerings, development and events.
- Ensure river transport and on-water activities are planned and coordinated.
- Retain, conserve and manage historic heritage places.

When resurveyed, community satisfaction of water quality for swimming increases.

Increase the number of trails and interpretation nodes.

Water quality is safe for recreational use.

Average visitor satisfaction for the Riverpark increases and meets or exceeds 85 per cent.

CULTURE

Strengthen respect and care for the river system by recognising, conserving and sharing Noongar culture and knowledge and retaining and conserving Noongar sites, places and values.

- Partner with Whadjuk Ancestral Custodians to preserve sites of significance, ensure appropriate access for customary practices and support the fulfilment of cultural responsibilities.
- Partner with Whadjuk Ancestral Custodians to preserve traditional cultural knowledge and integrate it into contemporary river management.
- Encourage Noongar tourism, commercial operations, employment and economic opportunities.

Riverpark is mapped for Noongar cultural and heritage sites, places and values.

Appropriate Noongar knowledge holders are invited to be involved in all major projects.

Please note: The Culture strategies were written by the Djarlgarro Plan's subcommittee and differ from the RPS. Targets in the green shapes are Swan Canning river system wide, not just for Djarlgarro.

CONNECTION TO NATURE

Connect people with nature in the river system.

- Create, protect and enhance spaces that enable the community to connect with nature.
- Educate and engage to increase adoption of river protection behaviours.

When resurveyed, the community feels increasingly connected to nature.

Increase in the number of River Guardian members.

Spaces and facilities that provide opportunities to connect with nature are created or enhanced.

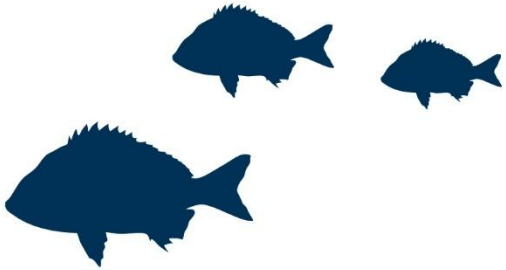
ENABLERS

SUSTAINABLE RESOURCING

Obtain ongoing and sufficient resourcing for improved management.

- Prepare an investment plan.
- Develop a targeted research strategy.

Sustainable funding supports river system protection and management.



COLLABORATION

Collaborate and effectively work together.

- Improve ways to work together.
- Empower Whadjuk Noongar Ancestral Custodians and enhance Whadjuk Noongar participation and partnering in waterways management.*
- Develop implementation plans.
- Engage openly and constructively with stakeholders.

70 per cent of Perth residents are satisfied with the management of the river system.

Traditional Owners are increasingly involved in decision making and management of waterways and wetlands on their Country.

Increase support to Friends of groups, schools and other environmental groups that actively improve the ecological health of the river system.

POLICY AND PLANNING

Policy and planning protects and enhances the ecological and community benefits and amenity.

- Secure foreshore reserves in public ownership and increase the provision of regional open space.
- Implement, collaborate on and continuously improve legislation, policy, guidance and land use planning.

Review and update policy and regulation to ensure their ongoing suitability and effectiveness.

Increase the amount of publicly owned foreshore reserves.

Increase the area of foreshore reserved as regional open space under the Metropolitan Region Scheme.

APPLIED KNOWLEDGE AND EVALUATION

Implement strategies and approaches that are adaptive and based on appropriate knowledge, monitoring and evaluation, with river health reported clearly and regularly.

- Improve information sharing systems to facilitate sharing of data and research with the community and to inform planning, decision-making and management.
- Provide high quality, timely and appropriate advice.
- Regularly review approaches to monitoring and evaluation.
- Monitor, report and share water quality and biodiversity outcomes.
- Encourage participation in citizen science, research and monitoring.

Increase in the number of trained Dolphin Watch volunteers.

Please note: Targets in the orange shapes are Swan Canning river system wide, not just for Djarlgarro.

** This strategy was written by the Djarlgarro subcommittee and differs from the RPS.*

Plan area

The Plan area includes Djarlgarro Beeliar (Canning River) from the Canning Dam to the Canning Bridge, including the freshwater and estuarine sections above and below the Kent Street Weir. It also includes the Southern River-Wungong River/Brook, Churchman Brook and Munday/Bickley Brook from the dams to their confluence with Djarlgarro Beeliar (Canning River).

Salter Point Lagoon on the lower reaches of Djarlgarro Beeliar (Canning River). *Photo - DBCA*

Pool in the upper reaches of Djarlgarro Beeliar (Canning River). *Photo - DBCA*

Upper reaches of Wungong River/Brook. *Photo - DBCA*

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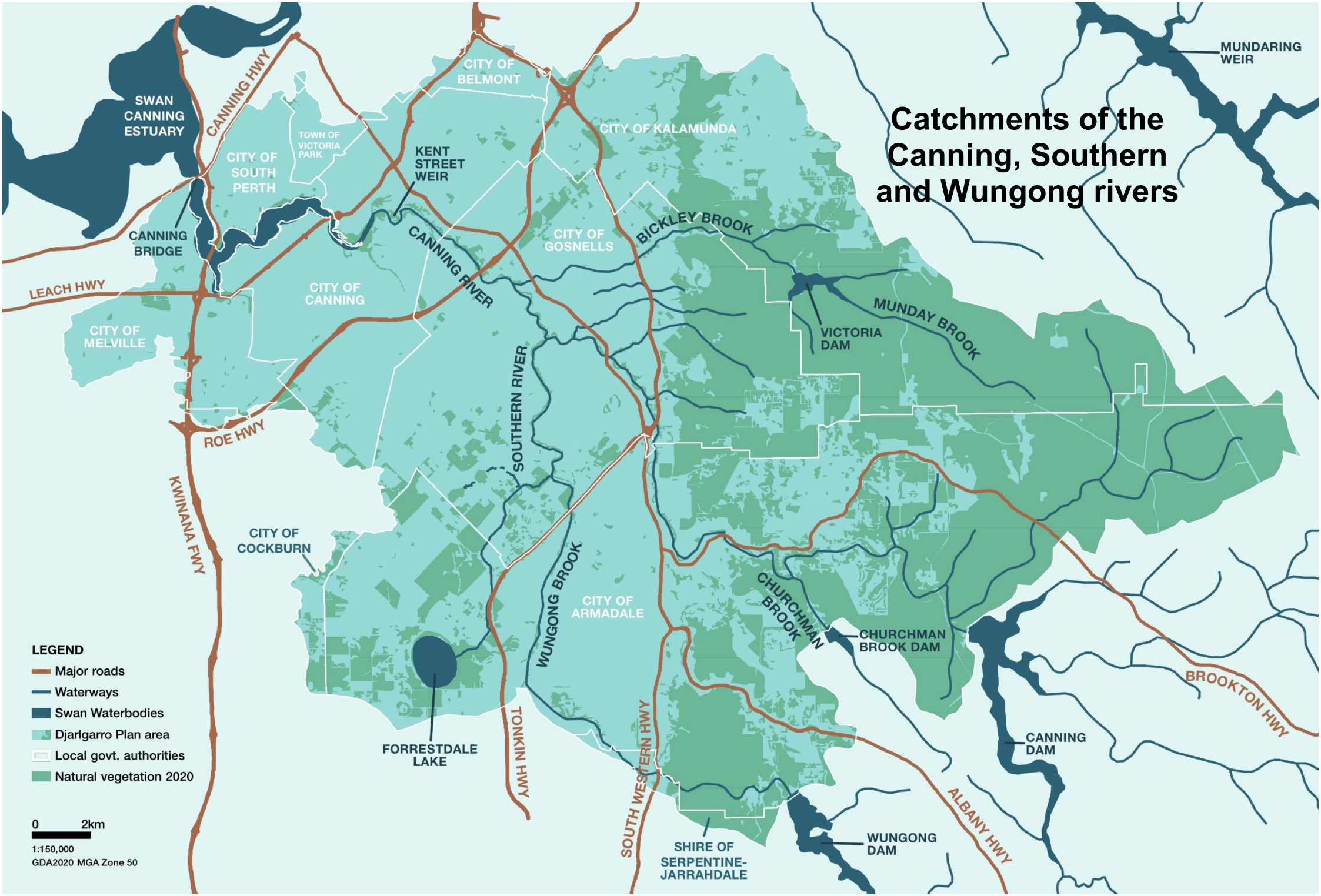
Catchments of the Canning, Southern and Wungong rivers
SWAN CANNING ESTUARY
CANNING HWY
CITY OF BELMONT
TOWN OF VICTORIA PARK
CITY OF SOUTH PERTH
KENT STREET WEIR
CITY OF KALAMUNDA
MUNDARING WEIR
CANNING BRIDGE
CANNING RIVER
CITY OF GOSNELLS
BICKLEY BROOK
LEACH HWY
CITY OF CANNING
CITY OF MELVILLE
VICTORIA DAM
MUNDAY BROOK
SOUTHERN RIVER
ROE HWY
KWINANA FWY
CITY OF COCKBURN
WUNGONG BROOK
CITY OF ARMADALE
CHURCHMAN BROOK
CHURCHMAN BROOK DAM
BROOKTON HWY
FORRESTDALE LAKE
TONKIN HWY
SOUTH WESTERN HWY
CANNING DAM
ALBANY HWY
SHIRE OF SERPENTINE-JARRAHDALE
WUNGONG DAM
LEGEND
Major roads
Waterways
Swan Waterbodies
Djarlgarro Plan area
Local govt. authorities
Natural vegetation 2020
0 2km
1:150,000
GDA2020 MGA Zone 50

Collaborative management

The Canning Waterways Working Group and Whadjuk Aboriginal Corporation will participate in the implementation of the actions of the Djarlgarro Plan. Multiple Local Governments (LGs) and State Government agencies have a statutory role to manage specific aspects of the Djarlgarro waterways. Not all of these land managers were actively part of the working group but have been consulted. There are also non-statutory organisations including regional and subregional NRM groups, community groups and private landholders providing a critical contribution to waterway management.

This is an aspirational plan. Many of the actions in the Djarlgarro Plan (including the knowledge gaps), are currently not funded and require additional resources to be delivered. Stakeholders will prioritise actions for implementation using a collaborative, partnership approach, with delivery partners active in identifying resources and external funding opportunities, for these projects.

It is envisaged that implementation of the Djarlgarro Plan will be led by the RPS implementation plans.

How you can be involved

The Djarlgarro Plan has been written with input from a wide range of stakeholders, including Whadjuk Ancestral Custodians, State Government agencies, LGs, NRM groups, community groups and other river stakeholders.

NRM groups and conservation groups play a vital role in protecting and managing Djarlgarro. If you want to become a volunteer, you can contact DBCA or any of the NRM groups, community groups or LGs acknowledged in this report. You can also find a conservation group via DBCA's website [www.dbca.wa.gov.au/management/urban-nature].

For all other enquiries, please contact the Healthy Catchments Program Manager:

rivers.systems@dbca.wa.gov.au

Djarlgarro (Canning) Waterways Restoration Plan

Department of Biodiversity, Conservation and Attractions

17 Dick Perry Ave, Kensington WA 6151

The role of organisations will vary depending on legislative responsibility.

Lead: an organisation has legislative, policy and/or accepted group/organisational responsibility relevant to the area or to delivery of the action.

Support: an organisation may not have legislative or policy responsibility, but has relevant data/information, group/organisational interest, and/or may assist in delivering the output/outcome of the action.

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Our Vision

The river has a voice.

It is healthy, resilient and flowing, with abundant and diverse natural habitats, wildlife and recreational opportunities. Natural living streams and wetlands provide fresh water, ecological corridors, and ecosystem services.

The spirit of the river will always flow.

Traditional, scientific and modern-day practices are woven together to ensure the sustainability of the waterways for future generations. The rivers are collectively managed by Whadjuk Ancestral Custodians, the community, State and Local Government, who value, understand and enjoy the rivers as carers of the waterways.

Canning River Regional Park. *Photo - DBCA*

Bilyagar, the River Peoples, custodians of the waterways

WARNING: Aboriginal and Torres Strait Islander people are warned that the following information contains images and quotes from deceased persons.

The following chapter, authored by the Whadjuk Aboriginal Corporation nominated Djarlgarro subcommittee and DBCA, is an important component of the Djarlgarro Plan. It outlines the history and aspirations for Whadjuk People in caring for Djarlgarro.

In line with the *United Nations Declaration of Rights of Indigenous Peoples*, the Djarlgarro Plan has been developed with the Whadjuk Aboriginal Corporation as the recognised Ancestral Custodians of Djarlgarro. It acknowledges the close cultural and spiritual connection the Ancestral Custodians maintain with the bilya, which encompass the land and waters (including the rivers, river pools, streams, wetlands, freshwater springs and groundwater) and unique ecosystems.

Caring for Boodja (the land), including land and water rights, are important aspirations for the Whadjuk Aboriginal Corporation. By promoting the connections of Whadjuk Ancestral Custodians to their Country and supporting the preservation of traditional ecological knowledge and customary practices, the Djarlgarro Plan recognises the bilya and its lands as a connected entity, requiring care, attention, and reverence across Djarlgarro.

Whadjuk Noongar people's connection to Djarlgarro

'*We're only the keepers of the waterways, we're not the makers. The Waugal is the maker.'* Greg Ugle RIP, Whadjuk Ancestral Custodian, October 2023.

The Whadjuk Noongar people are the Ancestral Custodians of Djarlgarro and its associated waterways. Djarlgarro signifies 'place of abundance,' where the richness of Whadjuk Country allowed Whadjuk people to have one of the highest pre-colonisation population densities in Australia (Hughes-Hallet, 2010).

The entire Djarlgarro Beeliar (Canning River) was used by Whadjuk people as an important trail to the Darling Range, and its lands are central to the Whadjuk Noongar peoples' Dreaming and wellbeing. Whadjuk people have a cultural responsibility to ensure the rivers and its lands support life now and into the future.

'The river is the giver of life. Without it, we will cease to exist.' Karen Morich, Whadjuk Ancestral Custodian, March 2024.

'The river has a soul, an identity, a voice.' Joe Collard, Whadjuk Ancestral Custodian, February 2024.

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'The river was so important to our women because they would give birth to their babies and wash them down by the river's edge. They would wash all their foods and they would grind their grain, with grinding stones, next to the river' Karen Morich June 2024.

'Anywhere there was fresh water, drinkable water, it was looked after, kept clean. No gnamma holes were left open, for things to fall into or goona in, they were always covered. It was everyone's responsibility. During Utopia, it was everyone's responsibility, it was water for everyone. White man came and changed that. Springs, water holes, trees.' Terry Morich, Whadjuk Ancestral Custodian, March 2024.

'Our culture comes from the being. The cultural obligations we used to have were there but when people moved away from Country and the land, it broke those. We looked after the waterways, the animals, our hunting practices. Getting back into looking after the Canning River is a cultural responsibility for all of us.' Greg Ugle RIP, March 2024.

'We want the river to be restored to what it used to be, a clean river. We've ended up with something that wasn't our fault. The river's so damaged now, and people need to recognise that the river needs to be more respected. Rubbish removed, weeds removed, natural vegetation restored. Clean water flowing in the river, the silt removed. We need more thought going into preserving what we've got, and any further damage needs to be stopped.' Terry Morich, March 2024.

The Three Peoples

In the Djarlgarro Plan, *Beeloo Mulgang Beeliar* refer to the names of the three clan groups that coexisted by the river (see map) (Armstrong, 1836). The path that the Waugal took to form Djarlgarro Beeliar (Canning River) became a boundary for these clan groups.

Under Waugal spirit lore, these three clan groups are the custodians of the river and are responsible for its care. Each clan could consist of several family units, with each group having a special kaleep (camping ground) (Hughes Hallet, 2010).

The family of Midgegooroo are the custodians of Beeliar territory. This is the land between Djarlgarro Beeliar (Canning River) and the ocean. Midgegooroo, father of Yagan, played a key role in Aboriginal resistance to white settlement, and he and Yagan were both executed in 1833 (Hughes Hallet, 2010).

The family of Munday are the custodians of Beeloo territory. This area is bounded by the Canning to the south and Swan and Helena rivers to the northeast. The Beeloo people were led by Munday (or Mundy), an important negotiator for Whadjuk people. They had camps in Kalamunda and Mundaring, with Mundaring Weir an important meeting place (Hughes Hallet, 2010).

Mulgang territory includes the upper reaches of Djarlgarro, inland from Kelmscott and on the eastern side of Katta-

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Moorda (the Darling Range) (Armstrong, 1836). South of York, and west of Beverley, it includes an area now referred to as the Jarrahdale State Forest.

For thousands of years, Whadjuk people sustainably sourced food from the rivers and its banks. A complex system of cultural lore ensured no food source was ever totally depleted. Much of the land around the waterways was low, swampy ground intersected by minor waterways where djildjit (fish), kweeyar/kooyar/kwooyar (frogs), yakkan/yarkan (turtles), waterfowl, noorik/noorook (eggs) were collected. Larger game included yonga (kangaroo), karda (goanna), moyoop (snakes), koomoorl/goormoorl/goomal (possums), birds and small mammals.

On higher ground, many plants were cultivated as staple food sources (Worsley, 2019). These included warrine or yam (*Dioscorea lustifolia*) which were harvested sustainably by replanting smaller roots for future supply. Conflicts arose when Whadjuk access to wild food sources and traditional sites was prevented by early colonists developing the land.

'They weren't just hunting grounds; they were corrobboree grounds and birthing places…Cultural ceremonies were practiced in that area. There are corrobboree grounds…today if you walk on it, you're affected by it. You feel it in your legs and your body.' Greg Ugle RIP, March 2024

Timbul and Ngilgie at Maamba Reserve, 1895. *Photo courtesy State Library of Western Australia*

Charles Timbul, Ngilgie and others at Maamba Reserve, 1895. *Photo courtesy State Library of Western Australia*

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Maamba Reserve

During the 1800s and early 1900s, the establishment of the Swan River Colony saw traditional territories along Djarlgarro dissected for agricultural, industrial, and residential development. While Whadjuk people continued to occupy and use the areas, access to Country and its resources became increasingly limited.

Warrine (yam) grounds became grazing lands or fruit and vegetable crops for settlers. Seine nets were used in the bilya. Both grazing lands and the rivers became off-limits to Whadjuk people. The settlers claimed the freshwater springs and set up towns on Whadjuk campgrounds, with sacred objects and ceremonial places disregarded.

'*Noongar people became dependent on rations about seven years after the arrival of settlers around the Swan River. Settlers began to eat the warrine as a food source because they were going hungry. Noongar people then had less to eat*,' Terry Morich, July 2024.

By 1901, a 'Native reserve' called Welshpool Reserve (also Maamba Reserve) was created at Hartfield Park, Forrestfield. The *Aborigines Act 1904* enabled the Chief Protector to remove Aboriginal people to reserves, with people from Perth, Gingin, York, Kellerberrin, Wagin, Pinjarra, New Norcia, and Busselton relocated to Maamba Reserve (Monks, 2019, Bates, 1938).

'*Aboriginal people were pushed out of these areas through no fault of their own. They were the custodians of these waterways*,' Karen Morich, August 2023.

Monks (2019) describes the conditions of Maamba reserve:

'Our game is gone…our hunting grounds have passed into the possession of the white man. Surely it is not asking the Government much to provide us with a fair allowance for rations.' James Cooper (*Sunday Times* 19 July 1902 in Monks, 2019).

In 1910, Maamba Reserve closed, and the remaining residents were relocated or returned to fringe camps (Green, 2013).

'Noongar people were moved away from the rivers. It would be good if Noongar people could be welcomed back, to a cleaner river, be more involved in the decisions that are made.' Greg Ugle RIP, March 2024.

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Whadjuk Noongar clans and place names

LEGEND

Djarlgarro Plan Area

TRADITIONAL NOONGAR ERA DATA

WADJUP Noongar name of topographic area

BEELIAR Noongar Clan name

MANDOON Noongar place name

Coastline alignment pre-colonisation

Watercourse alignment pre-colonisation

Outline of lakes lost since colonisation

TRADITIONAL NAMES OF THE CANNING WATERWAYS

- Booragoon
- Burdgarro
- Dyarlgarro
- Gabbeedjil
- Gargan-gara
- Goolommup
- Kalbyamba
- Wadjup
- Wardoo

PRE-EUROPEAN VEGETATION

- Forest – jarrah and marri eucalyptus
- Low forest, woodland or low woodland with scattered trees – jarrah, banksia or casuarina eucalyptus
- Woodland southwest – jarrah, marri and wandoo eucalyptus
- Woodland, low woodland or low forest
- Salt lake, lagoon, clay-pan

POST COLONISATION TOPOGRAPHY

- Coastline
- Major watercourse
- Lake; perennial
- Lake; non-perennial
- Swamp
- Marsh

0 2 4 6 8 km

Map Projection: MGA Zone 50 Map Datum: GDA-2020

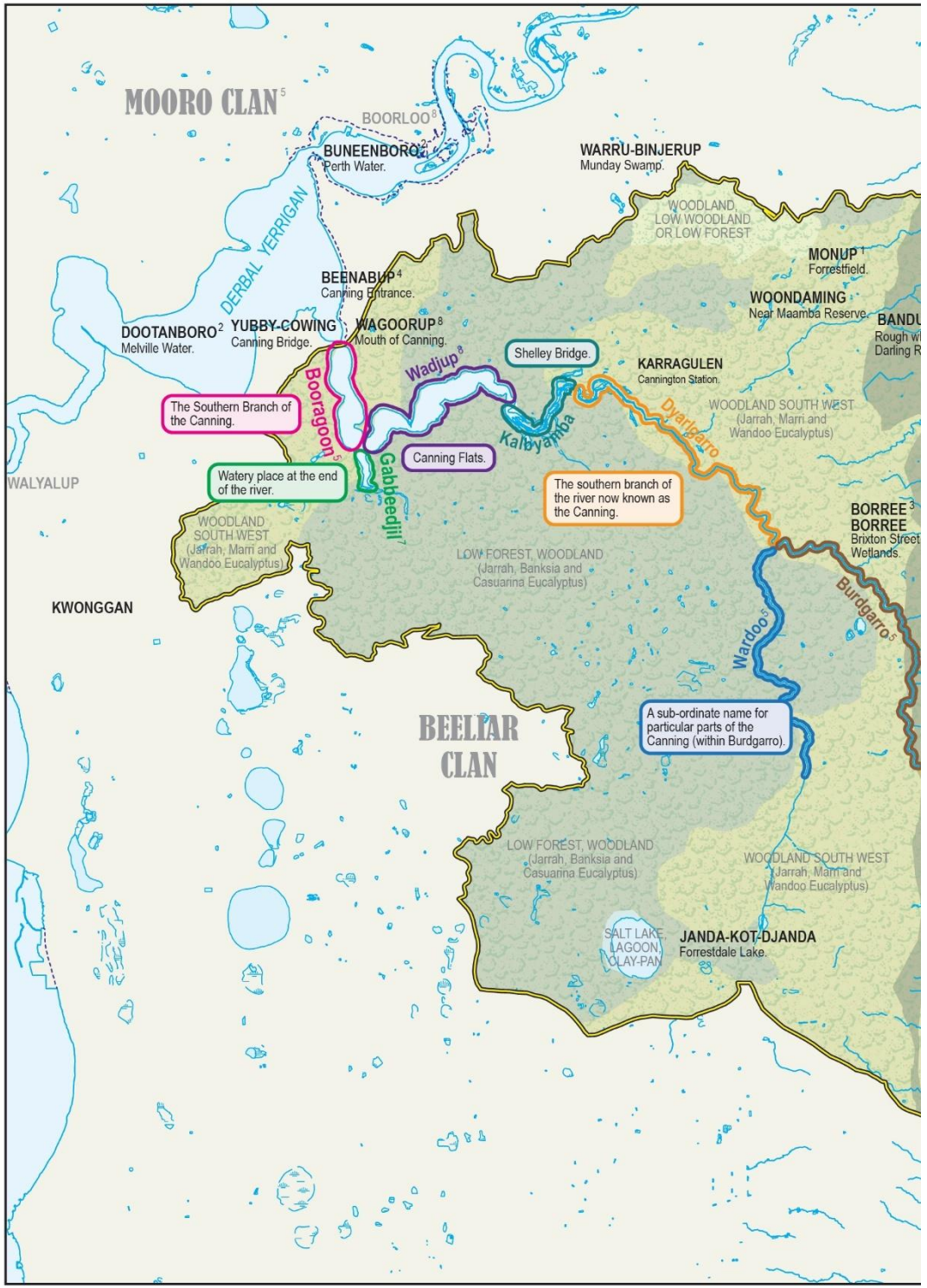
Map produced by the Cartographic Services Unit for the Swan Canning Waterways Branch
Department of Biodiversity, Conservation and Attractions (DBCA)

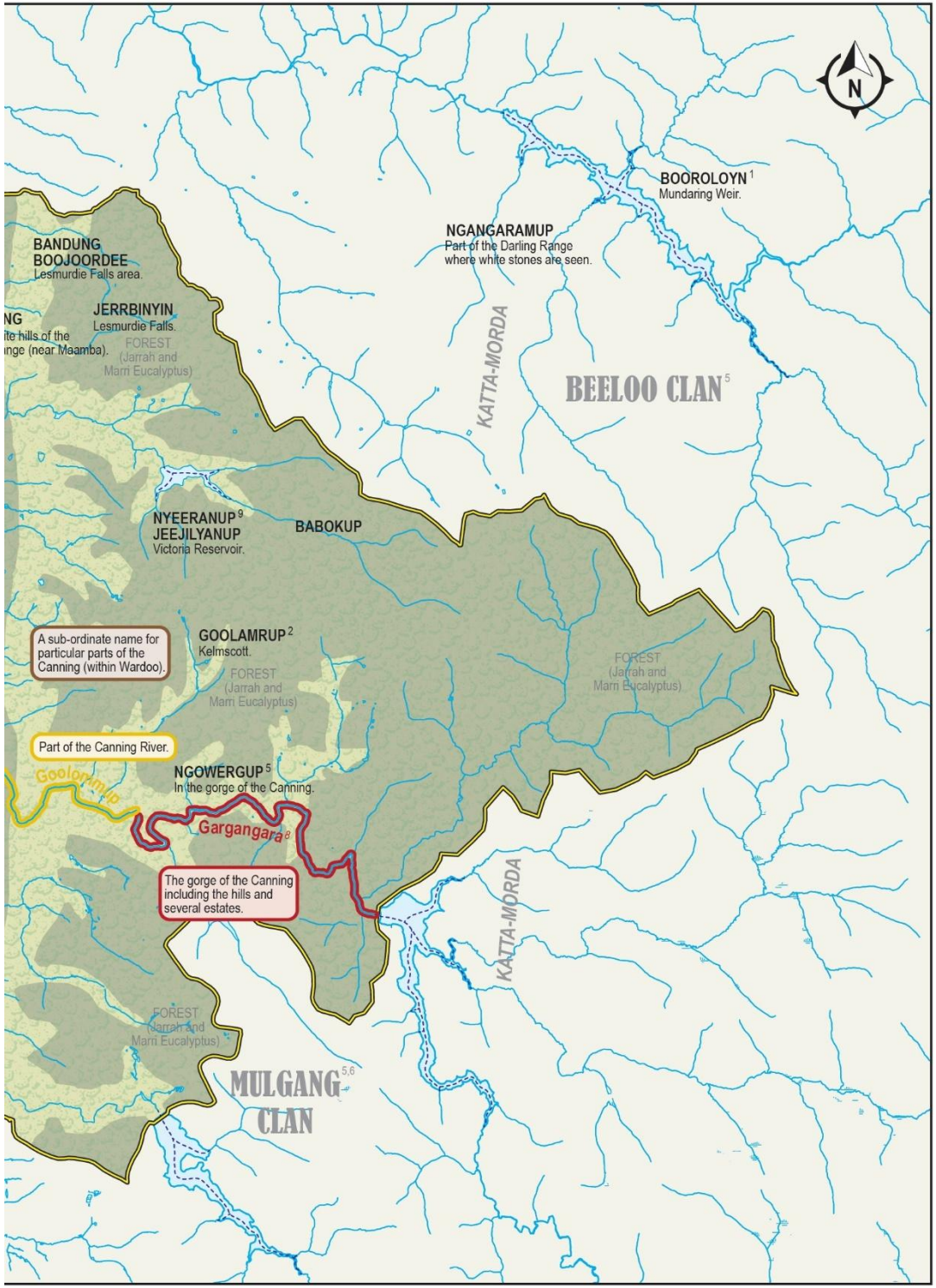
Map Publication Date: 4th November, 2024

Department of Biodiversity, Conservation and Attractions

PARKS AND WILDLIFE SERVICE

Whadjuk





This map was created by the Djarlgarro subcommittee. It was important to the subcommittee to find the original published sources of the traditional names. The subcommittee and DBCA visited the State Library of Western Australia who helped locate early maps of the Perth area and records from early anthropologists who spoke with Elders at the time of colonisation, including Yagan of the Beeliar Clan.

Djarlgarro Beeliar (Canning River) has many names, reflecting river reaches with specific landscape features.

Place names represent animal species that occur or occurred in the area, or landscape features. Where known, the place name meaning is included in the glossary.

Locations are approximate and based on current understanding. Place name spellings vary depending upon the reference. Where possible, place name spellings published in WA lands department maps have been used.

References

[1] Bates (1936).

[2] Brockman (1915).

[3] Carter (2006).

[4] Fyfe (1933).

[5] Green (1979).

[6] Hallam and Tilbrook (1990).

[7] Hughes Hallet (2010).

[8] Lyon (1833).

[9] Perth Land Agency (1909).

Noongar six seasons

The diet of Whadjuk people varies according to the weather. Whadjuk people used to travel in groups to the most appropriate place within their territory to find food. Weather changes, and the corresponding changes in the plants and animals divided the Noongar year into six seasons, with food sources eaten sustainably when they were seasonally abundant. In 1829, when Captain Stirling arrived during Makuru (winter), Whadjuk people were camped in the hills and did not realise they had lost their land until the following Birak (first summer) (Worsley, 2019).

Birak (December/January)

The first summer. Season of the young.

Birak is hot and dry and a time of plenty. It is the main fishing season where gidgigarbel (a short, heavy single barbed spear) and koilee (throwing stick like a boomerang) were used to kill fish in shallow waters (Worsley, 2019). Controlled scrub fires were used to hunt kangaroos and wallabies. The blossom of the Moodja ('Christmas Tree') indicated it was time to move to the coast.

Bunuru (February/March)

The second summer. Season of adolescence.

A lack of water moved Whadjuk people to the coast where fishing and hunting coincide. The sea and estuaries became an important food source. Fire continues to be used for hunting and to reduce undergrowth and encourage lush growth of grasses and young plants (Murdoch University, 2008). These grasses attract game, including yonga (kangaroo), for hunting. This was an important time for ceremonies and large group meetings.

Djeran (April/May)

Autumn. Season of adulthood.

The winds swing to the south-west and the temperature cools. With the first autumn rains, Whadjuk were invited to visit their Pinjarup relatives (Pinjarra and Mandurah) for the great munga (fish trap) feast (Worsley, 2019). It was an important time of marriages and courtship ceremonies.

Makuru (June/July)

The first rains. Fertility season.

Cold and wet weather with westerly gales arrive. Whadjuk people moved inland to their hunting grounds. Moulting marlee (swans), yonga (kangaroo), waitch (emu), kwenda (quenda) and

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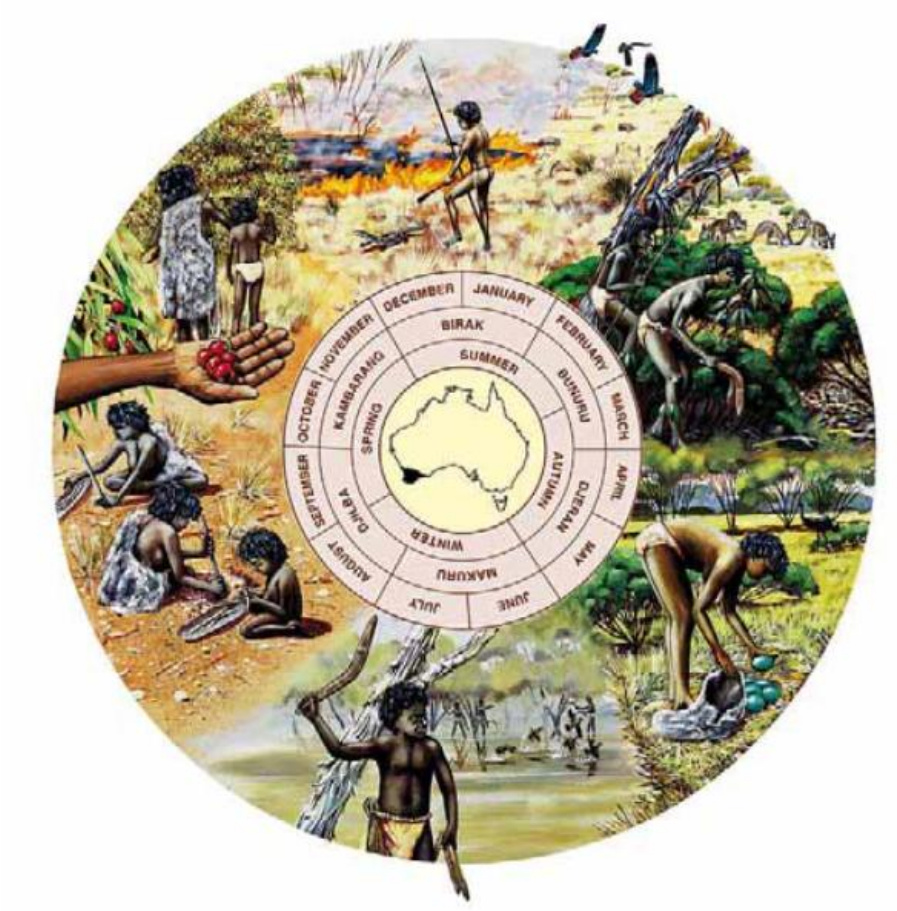

Image - DBCA

koomoorl/goormoorl/goomal (possums) were hunted. Warrine or yam were harvested.

Djilba (August/September)

The second rains. Season of conception.

The weather begins to warm, and rain fills wetlands and waterholes. Inland hunting continues. Seeds (some *Acacia* species) were roasted or ground into flour. When in blossom, bloodroots were harvested, roasted, or eaten raw. Lush new undergrowth from Birak and Bunuru burning attracts animals.

Kamberang (October/November)

The wildflower season. Season of birth.

The rains recede and family groups began moving back towards the coast. Hunting focuses on wetlands and waterways where waterfowl, gilgie (freshwater crayfish), yakkan/yarkan (turtles), kweeyar/kooyar/kwooyar (frogs) were caught and noorik/noorook (eggs) were collected.

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Bush lollies from a local *Acacia* tree. *Photo - DBCA*

Soap bush (*Trymalium odoratissimum*), a natural detergent. *Photo - DBCA*

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South West Native Title Settlement

In 2019, the Noongar people of the South West of Western Australia gained a legislative mechanism through the South West Native Title Settlement (the Settlement) within which to formally engage in the management of their Country. Under the *Noongar (Koorah, Nitja, Boordahwan) (Past, Present, Future) Recognition Act 2016* (WA) and *Aboriginal Heritage Act 1972* (WA), the Whadjuk Noongar people are recognised as the Ancestral Custodians of the Perth area. Established in 2022, the Whadjuk Aboriginal Corporation is the representative body of the Whadjuk Noongar people.

The full details of the Settlement between State Government and the six Noongar Regional Corporations, including the Whadjuk Aboriginal Corporation, are outlined in six Indigenous Land Use Agreements (ILUAs). Under the Whadjuk ILUA, DBCA and Whadjuk Aboriginal Corporation will enter into Co-operative and Joint Management Agreements for the conservation estate, as specified in the *Conservation and Land Management Act 1984* (CALM Act). However, land tenure arrangements along the Canning, Southern and Wungong rivers include some CALM Act tenure, private property, as well as Local Government and other State Government tenure. These complex land tenure arrangements require collaboration between Whadjuk Ancestral Custodians and stakeholders caring for the bilya (rivers), with these approaches currently being explored.

Indigenous Landuse Agreement Areas under the Settlement

Image courtesy South West Aboriginal Land and Sea Council

Caring for Djarlgarro

Whadjuk Ancestral Custodians have a right and cultural responsibility to care for water under their lore and customs. These obligations connect across communities, catchments and over connected aquifer and groundwater systems.

The *Swan and Canning Rivers Management Act 2006* recognises the interests of the Noongar community and provides for their participation in the management of the development control area and Riverpark and the management of activities affecting the ecological and community benefits and amenity of those areas.

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A recurring challenge for Ancestral Custodians is that contemporary legislation, policy, plans and programs have often been silent on First Nations people's rights and aspirations. Currently, water rights and cultural flows are not addressed in the Settlement. As Greg Ugle RIP explains, 'it [the river] is disappearing into the hills. The dams are feeding little drips into the waterways.' He continues, 'the river is alive, and it's kept us alive. It struggles through summer, through the heat and it thins out, but it's always survived,' (March 2024).

According to Whadjuk Ancestral Custodians, caring for Country requires that we *listen to Country*. This is difficult for contemporary science because it relies on a more-than-human approach to understanding the ever-present interactions between people and Country – including plants, animals, water, rocks, weather and spirit. To Whadjuk people, Country, including rivers, are living, sentient beings that can communicate and feel.

'We acknowledge it by throwing the sand into parts of the river. That's our cultural connection,' says Greg Ugle RIP (March 2024). According to Terry Morich, 'all of us, even non-Aboriginal people, suffer when the environment's not healthy. The rivers are in a sad state; therefore, our people are in a sad state,' (March 2024). Karen Morich continues, 'people have lost that respect for the waterway. People should respect it because it looks after us,' (March 2024).

'The pools are sacred. We need to protect all life including the black cockatoo, long neck tortoise, freshwater cobbler, mussels and quenda,' explains Joe Collard, Whadjuk Ancestral Custodian, (March 2024). Greg Ugle RIP continues, 'the river needs a voice. It needs to survive. If there's change, it needs to be for the benefit of the river,' (March 2024).

'We're renewing our cultural responsibility. It's an honour to because we follow behind our Elders. My father was involved in a lot of stuff before I was born, now he's passed on, it's up to us to follow their legacy,' Terry Morich explains (March 2024). 'We have to be raised and elevated, so we are a true stakeholder,' says Joe Collard (August 2023). 'The care of the waterways comes back to us every time,' explains Greg Ugle RIP (September 2023).

Joe Collard (right) with Dexter Cross paddling on Djarlgarro Beeliar (Canning River). *Photo - Trevor Walley*

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Karen Morich and Michael Little with soap bush at Jerrbinyin (Lesmurdie Falls). *Photo - DBCA*

Terry Morich at Maamba Reserve. *Photo - DBCA*

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A HISTORY OF CHANGE IN THE CANNING WATERWAYS

SOCIETAL CHANGES

ENVIRONMENTAL CHANGES

60K+ YEARS
WHADJUK NOONGAR CUSTODIANS OF WATERWAYS

1788
Colonists declare Terra Nullius

Whadjuk Noongar harvesting of traditional foods

1829
European settlement

1833
Midgegooro, leader of the Beelier Clan, and his son Yagan, executed

1890s
Riverside land-fills created in low lying areas (Adenia Park, Centenary Ave)

1892
Rocky bar removed from mouth of Swan River

1900
Loss of Noongar language begins

1905
- Waterway intergenerational knowledge transfer and cultural identity impacted by the Aborigines Act 1905 when the Chief Protector is appointed legal guardian for every Aboriginal child up to the age of 16
- Joobaitch passes away in Maamba Reserve

EARLY 1900s
Araluen YMCA Dam
Stinton Creek

1909
State Department of Aborigines and Fisheries created to manage Aboriginal affairs

1911
Kent St Weir first created as sandbags in the river

1914
Rights In Water Irrigation Act

1921
Old Victoria Dam

1923-29
Churchman Brook Dam

1925
Wungong Dam

1927
Kent St Weir made permanent

1920s
Market gardens established along Canning waterways

1940s
Canning Dam

1841-1880s Water custodianship impacted by broadscale death of Aboriginal people from introduced disease

LATE 1860s - 1890s Canning River dredged to improve navigation at the request of Mason Timber Company

1899 - 1930s Maamba reserve established and Aboriginal people including Joobaitch relocate

EARLY 1920s - 1950s Rivers popular for swimming and market garden established along waterways

1830 - 1890 Clearing, orchards established, logging Darling Plateau, river dredged to transport logs

1890 - 1940 Large-scale land clearing, deep drainage, river training, irrigation, uncontrolled grazing and modification of flows

1929 - 1939
Great Depression

1829 ONWARDS Resistance and frontier violence between colonists and Noongar people Colonisation reduces food sources for Noongar people, limiting access and displacing them from the river

1820 1830 1850 1870 1890 1910 1930 1950

1840 - 1890 Permanently flowing, groundwater fed, freshwater system

1890 - 1925 Canning River becomes more estuarine

1925 - CURRENT Canning River upstream of Kent St Weir becomes freshwate

1890 - CURRENT Period of mass extinction as urban development expands | Sediment from clearing and urban/industrial development fills river po

1940 - CURRENT Natural

Foxes, pigs, cats and rabbits introduced to Canning waterways

1930s
Introduction of Mosquito fish

1944
Waterway custodianship is impacted when Aboriginal People were forced to sever ties to their culture and Country to become citizens under the Natives Act 1944

1958 - 1976
Swan River Conservation Board

1960s
Shelley Rossmoyne foreshore dredging and reclamation

1962
Aboriginal people to vote in Commonwealth elections

1967
Referendum to change Constitution to include Aboriginal people in the official population.

1977 - 1989
Swan River Management Authority

1989
- Kent St Weir update
- Swan River Trust established

1991
New Victoria Dam

2006
Swan Canning Rivers Management Act

2012
Middle Canning Surface Water Allocation Plan

2008
National Apology by the Prime Minister to Aboriginal Peoples

2015
- South West Native Indigenous Land-use Agreements (ILUAs) executed
- River Protection Strategy

2016
Noongar (Koorah, Nitja, Boordahwan) (Past, Present, Future) Recognition Act 2016

2018
Kent St Weir Upgrade

2021
- The South West Native Title Settlement formally commences
- Six Indigenous Land-use Agreements (ILUAs) conclusively registered

2022
Whadjuk Aboriginal Corporation Directors and CAC members commence their first terms

2005 ONWARDS Wetlands constructed to improve WQ (Leige St, Anvil way, Wharf St)

2000 - 2011 Phoslock applications - Kent St Weir pool

1994 - CURRENT Reductions in nutrients resulting from water quality improvement programs: Swan Canning Cleanup Program **1994**, Healthy Rivers Action Plan **2007**, SCWQIP **2009**, Urban Water Renewal Program **2010**, Environmental Protection (Packaged Fertiliser) Regulations **2010**, **2015** River Protection Strategy and Urban Rivers and Catchments Program, Cleaning up the Canning **2022**

1950's - 1980s Socio-economic boom, intense urban and industrial development

1970 1980 1990 2000 2010 2020

1970s - 2020s Inflows to Canning Dams reduced by 86% (compared to 1911-74 average)

1998 ONWARDS Oxygen levels in Kent St Weir pool increase from artificial oxygenation

1994-2004 Algal blooms dominated by Cyanobacteria

ols | Decline in condition of foreshore habitat including broad scale invasion by weed species

flows reduced in the Canning River by 98% following dam construction

2000 ONWARDS Decrease in phosphorus in Kent St Weir pool following oxygenation and Phoslock applications

2003 - CURRENT Fish killing dinoflagelate karlodinium in Canning estuary

2003
Karlodinium causes fish kill > 1000 fish

1998
Severe Cyanobacteria bloom upstream of Kent St Weir closes Canning River for several months

1992
Major hydrocotyle infestation above Kent St Weir

2008
Introduced Anchor worm first found in Canning River

2013
- Samphire communities impacted by freshwater flow from drainage systems (listed as vulnerable under EPBC)
- Introduced Pearl Cichlid first found in the upstream Canning River

2015
Introduced Pearl Cichlid first found in the Canning estuary

2018
- Carters Freshwater Mussel listed as vulnerable
- Lamprey found upstream of Kent St Weir

2020 - CURRENT Toxic dinoflagelate Alexandrium in Canning estuary

Alexandrium temporarily closes fishing in Canning estuary

PRESSURES ON THE CANNING RIVER AND ESTUARY

Cultural Knowledge and access

Traditional knowledge has been displaced from its central position on how the river is managed and is at risk of being lost as Noongar Elders pass away. Land tenure and current management limit Traditional Owner access to fulfil cultural responsibilities and undertake customary practices that help keep Country healthy.

Natural vegetation clearing

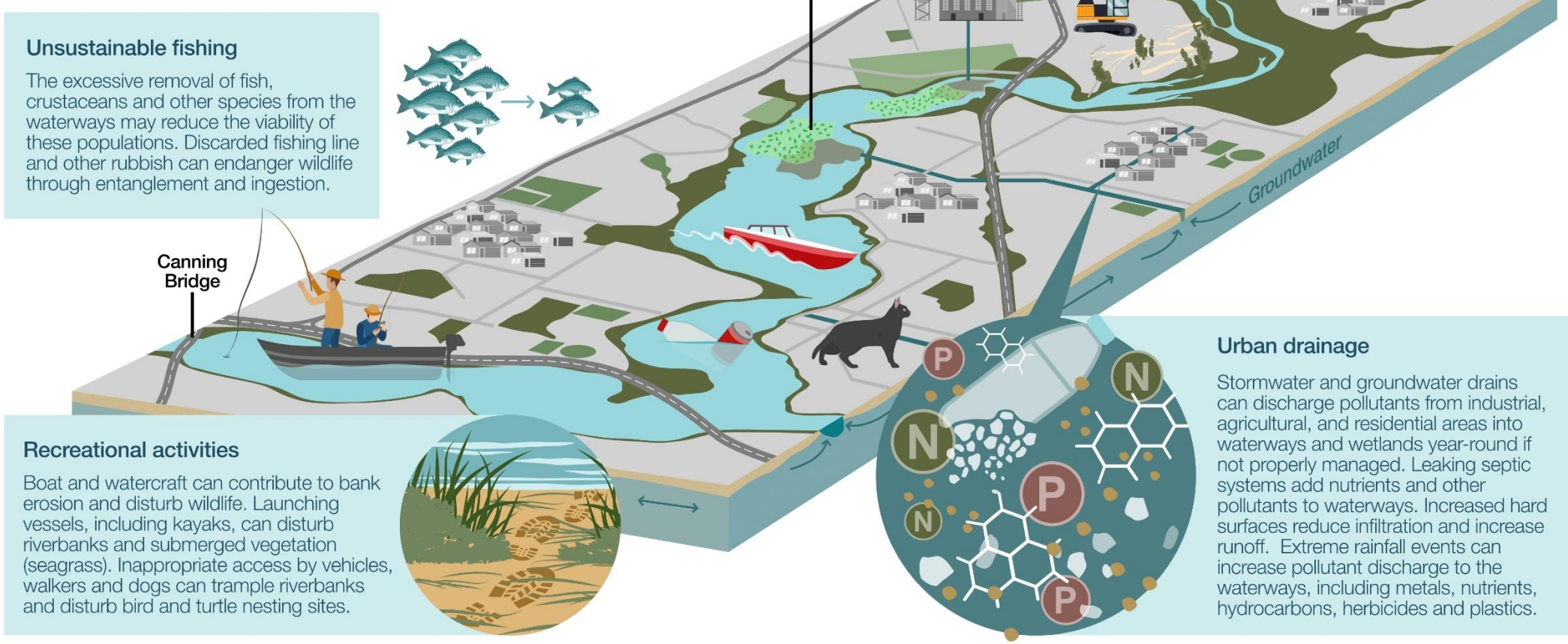
Natural vegetation clearing along waterways has degraded foreshores contributing to poor water quality, increased erosion, invasion by weeds and loss of critical habitat.

Climate change

Climate change is reducing rainfall and riverine flows while increasing temperatures, sea level, storm surges and occurrences of summer rainfall events. Climate change is expected to impact water quality, habitat availability and hydrology, including making the waterway saltier.

Unsustainable fishing

The excessive removal of fish, crustaceans and other species from the waterways may reduce the viability of these populations. Discarded fishing line and other rubbish can endanger wildlife through entanglement and ingestion.

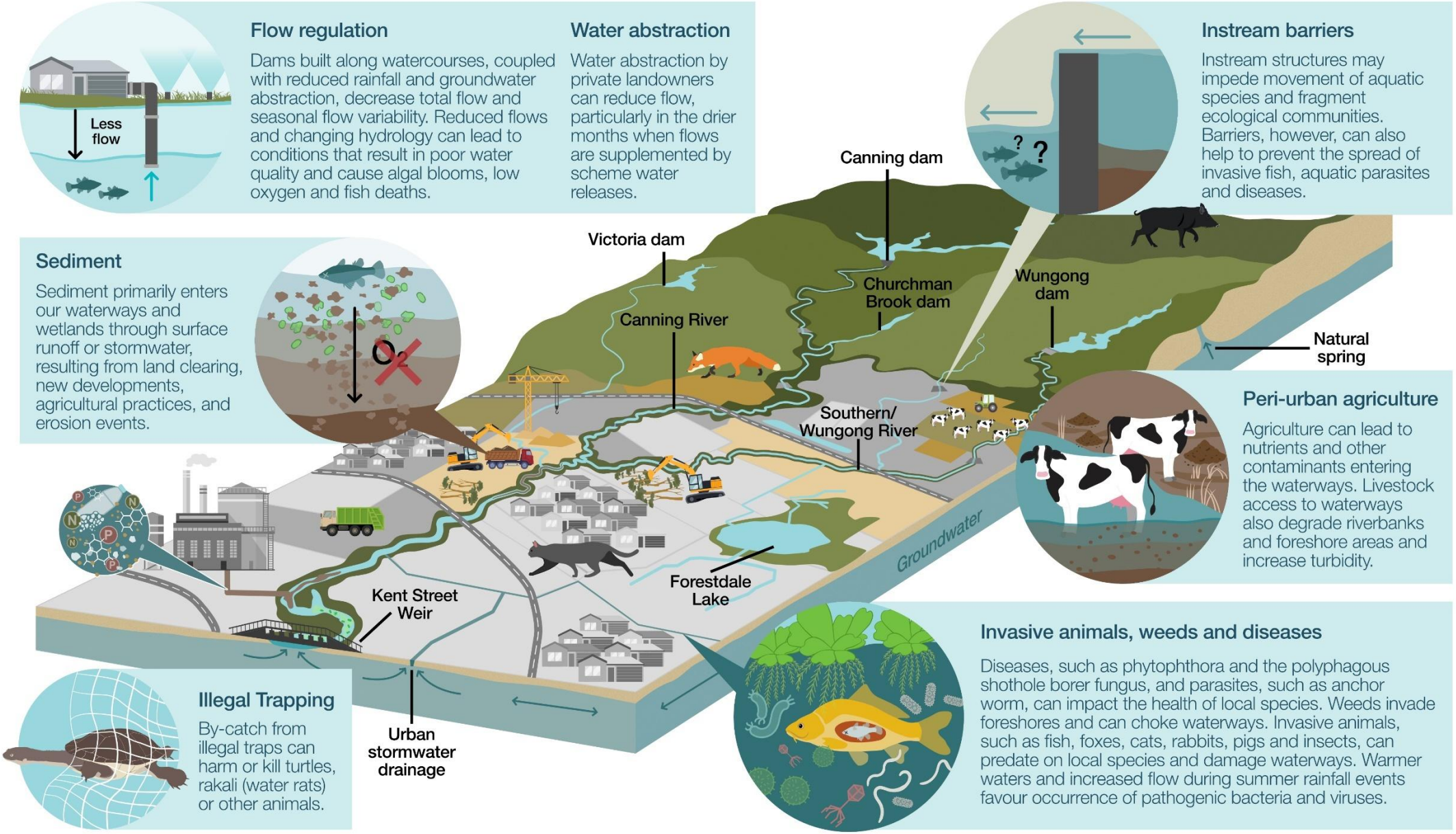


Recreational activities

Boat and watercraft can contribute to bank erosion and disturb wildlife. Launching vessels, including kayaks, can disturb riverbanks and submerged vegetation (seagrass). Inappropriate access by vehicles, walkers and dogs can trample riverbanks and disturb bird and turtle nesting sites.

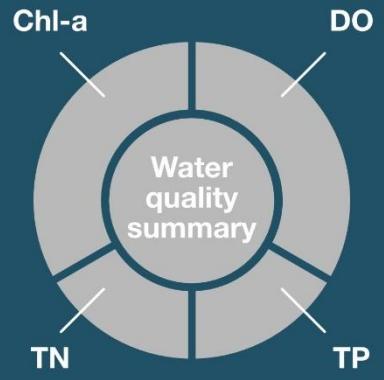
Urban drainage

Stormwater and groundwater drains can discharge pollutants from industrial, agricultural, and residential areas into waterways and wetlands year-round if not properly managed. Leaking septic systems add nutrients and other pollutants to waterways. Increased hard surfaces reduce infiltration and increase runoff. Extreme rainfall events can increase pollutant discharge to the waterways, including metals, nutrients, hydrocarbons, herbicides and plastics.


Less flow
Flow regulation
Dams built along watercourses, coupled with reduced rainfall and groundwater abstraction, decrease total flow and seasonal flow variability. Reduced flows and changing hydrology can lead to conditions that result in poor water quality and cause algal blooms, low oxygen and fish deaths.
Water abstraction
Water abstraction by private landowners can reduce flow, particularly in the drier months when flows are supplemented by scheme water releases.
Instream barriers
Instream structures may impede movement of aquatic species and fragment ecological communities. Barriers, however, can also help to prevent the spread of invasive fish, aquatic parasites and diseases.
Canning dam
Victoria dam
Churchman Brook dam
Wungong dam
Canning River
Natural spring
Sediment
Sediment primarily enters our waterways and wetlands through surface runoff or stormwater, resulting from land clearing, new developments, agricultural practices, and erosion events.
Southern/ Wungong River
Peri-urban agriculture
Agriculture can lead to nutrients and other contaminants entering the waterways. Livestock access to waterways also degrade riverbanks and foreshore areas and increase turbidity.
Groundwater
Forestdale Lake
Kent Street Weir
Urban stormwater drainage
Illegal Trapping
By-catch from illegal traps can harm or kill turtles, rakali (water rats) or other animals.
Invasive animals, weeds and diseases
Diseases, such as phytophthora and the polyphagous shothole borer fungus, and parasites, such as anchor worm, can impact the health of local species. Weeds invade foreshores and can choke waterways. Invasive animals, such as fish, foxes, cats, rabbits, pigs and insects, can predate on local species and damage waterways. Warmer waters and increased flow during summer rainfall events favour occurrence of pathogenic bacteria and viruses.

WATER QUALITY SUMMARY

Calculated from surface water quality monitoring in the Swan Canning river system in 2016-2020 (Jan - May).



Good: >75% of samples achieved target

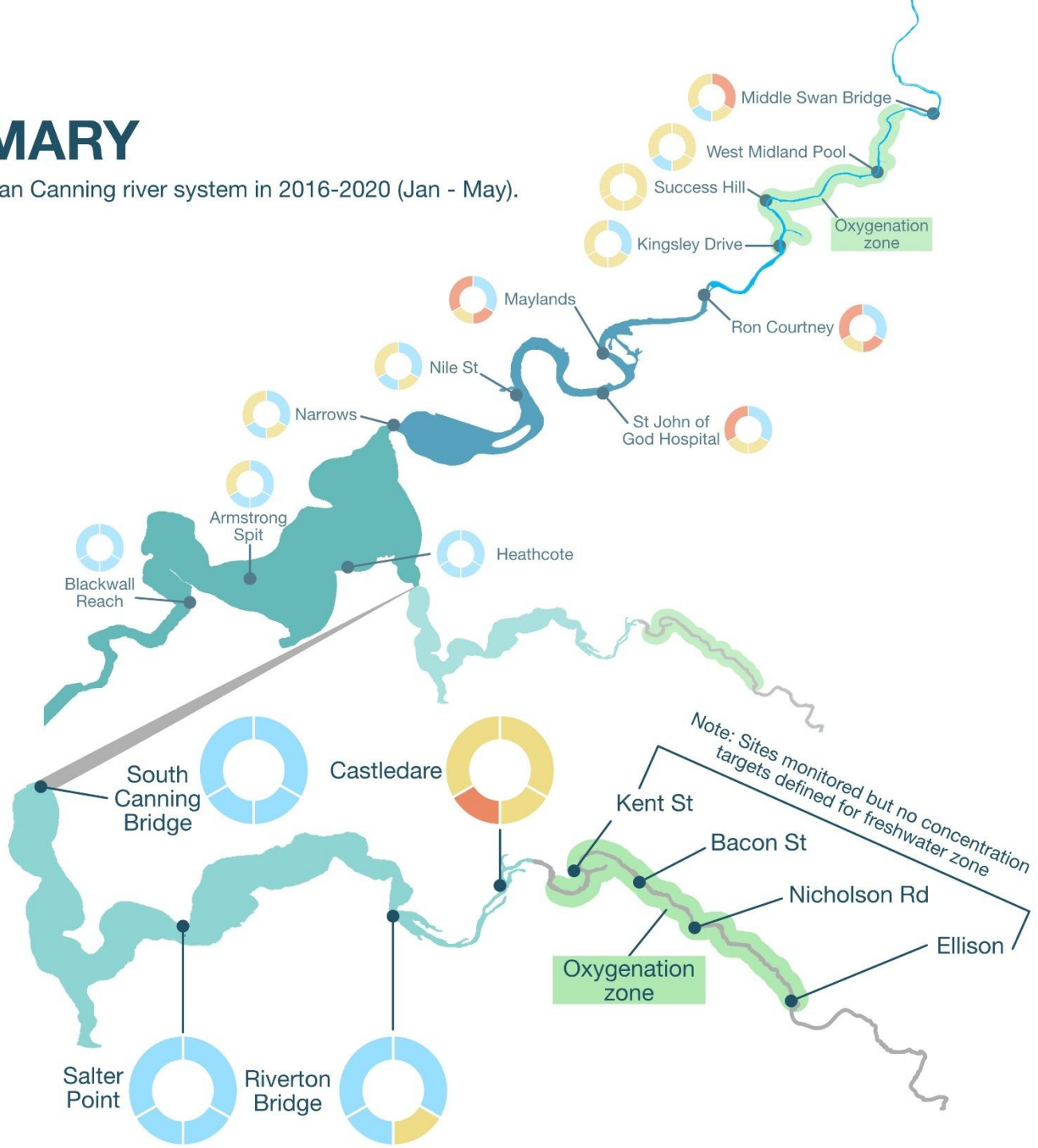
Fair: 25-75% of samples achieved target

Poor: <25% of samples achieved target

Concentration targets for zones of waterway (SRT, 2003):

	TN ug/L	TP ug/L	Chl-a ug/L	DO %
LSC	509	58	3.55	82.1
MS	790	110	8.75	75.1
US	1009	119	19.98	81.2
CE	790	190	11.67	49.2

TN = Total nitrogen; TP = Total phosphorus;
Chl-a = Chlorophyll a; DO = Dissolved oxygen



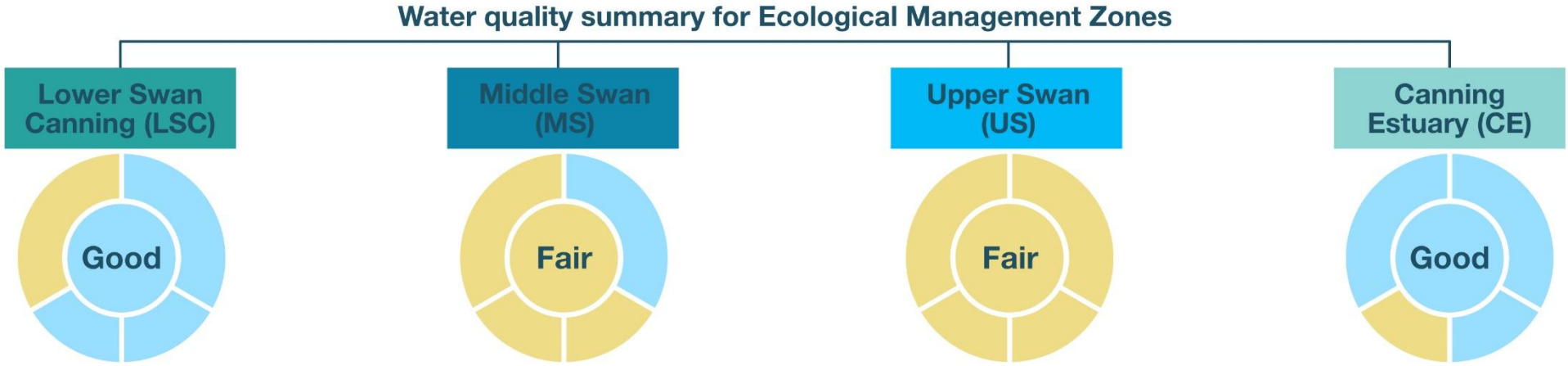
How is the Water Quality summary calculated?

Surface water quality results for four parameters were compared against targets (SRT, 2003) for four ecological management zones in the Swan Canning system for the 2016-2020 Jan-May compliance period.

The four parameters are total nitrogen (TN), total phosphorus (TP), dissolved oxygen (DOx), and chlorophyll-a (Chl-a), which is an indicator of algal biomass. Excess nutrients and organic material entering the waterways drive algal blooms and can lower DOx, affecting aquatic life.

In the Canning, water quality was measured fortnightly across eight sites (highlighted) during the compliance period, but only four of those had targets for comparison. At two of those sites, >75% of samples met the specified target for all parameters. Castledare scored the poorest of the four Canning Estuary sites assessed in this way.

Water quality was summarised for each ecological management zone based on the averaged per cent compliance for each site within the zone. Relative to the targets (SRT,2003), the Canning Estuary zone (CE) scored fair overall.



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NUTRIENT LOAD CONTRIBUTIONS OF THE CANNING CATCHMENTS

Canning River Catchment

2016-2020 nutrient load (tonne/year) contribution:

High: > 5%

Moderate: 1% to 5%

Low: <1%

G = Gauged catchment

E = Ungauged model estimated catchment

1. Bannister Creek (G)
2. Bayswater Brook (G)
3. Belmont Central (E)
4. Bennett Brook (G)
5. Blackadder Creek (E)
6. Bull Creek (E)
7. CBD (E)
8. Claisebrook Main Drain (E)
9. Downstream (E)
10. Ellen Brook (G)
11. Ellis Brook (E)
12. Helena River (G)
13. Helm Street Drain (E)
14. Henley Brook (E)
15. Jane Brook (G)
16. Lower Canning (E)
17. Maylands Main Drain (E)
18. Millendon (E)
19. Mills Street Main Drain (G)
20. Munday Bickley (E)
21. Perth Airport North (E)
22. Perth Airport South (E)
23. Saint Leonards Creek (E)
24. South Belmont (G)
25. South Perth (E)
26. Southern River (G)
27. Susannah Brook (G)
28. Upper Canning River (G)
29. Upper Swan (E)
30. Yule Brook (G)

TOTAL NITROGEN

Average annual total nitrogen (TN) load contribution from 2016 to 2020.

Average TN from all Swan Canning Catchments is 188.4 tonnes/year and total from Avon Catchment is 353.8 tonnes/year.

Nutrients enter the waterways from the catchment

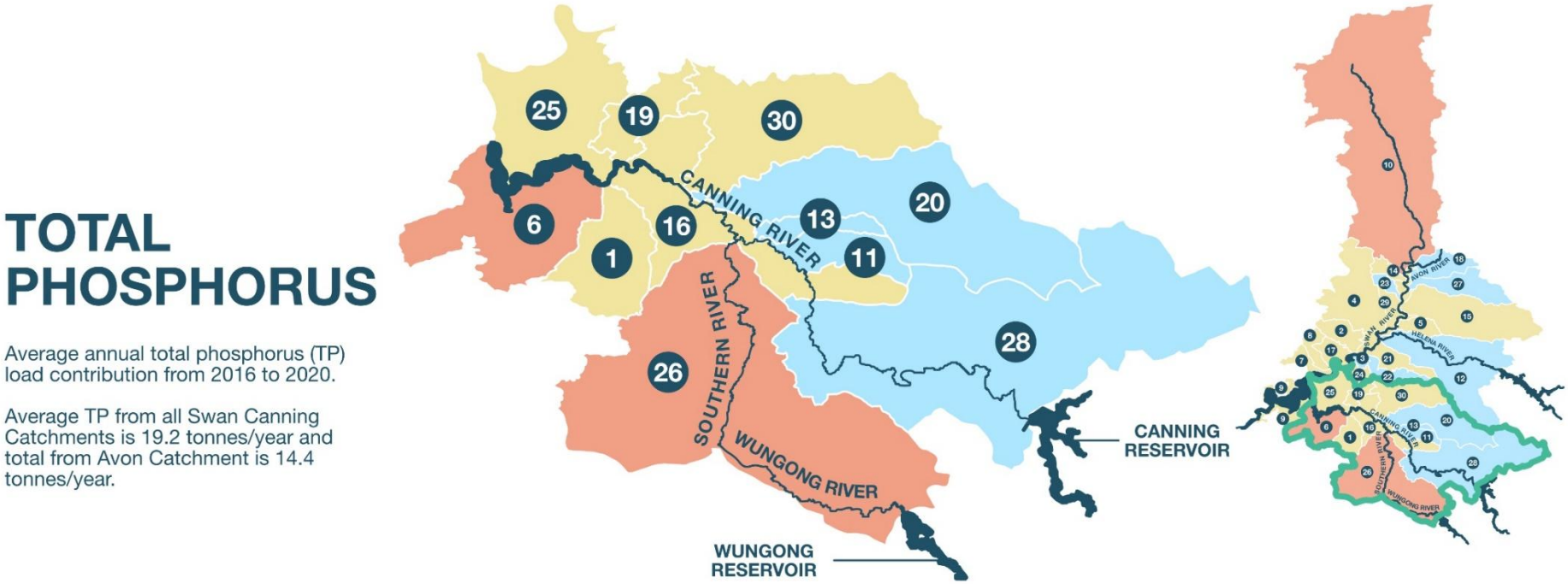
Most nitrogen and phosphorus entering the waterways originate from intensive land uses in the catchment. These include fertiliser use across residential areas (gardens), recreational spaces (public open spaces, sports ovals, golf courses) and farming operations (commercial crops and pasture) (SRT, 2009). Septic tanks in residential and industrial areas can also be a source of nutrients entering the waterways via the groundwater.

The infographic shows the nutrient load contributions from each subcatchment relative to the overall nutrient loading to the Swan Canning system.

Nutrient loads for each subcatchment are calculated from nutrient concentrations and flow. In subcatchments where flow is not measured, nutrient loads are estimated through sophisticated modelling.

Besides the Avon catchment (not shown), Ellen Brook contributes the highest nutrient loads of all the Swan Canning subcatchments, providing 19% (TN) and 41% (TP) respectively.

In the Canning waterways, the Southern-Wungong subcatchment was the highest contributor of TN (14%) and TP (8%), with the Bull Creek subcatchment close behind.



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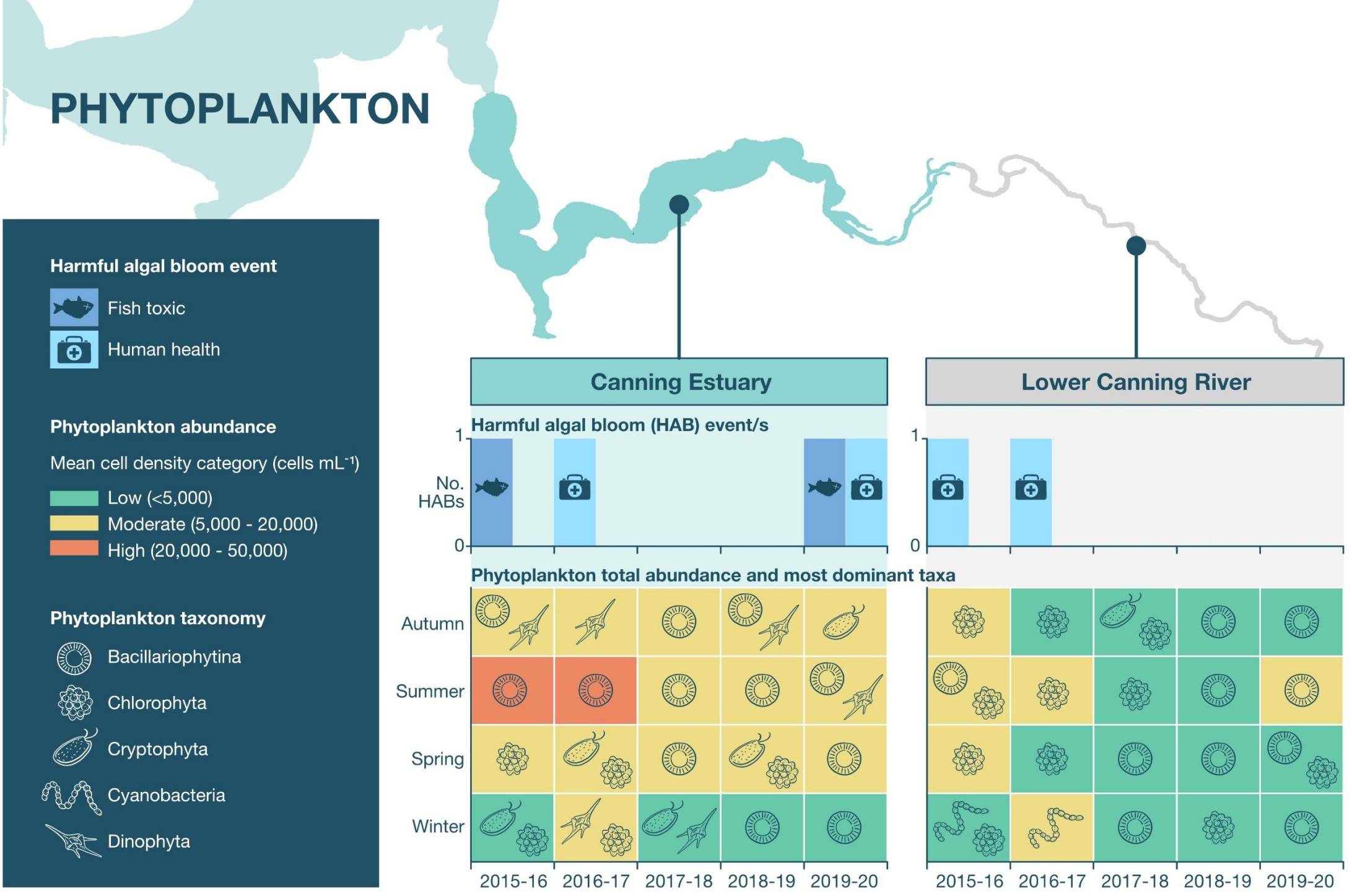
PHYTOPLANKTON

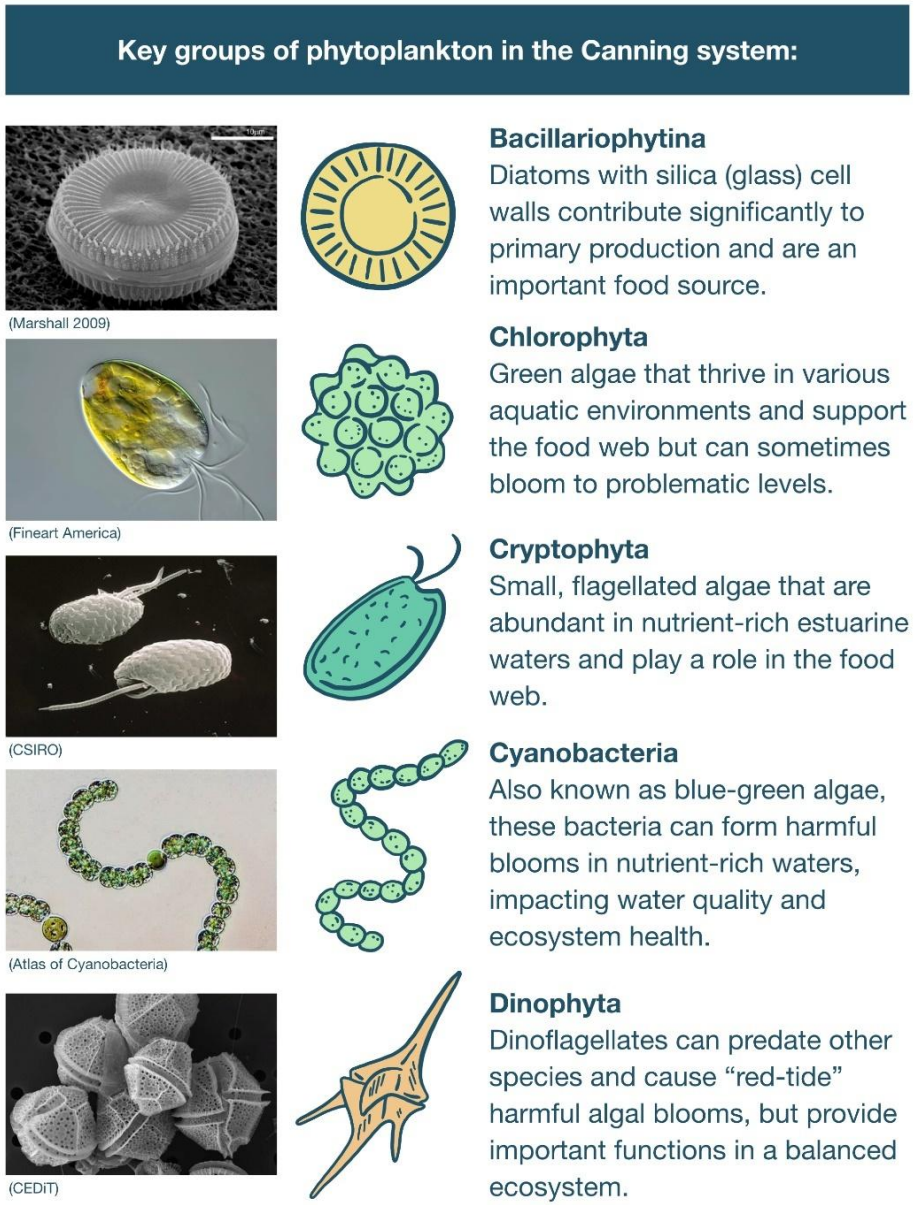


Phytoplankton and algal blooms

Phytoplankton are microscopic organisms found in suspension throughout the water column, often just a single cell. Some swim, some get carried by the currents, but all are like plants, catching light to photosynthesise. They are a critical component of the ecology of aquatic systems but can become problematic when excessive growth occurs, forming blooms. Blooms are often a result of excess nutrients.

DCBA undertook weekly phytoplankton monitoring at four sites in the Canning Estuary and four sites in the Lower Canning River. Samples were evaluated to the number of cells and identified the species present. The infographic gives a representation of the cell density for each season and which type of phytoplankton was most dominant. Overall, winter tends to experience the lowest densities while summer has the highest. There has also been a general transition in phytoplankton species composition, with chlorophytes (green algae) decreasing and Bacillariophytina (diatoms) increasing in both the estuarine and freshwater zones of the Canning system.

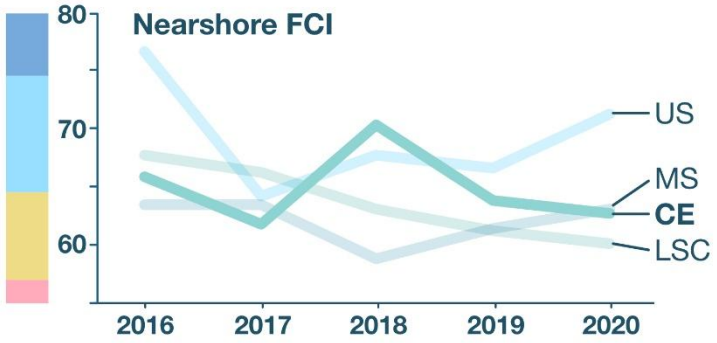
Harmful algal bloom events can sometimes present a risk to fish or human health. Blooms that required significant management response have been presented. Although there were six harmful algal blooms recorded between 2015 and 2020, no fish kill events or human illnesses linked to these blooms.

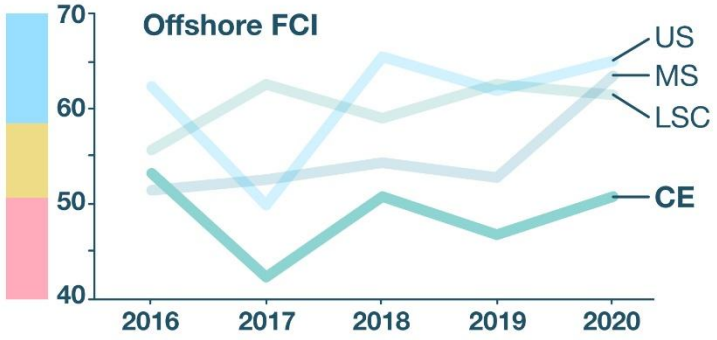


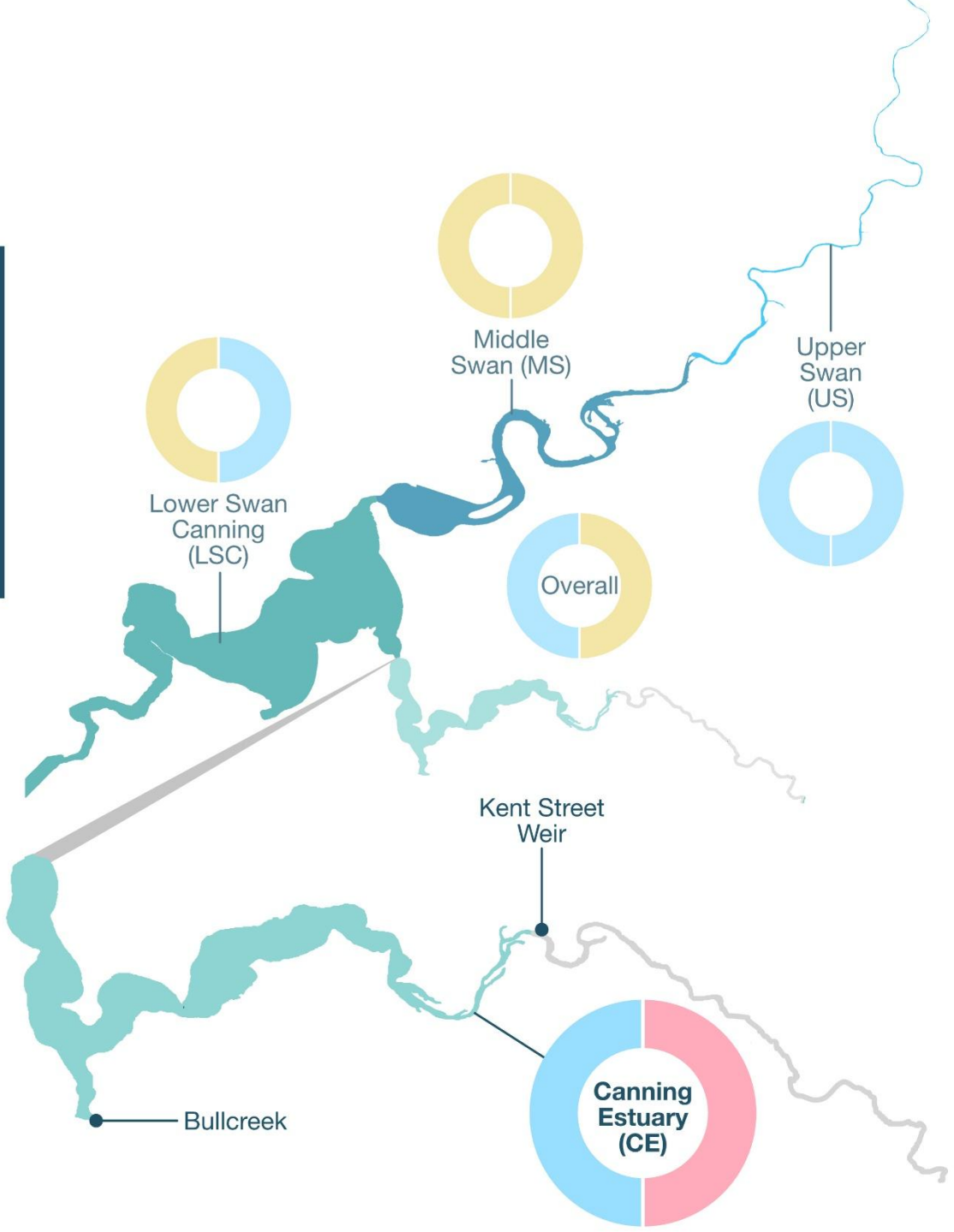
FISH COMMUNITIES

Based on Fish Community monitoring from 2016-2020 (Murdoch University).

Ecological condition	Nearshore FCI Scores	Offshore FCI Scores
Very good	>74.5	>70.7
Good	64.6 - 74.5	58.4 - 70.7
Fair	57.1 - 64.6	50.6 - 58.4
Poor	45.5 - 57.1	36.8 - 50.6
Very poor	<45.5	<36.8







Fish communities in the Canning Estuary

A Fish Community Index (FCI) is used to monitor fish communities in the broader Swan Canning Estuary. Fish communities are monitored twice annually (in spring and autumn) and the index is calculated separately for nearshore (< 1.5m deep) and offshore areas (> 1.5m deep) because the fish and method of sampling differ for these two areas.

The infographic shows the FCI scores for nearshore and offshore areas (averaged across 2016-2020) for the four ecological management zones (Canning Estuary – CE; Upper Swan – US; Middle Swan – MS; and Lower Swan Canning – LSC) and the estuary overall.

The Canning Estuary is highlighted relative to the other ecological management zones and scores poorly in offshore areas. The line plots show the offshore FCI scores were consistently low in the Canning for the period 2016-2020, relative to other ecological management zones. By comparison, the nearshore areas of the Canning Estuary scored good overall.

Further investigation is being undertaken to understand the consistently poor offshore FCI scores in the Canning Estuary.

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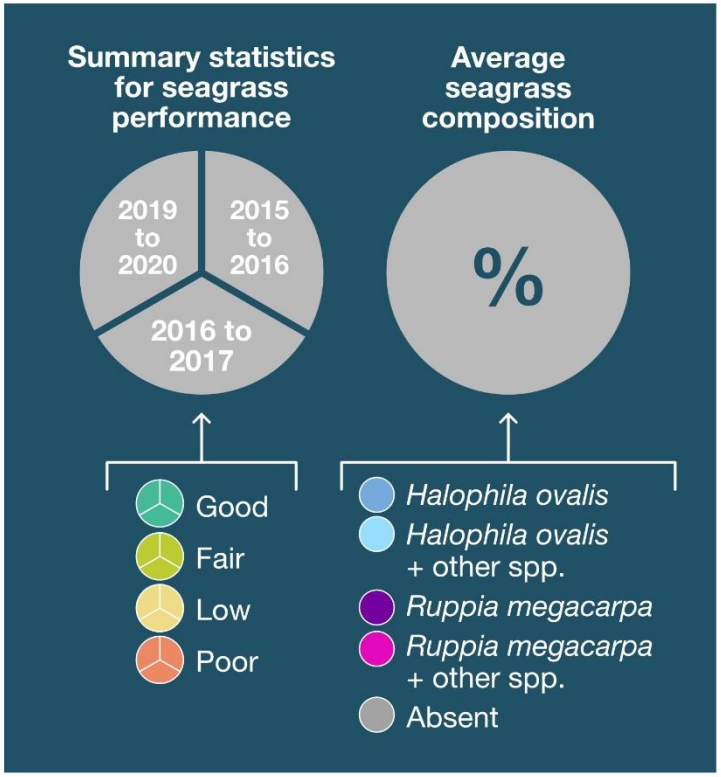
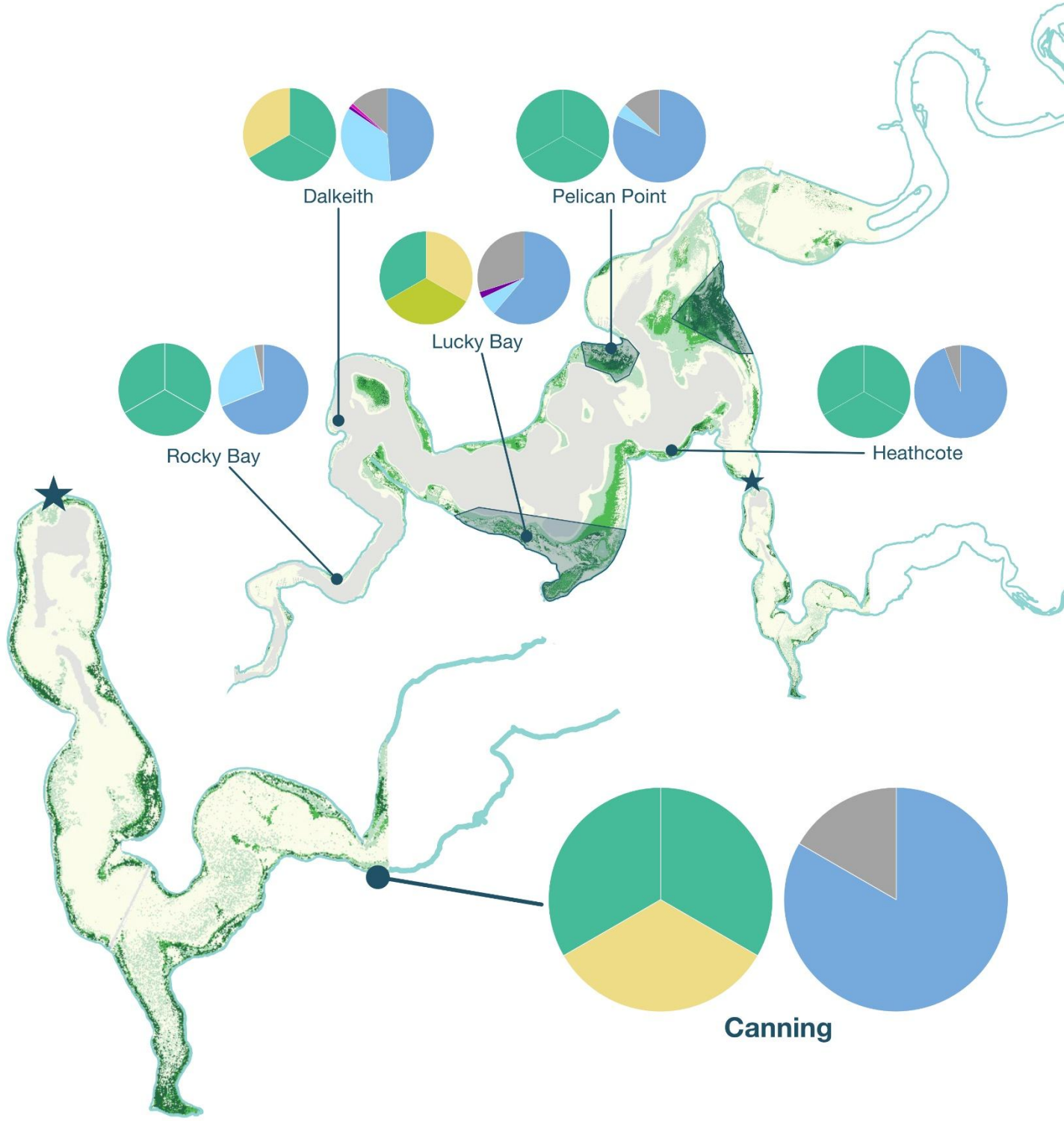
SEAGRASS





Seagrass distribution in 2019:

- Seagrass sparse
- Seagrass medium
- Seagrass dense
- Sand
- >5m depth (not processed)

Swan Estuary Marine Park

Why are seagrasses important?

Seagrasses are aquatic flowering plants with leaves, roots and rhizomes. As photosynthetic plants, they form the base of the food chain, supporting a range of species including macroinvertebrates, fish, crabs and birds. They provide habitat, take up nutrients and store carbon. As they are rooted into the sediment, they also need good sediment conditions and water quality to survive. As a result, changes in the distribution and amount of seagrass can indicate changes in estuary health.

Halophila ovalis monitoring. *Photo - DBCA*

Seagrass performance and distribution

The main seagrass found in the Canning Estuary is *Halophila ovalis*. In 2019, system wide mapping combined survey data and satellite imagery to produce an interim map of seagrass distribution. Based on this map, seagrass is estimated to cover around 6km^2 of the broader Swan Canning estuary. Its distribution is limited to the lower reaches of the Swan and Canning system due to favourable salinity and light conditions.

Seagrass performance for the Canning Estuary relative to the Swan estuary shows the Canning scored “good” in two-thirds of the monitoring years. Seagrass performance is determined by presence, cover and reproductive metrics. Lower scores in 2016-2017 are likely to have been the result of a significant rainfall and flooding event in February 2017.

Seagrass distribution monitoring. *Photo - DB*CA

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HEAVY METALS EXCEEDING GUIDELINES

Based on sediment monitoring in Djarlgarro Beeliar in 2007 (Nice, 2009) and 2015 (Novak and Hoeksema, 2022)

2007 average metal concentration (± standard error)

2015 average metal concentration (± standard error)

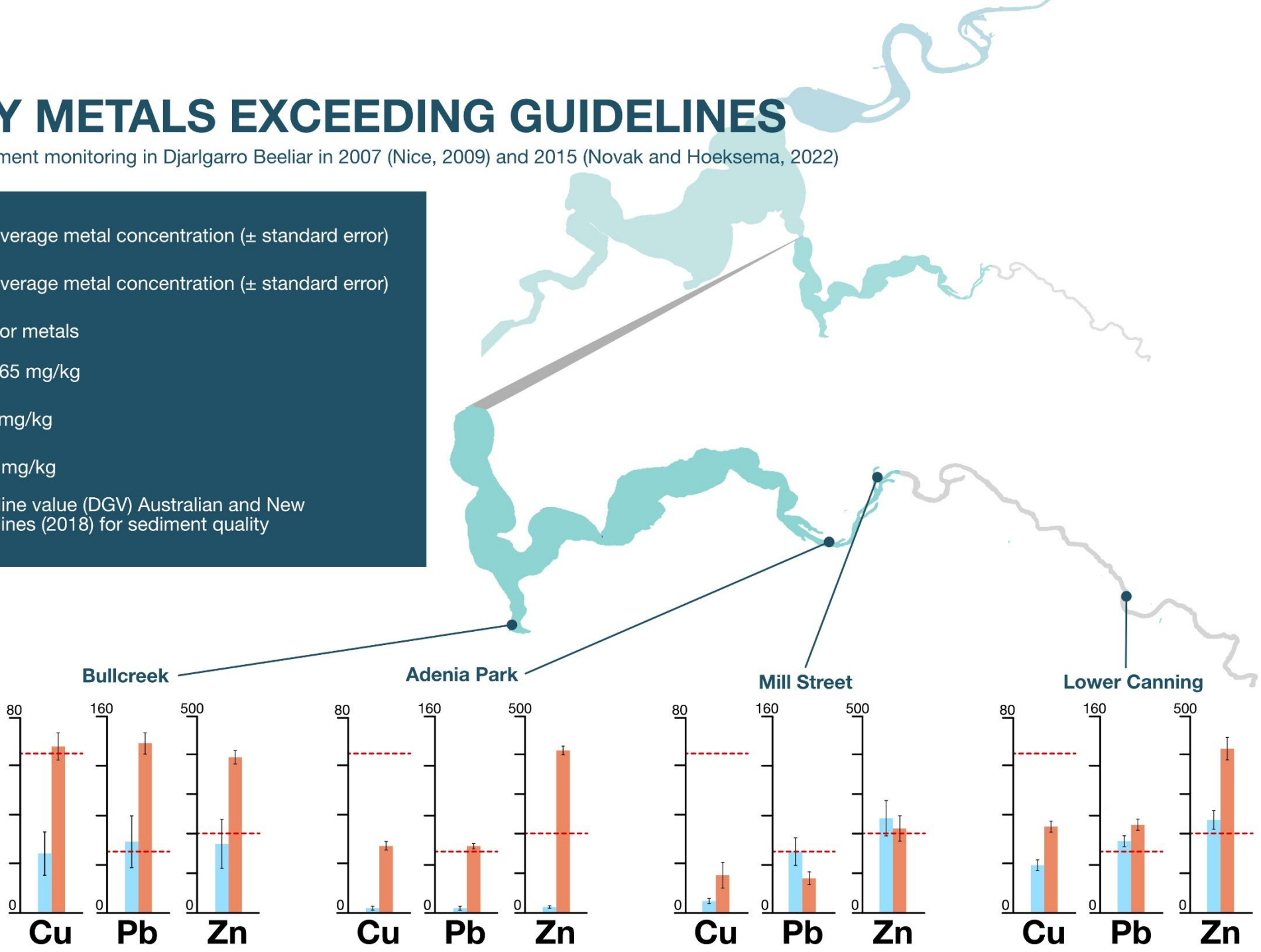
DVG* for metals

Copper (Cu) - 65 mg/kg

Lead (Pb) - 50 mg/kg

Zinc (Zn) - 200 mg/kg

* Default guideline value (DGV) Australian and New Zealand Guidelines (2018) for sediment quality



Heavy metals in the waterways

Sediment contaminant levels are periodically evaluated at a range of sites across the Djarlgarro Beeliar (Canning River) system, with surveys undertaken in 2007 and 2015.

A report comparing results across those two time periods (Novak and Hoeksema 2022) identified where contaminants were above the Australian and New Zealand Environment and Conservation Council (ANZECC) toxicant default guidelines for sediment quality (ANZG, 2018).

The ANZECC guidelines indicate the maximum concentrations acceptable to ensure the protection of aquatic ecosystems and should be used along with other information.

While sediment contaminant levels have decreased in many parts of Derbal Yirragan Beeliar (the Swan Canning river system), the sediment concentration of some heavy metals (Copper, Lead, and Zinc) generally increased at four sites in Djarlgarro Beeliar (Canning River) and, in some cases, to above guideline levels. The infographic shows these sites.

Management actions need to be undertaken to better understand the source of contamination and determine mitigation responses to reduce contamination to below ANZECC guideline levels.

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Revitalising Djarlgarro

The following actions have been developed through extensive engagement with stakeholders, including Whadjuk Ancestral Custodians, NRM groups, community groups, LGs, and State Government agencies. Over a three-year period, this process involved a series of one-to-one stakeholder meetings, 12 Working Group meetings and 18 Whadjuk Djarlgarro subcommitee meetings, including reflection workshops, vision setting, identification of knowledge gaps, and determination of issues and responses. The stakeholder engagement process identified both value-based and pressure-based knowledge gaps which were prioritised by the Working Group and DBCA. A knowledge gap occurs when an issue or topic identified by stakeholders requires further investigation to determine appropriate management actions.

The Djarlgarro Plan follows the RPS objectives and strategies to protect the values of catchment, water, biodiversity, foreshore, lifestyle, culture and connection to nature, and promote the enablers of sustainable resourcing, collaboration, policy and planning, and applied knowledge and evaluation. The issues and threats affecting these values and enablers in Djarlgarro are summarised, and actions identified. For the Culture value, the Djarlgarro Plan's objectives, strategies and actions have been co-created with the Whadjuk Aboriginal Corporation subcommittee and differ from the RPS objectives and strategies.

Unless marked, the actions in the Djarlgarro Plan (including the knowledge gaps), are currently not funded and require additional resources to be delivered. Partially or fully funded actions are denoted using the symbols below. In 2023, $10 million was secured through the Commonwealth Government's Urban Rivers and Catchments Program for delivery of several priority actions in the Djarlgarro Plan.

* Partially or fully funded initiative

^ Partially or fully funded under the Urban Rivers and Catchments Program.

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Healthy River System

CATCHMENT

Objective 1: Manage the catchment to protect biodiversity, ecological integrity, waterways and wetlands.

Urban development

Greenfield and infill development in the Canning, Southern and Wungong catchments are continuing at a rapid rate. Development can result in **increased nutrients, sediment and NNC entering waterways** if mitigating measures and appropriate water sensitive design (WSD) are not implemented, particularly in areas with high groundwater like in the Southern River Catchment.

Water quality

Rural, industrial and urban development in the catchment has led to a deterioration of water quality in the waterways, which impacts on the health of aquatic ecosystems. For example, when oxygen levels in bottom waters decrease, nutrients and other contaminants are released into the water column from sediments, potentially leading to human health impacts and localised issues, including toxic algal blooms and fish kills.

Water quality is influenced by a range of factors including:

- Nutrients (e.g. phosphorus, nitrogen)
- Sediment
- NNC (e.g., heavy metals, pesticides, other chemicals, and gross pollutants)
- Dissolved oxygen
- Organic matter

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- Pathogens and bacteria
- Temperature
- pH

Currently, there are limited direct control options to moderate algal blooms in the river, or to reduce the severity of algal blooms once they occur, without negatively impacting other elements of the ecosystem. Therefore, nutrient management and building ecosystem resilience is important to reduce the prevalence of algal blooms.

Nutrients

Excess nutrients (phosphorus, nitrogen, and carbon) enter the waterways from a wide range of diffuse agricultural, urban, industrial, and domestic sources.

In 2020, all priority sub-catchments in the Canning Catchment met the total phosphorus (TP) targets, except Southern River and Mills St Main Drain. All sub-catchments failed the total nitrogen (TN) targets (except the Upper Canning sub-catchment), data not shown.

Scientific modelling, decision support tools, and scenario assessment are required to identify the most **cost-effective management decisions** to address the nutrient sources and improve water quality.

Sediment

Rivers are dynamic systems and minor erosion of riverbanks is a natural waterway process. **However, erosion** of cleared slopes in the catchments and **soil erosion from poorly managed urban development** (land clearing, subdivision, industrial and residential building, transport infrastructure) have significantly increased **the amount of sediment** in the Canning waterways.

Coupled with the **loss of scouring river flows** since the construction of the dams, and **rainfall decline**, sediments build up and **fill deep river pools**, destroying critical habitat, altering flow regimes, disrupting aquatic ecosystems and minimising the effectiveness of the river releases in meeting their objectives. Aquatic weeds can then colonise sediment deposits, stabilising them and making them harder to manage.

The current state of **complex aquatic habitat** throughout the river system is not known. A better understanding of assessing, categorising, and prioritising river pools for restoration, including the most appropriate methods to stabilise sediment, improve sediment quality or remove sediment is required.

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Non-nutrient contaminants

A range of NNC enter the rivers from the catchments. These include heavy metals, pesticides, perfluoroalkyl and polyfluoroalkyl substances (PFAS), and gross pollutants such as plastics. These contaminants can accumulate in sediments and animal tissue, and over many years, pass through food chains, causing long-term contamination of food webs.

Diffuse source pollution from various land uses, including light industry, contributes contaminants to the drainage networks. Currently, DWER focuses its resources on businesses licensed under the *Environmental Protection Act 1986* and does not focus on regulating unauthorised discharges by **light industry operators** (OAG, 2020).

DWER requires the assistance of Local Governments to enforce the **Unauthorised Discharge Regulations 2004**); however, Local Government participation in the **Light Industry Program** (LIP) and **Authorised Officer Program** (AOP) is voluntary and often seen to be the role of State Government. Local Governments have limited capacity and resources to enforce these regulations.

Disused **waste disposal sites** can also be a point source of contaminants entering the waterways.

Sediment from a residential estate in the Wungong Catchment. *Photo - DBCA*

Light Industry Audit Officers. *Photo courtesy of DWER*

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Swimming at Kent Street Weir in the late 1920s.
Photo courtesy of City of Canning

Degradation and loss of wetlands

Wetlands on the Swan Coastal Plain have been significantly affected by urban, industrial and agricultural development, with the cumulative impact of development resulting in **less than 20 per cent of wetlands remaining** (DWER, 2022). Wetlands play a vital role in maintaining or improving water quality in the waterways, as water refuges during dry conditions, and as critical habitats for life cycle stages of aquatic species.

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CATCHMENT

Objective 1: Manage the catchment to protect biodiversity, ecological integrity, waterways and wetlands.

Strategy 1: Update and implement water quality improvement plans, including the Swan Canning Water Quality Improvement Plan.	Lead	Support
Action 1.1 Develop a high-resolution distributed catchment-urban hydrology model for the Southern River Catchment to simulate water balance in areas of high groundwater flow. ^	DBCA	DWER, LG
Action 1.2 Update and implement local water quality improvement planning, informed by the Light Industry Program (LIP) and water quality monitoring, identifying pollution hotspots and priority intervention sites to reduce contaminants entering the waterways. *	DBCA	Working Group members
Action 1.3 Subdivision and development is connected to reticulated sewerage where required in accordance with SPP 2.9.	LG, WAPC	DBCA, DWER
Knowledge gap 1.4 Investigate the impact of septic systems in unsewered urban and industrial areas on groundwater quality adjacent to Djarlgarro (eg Southern River, Mills St Main Drain and Bickley Brook).	Research institutions	DBCA, DWER

* Partially or fully funded initiative

^ Partially or fully funded under the Urban Rivers and Catchments Program

Knowledge gap 1.5 Further develop existing hydrological and nutrient modelling to better understand nutrient sources, climate change impacts, surface water and groundwater flow and to assess the cost/benefit of a range of nutrient management approaches (including at-source management, water sensitive design [WSD] and infill sewerage).	DBCA	DWER, research institutions
Strategy 2: Implement and maintain water sensitive design in new urban and industrial developments, to ensure development and changes in land use and transport systems prevent pollutant export to waterways and wetlands and maintain the surface water and groundwater balance of waterways and wetlands.	**Lead**	**Support**
Action 2.1 Promote the implementation of an 'at-source' WSD approach by proponents of all planning and development proposals, aiming to reduce nutrients and other pollutants entering stormwater, groundwater, waterways and wetlands.	DWER, LG	DBCA, DPLH, Water Corporation
Knowledge gap 2.2 Further investigate the best WSD approaches (including at-source stormwater management, soil amendments, subsoil drainage management, dewatering management, revegetation) to reduce nutrient, non-nutrient and sediment transport and improve water balance in sites with shallow groundwater and heavy soils (Southern and Wungong rivers catchment areas) and identify where these should be targeted. *^	Research institutions	DBCA, DWER

* Partially or fully funded initiative

^ Partially or fully funded under the Urban Rivers and Catchments Program

Strategy 3: Identify pollution sources, ensure compliance with legislation and implement actions to reduce contaminants entering waterways and wetlands.	Lead	Support
Action 3.1 Examine non nutrient contaminant (NNC) data collection and management systems to: • ensure efficient intelligence and compliance sharing. • adopt new work practices that improve responsiveness to NNC complaints.	DWER	LG
Action 3.2 Help light industry operators identify and mitigate the risks of minor pollution by reviewing and disseminating educational material that offers best practice examples and cost-effective solutions.	DWER	LG
Action 3.3 Assist LGs to implement Unauthorised Discharge Regulations and review and revise the LIP, including: • Identifying additional sources of funding for the program. • Developing monitoring targets and performance objectives. • Reviewing partnership agreements (between DWER, NRMs and LGs) for the LIP and Authorised Officers Program (AOP). • Linking industry audits with LG catchment water quality monitoring to identify potential pollution hotspots. • Using drones and satellites for industrial site/environmental waterway monitoring (Nearmap). • Applying track and trace technologies.	DWER	DBCA, LG

* Partially or fully funded initiative

^ Partially or fully funded under the Urban Rivers and Catchments Program

Action 3.4 Continue to monitor disused waste disposal sites (including Bicentennial Adenia Park and Centenary Park) to ensure they pose a low risk to the Canning waterways and associated wetlands.	LG	DWER
Action 3.5 Repeat the 2007 (Nice, 2009) and 2015 (Novak and Hoeksema 2022) sediment contaminants assessments (including heavy metals) to determine change over time relative to catchment effort.	DBCA	DWER
Action 3.6 Undertake at-source management of gross pollutants and plastics in priority areas, including litter reduction education programs and installation and management of gross pollutant traps or other appropriate mechanisms, as required.	DBCA, LG	DWER, Water Corporation
Knowledge gap 3.7 Determine the management approaches required to reduce NNC entering the river system and how outcomes of improved management will be measured to ensure accountability and enforcement.	DBCA	DWER
Strategy 4: Develop and implement plans for targeted infrastructure retrofits throughout the catchment to improve water quality, ecological health and amenity.	**Lead**	**Support**
Action 4.1 Pilot the Thriving Perth Portal as a collaborative platform to identify and prioritise environmental improvement projects that deliver the greatest net benefit to the health of Djarlgarro, strengthening the evidence base and readiness for future funding opportunities. *	DBCA, Water Corporation	DWER, LG, Perth NRM

* Partially or fully funded initiative

^ Partially or fully funded under the Urban Rivers and Catchments Program

Action 4.2 Implement prioritised drainage retrofit and constructed wetland projects with the aim to improve urban liveability, climate resilience, greenery and water quality in priority catchments and regularly monitor and maintain existing projects to ensure maximum operating efficiency. *^	DBCA, LG, SERCUL	DWER, Perth NRM, Water Corporation
Knowledge gap 4.3 Identify the critical factors determining the effectiveness of living streams and constructed wetlands in reducing nutrient transport and provide information for LGs and other partners. *	Research institutions	DBCA, DWER, Perth NRM
Strategy 5: Retain natural vegetation and implement on-ground actions, such as planting local trees and plants throughout the catchment and restoring waterways and wetlands, to enhance ecological functions, create/extend ecological linkages between habitats and reduce urban temperatures.	**Lead**	**Support**
Action 5.1 Update and review management plan arrangements for the Ramsar listed Forrestdale Lake and other wetlands (+5 years).	DBCA	DWER, Perth NRM
Action 5.2 Undertake environmental rehabilitation projects in waterways and wetlands, including Forrestdale Lake.	DBCA, LG	Community groups, Perth NRM, SERCUL
Action 5.3 Investigate opportunities to rehabilitate the Southern and Wungong rivers, including the Wungong River/Brook between Hilbert and Haynes, through the Wungong Urban development.	DBCA, LG	Community groups, DWER, SERCUL, Water Corporation

* Partially or fully funded initiative

^ Partially or fully funded under the Urban Rivers and Catchments Program

Strategy 6: Prevent sediment mobilisation due to stock entering waterways and wetlands, vegetation clearing, and from development and building sites.	Lead	Support
Action 6.1 Secure ongoing funding for the Sediment Task Force (STF) and implement the STF's five-year strategic priorities. *	STF	DBCA
Action 6.2 Partner with LGs to ensure sediment management planning tools are applied and monitored for compliance throughout the planning approval process, including the use of Erosion and Sediment Control Plans. ^	LG, STF	DBCA
Action 6.3 Partner with peak industry bodies (Housing Industry Association and Master Builders Association) to build capacity in the housing industry for environmental best practice on new and existing development sites. *^	STF	DBCA, industry associations, LG
Action 6.4 Enforce compliance with the Unauthorised Discharge Regulations for the prevention of sediment entering waterways through the LIP and AOP.	DWER	LG
Knowledge gap 6.5 Improve understanding of sedimentation processes in the river system and the impact on river pools and aquatic habitats. Investigate the ecological and socio-cultural values at risk and the feasibility of intervention to protect those values. *^	DBCA, Whadjuk Aboriginal Corporation	Research institutions

* Partially or fully funded initiative

^ Partially or fully funded under the Urban Rivers and Catchments Program

Strategy 7: Promote and educate on sustainable gardening, land management and land development practices in urban and rural areas that protect waterways and wetlands and improve soil health.	Lead	Support
Action 7.1 Assist householders to implement waterwise and fertilise-wise practices in urban gardens to reduce nutrient export risk (aligned to Kep Katitjin – Gabi Kaadadjan: Waterwise Action Plan 3). *	DBCA, SERCUL	LG, Perth NRM, Water Corporation
Action 7.2 Public open space managers to adopt waterwise and fertilise-wise practices, including adoption of slow release, low nutrient fertilisers in public open space *	LG	DBCA, DWER, SERCUL, Water Corporation
Action 7.3 Public open space managers to evaluate the use of soil amendments to reduce phosphorus exports to waterways, wetlands, and groundwater.	LG	DBCA, DWER
Action 7.4 Public open space managers of parks, reserves and streetscapes adjacent to waterways and wetlands to adopt a policy that deciduous trees are replaced with locally endemic trees when they are removed, die or enter terminal decline to reduce organic material entering waterways and wetlands.	LG	DBCA, SERCUL

* Partially or fully funded initiative

^ Partially or fully funded under the Urban Rivers and Catchments Program

Healthy River System

WATER

Objective 2: Manage water quality and quantity to support the river system's ecological and cultural values.

Environmental monitoring

Information on the **ecological health** of the river system is required to **inform management decisions and action**. DBCA conducts weekly **water quality monitoring** at eight sites in the Djarlgarro Beeliar (Canning River) system and fortnightly in the catchments. Monitoring of hydrodynamic conditions, including salinity, oxygen content and water temperature, is used to prepare weekly water quality profile reports on the prevailing conditions in the waterway and annual water quality reports. A weekly report on **microalgae activity** levels and potential warnings for the eight sites in the Canning system is also provided to the public. Additional monitoring also occurs to inform the oxygenation program when the Kent Street Weir is closed.

LGs undertake water quality monitoring in tributaries and drainage systems. This monitoring could be better aligned with DBCA monitoring to improve efficiencies and contribute to a catchment wide dataset.

A **Fish Community Index** is used to assess the condition of nearshore and offshore fish communities as an indicator of ecosystem health in the estuary, and **triennial assessments** of river releases provide an indication of the impact of flow on fish community health in the freshwater reaches.

Seagrass performance is also monitored as an indicator of the ecological health of the estuary.

Reporting is undertaken five-yearly as part of reporting against the River Protection Strategy.

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Environmental flows

Djarlgarro Beeliar (Canning River) is a major **water source** for Perth's Integrated Water Supply Scheme (IWSS) and the Canning Dam (along with the Wungong, Victoria, and Churchman dams) store winter flows that account for most of the flow in Djarlgarro Beeliar (Canning River) and its tributaries. The Canning Dam also stores excess water pumped from Perth's seawater desalination plants. Construction of the Canning Dam, a drying climate and resulting reduced streamflow from tributaries has reduced flow in Djarlgarro Beeliar (Canning River) below the dam by nearly 100 percent (Storey et al., 2002; DoW, 2012; DWER, 2025).

Environmental water requirements (EWRs) have been determined for Djarlgarro Beeliar (Canning River) from the Araluen pumpback dam to the Kent Street Weir and include a range of seasonal, sporadic and interannual flows. EWRs have not been determined for the other dammed tributaries including the Southern River, Wungong River/Brook and Munday/Bickley Brook.

The **Middle Canning surface water allocation plan** (the allocation plan) provides **environmental water provisions (EWPs)** for Djarlgarro Beeliar (Canning River) under the *Rights in Water and Irrigation Act 1914* (RIWI Act). These are met via **river releases** that maintain baseflow and connectivity over the dry period (October to May). DWER has recently completed an Evaluation Statement for the allocation plan (DWER, 2025).

Currently, existing EWPs do not meet all the EWRs identified for the system (Radin et al., 2010) which is directly linked to low rainfall (DWER, 2025). Triennial assessments of river health suggest that river releases are sufficient to provide for aquatic biota lifecyles but the system is showing signs of ecological stress, particularly in the lower reaches of Djarlgarro Beeliar (Canning River) above Kent Street Weir (DWER, 2025). DWER recognises that allocation plans need to be adaptive, particularly given the need to respond to changing pressure from factors including climate change, to ensure EWPs adequately support ecological, economic and social requirements.

Estuarine environments sit outside of the RIWI Act and the EWRs for the **Canning Estuary** downstream of the Kent Street Weir have not been identified.

The accuracy of some **flow gauges** used to monitor the system could be improved.

Surface water abstraction

Djarlgarro Beeliar (Canning River) is used as a water source by some properties adjacent to the river, either via a **licence** to take water or a **riparian right** to water under the RIWI Act. Currently, the quantity of water used by properties with riparian rights is unknown, with abstraction (for irrigation) likely to occur during periods of low flow, when flow is provided solely by river releases.

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Alternative water sources

A **drying climate** places increased pressure on existing water sources in the Perth metropolitan area. To ensure flows are adequate to meet the environmental water requirements for the system, **alternative sources of water** may need to be further considered.

Groundwater

The influence of groundwater on the river system, particularly in relation to the drying climate, requires further investigation. The Canning, Southern and Wungong rivers had been identified as **perennial, groundwater-fed systems** prior to European settlement (Smith et al, 2002). Groundwater extraction is believed to contribute to the loss of permanent wetlands on the coastal plain.

Understanding sediment condition

Catchment inputs, stratification and anoxic conditions in bottom waters lead to the creation of **monosulphidic black oozes** (MBOs). If disturbed, MBOs can lead to the release of contaminants, rapid deoxygenation, and acidification of the water column, leading to fish deaths and an inhospitable environment for macrophyte growth. The disturbance of **acid sulfate soils** (ASS) or **contaminated sediments** also has the potential to release heavy metals or other contaminants into the waterways. Currently, there is no conclusive evidence to suggest impacts from ASS in the Canning Estuary (Kilminster, 2010).

Canning Dam under construction, 1930.
Photo courtesy of State Library of Western Australia

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WATER

Objective 2: Manage water quality and quantity to support the river system's ecological and cultural values.

Strategy 8: Monitor water quality, contaminants and measures of ecological health in the river system and review targets.	Lead	Support
Action 8.1 Review the long-term monitoring of water quality throughout the catchments to ensure it is cost-effective, efficient and coordinated, and aligns to the agreed values and existing dataset for the waterways. *	DBCA, LG	DWER
Action 8.2 Develop a holistic understanding of the lower Canning Estuary, its values, and key drivers of condition, including the extent of monosulphidic black oozes (MBOs), where they occur and the best approach to their management.	DBCA	Research institutions
Action 8.3 Continue to monitor fish communities using the Fish Community Index in the Canning Estuary and investigate the drivers of low scores. *	DBCA	Research institutions
Action 8.4 Continue to report on the condition of seagrass in the system and investigate stressors. *	DBCA	Research institutions

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Knowledge gap 8.5 Review existing water quality indicators and targets to ensure they: • Reflect the objectives for the waterway. • Identify other indicators, where appropriate. • Are presented in an appropriate framework for the community. *	DBCA	DWER, research institutions
Knowledge gap 8.6 Identify the critical tipping points for significant species loss (including threatened species and Threatened Ecological Communities).	DBCA	DWER, research institutions
Strategy 9: Determine and provide, where possible, the water regime required to protect ecological and cultural values of waterways, including the provision of water flows and the installation of adaptation measures.	**Lead**	**Support**
Action 9.1 Evaluate the risks to waterway and wetland ecosystems of not meeting the existing environmental water requirements (EWRs), including overbank flows, submergence of emergent vegetation, and inundation of instream benches, mid-bank vegetation, and shallow backwaters.	DBCA, DWER	Research institutions, Water Corporation
Action 9.2 Work with partners to investigate cultural flow opportunities for the system.	DBCA, Whadjuk Aboriginal Corporation	DWER, Water Corporation

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Action 9.3 Determine the location and number of properties abstracting water from Djarlgarro (the Canning, Southern and Wungong waterways) (including groundwater reserves) without a licence or riparian rights and consider options for the removal of water abstraction infrastructure from the waterways.	DBCA, DWER	LG
Knowledge gap 9.4 Further investigate the use of treated wastewater as a climate-independent source of fit-for-purpose water for a range of consumptive, amenity, and environmental uses.	Research institutions	DBCA, DoH, DWER, Water Corporation,
Knowledge gap 9.5 Evaluate the water requirements to meet spatial and temporal needs for the Djarlgarro freshwater system and floodplain (Canning, Southern and Wungong), taking into consideration the changing climate.	Research institutions	DBCA, DoH, DWER, Water Corporation
Knowledge gap 9.6 Investigate the critical flow-ecology linkages (surface and groundwater), for the Canning Estuary and floodplain under a changing climate.	Research institutions	DBCA, DWER
Knowledge gap 9.7 Determine what proportion of flow reduction in the Djarlgarro Beeliar (Canning River) system is attributed to regulation versus climate change effects.	Research institutions	DBCA, DWER
Knowledge gap 9.8 Investigate how limited freshwater sources can be managed to respond to climate change and urban development, including the feasibility of using suitable quality urban stormwater to augment waterway flows.	Research institutions	DBCA, DWER, LG, Water Corporation

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Knowledge gap 9.9 Determine the key locations and volumes of groundwater entering Djarlgarro and its tributaries, its changes over time and future projections under a changing climate.	Research institutions	DBCA, DWER
Strategy 10: Improve the accuracy of flow gauging for priority catchments and investigate the feasibility of installing gauging stations in ungauged catchments.	**Lead**	**Support**
Action 10.1 Improve the accuracy of flow gauges for the Southern River and Bannister Creek catchments and investigate the feasibility of installing flow gauges in the South Perth, Lower Canning, and Bull Creek catchments to improve nutrient load and reduction target estimates.	DBCA	DWER, Water Corporation

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Healthy River System

BIODIVERSITY

Objective 3: Protect and enhance local biodiversity of the river system and build resilience to climate change.

Understanding local fish and invertebrate communities

Water quality, flow, the loss of critical habitat and recreational fishing pressures impact on the health of **local fish and invertebrate communities**. Further investigations and remedial works (such as restocking or creating fish habitat) may be required to **understand and address the impacts** of these pressures on local fish and invertebrate ecosystems.

Understanding local fauna and ecosystems

Degradation of the waterways adversely affects the **fauna** which rely on them for survival. **Knowledge gaps** exist about the types of fauna using the waterways and the complex ecosystems upon which they depend.

Threatened species and communities

Subtropical and temperate coastal **saltmarsh** (Priority 3(iii) Vulnerable under the Commonwealth Government *Environmental Protection and Biodiversity Conservation Act 1999* (EPBC Act 1999) has been identified along the Canning waterways. A range of **threatened and priority flora and fauna species,** and other **threatened ecological communities** are also found within the waterways, including multiple populations of Carter's Freshwater Mussel *(Westralunio carteri)*.

Knowledge gaps exist for some of these species and a range of approaches, including **Recovery Plans**, are used to support their recovery to maximise their chances of long-term survival in the wild.

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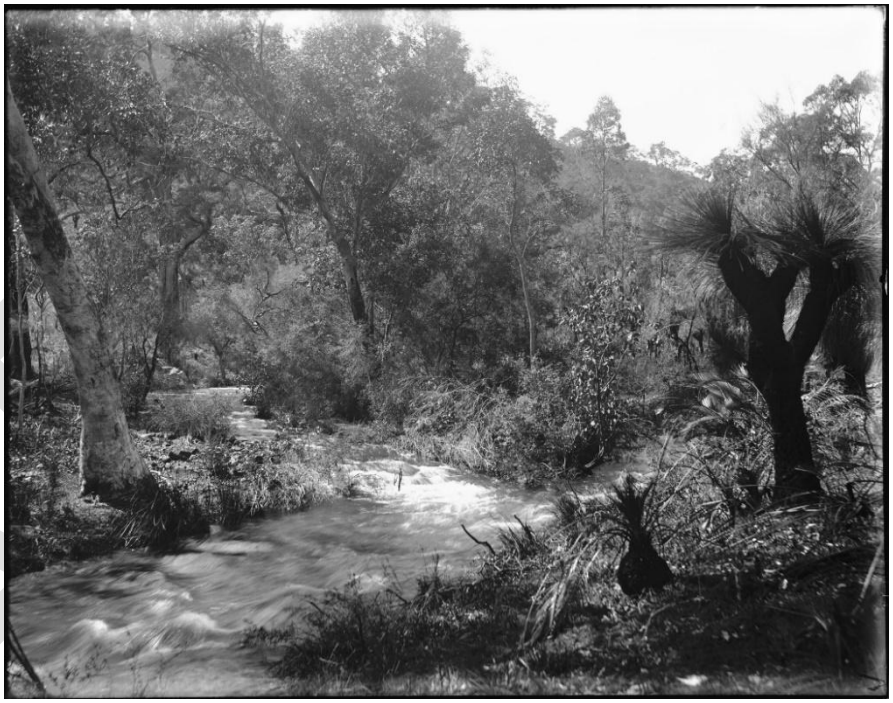
Managing biosecurity

A coordinated and proactive approach to **biosecurity** is needed, such as the implementation of **restorative biosecurity,** to reduce the adverse impact of invasive plant, animal and insect species, parasites, weeds and diseases and improve ecological resilience in the waterways.

In-stream barriers

The **Kent Street Weir** creates an impounded body of freshwater upstream of the weir during summer. A vertical slot fishway was installed on the weir in 2017 and has been found to be used by many species.

Artificial barriers, including weirs and dams upstream of Kent Street Weir, impact the connectivity of the river and may hamper the movement of local species up and down the river. However, these **barriers** may provide **refuge zones** and protection for local aquatic communities from invasive species such as the pearl cichlid (*Geophagus braziliensis***)** and the ectoparasite anchor worm *(Lernaea cyprinacea*).



Wungong River/Brook, 1908. Photo: E.G. Rome
Photo courtesy of State Library of Western Australia

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BIODIVERSITY

Objective 3: Protect and enhance local biodiversity of the river system and build resilience to climate change

Strategy 11: Improve understanding of the biodiversity in the river system, the processes that support biodiversity and the associated threats, through approaches such as green asset and ecosystem mapping, and improve management of threats by developing cross-boundary, multiple-stakeholder approaches.	Lead	Support
Action 11.1 Define partnership arrangements between DPIRD, DBCA and DWER to identify roles and responsibilities for proactive, restorative biosecurity to protect aquatic ecosystems. *	DBCA, DPIRD, DWER	
Action 11.2 Establish a cross-boundary, whole of catchment approach to the management of priority invasive terrestrial and aquatic weed species. *^	DBCA, LG	AGLG, community groups, DPIRD, DPLH, DWER, SERCUL

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Action 11.3 Establish a cross-boundary, whole of catchment approach to the management of priority invasive terrestrial fauna species, including foxes, feral cats and feral pigs.	LG	DBCA, DPIRD, DPLH
Action 11.4 Adopt a consistent approach to domestic cat management, including the promotion of best management practices and legislative requirements under the *Cat Act 2011*. *	LG	DBCA
Action 11.5 Trial alternatives to mosquito and midge control in sensitive areas, such as restocking western minnows (*Galaxias occidentalis*) and pygmy perch (*Nannoperca vittata*) and the use of bat boxes in wetlands.	DPIRD, LG	DoH, DWER
Action 11.6 Investigate algal blooms and approaches to their control. *	DBCA	DWER, research institutions
Action 11.7 Apply acoustic technologies to investigate movement of specific species in Djarlgarro Beeliar (Canning River) and its estuary. *	DBCA	DWER, research institutions
Action 11.8 Explore the use of molecular technology, such as eDNA, to better understand current fish distributions, their changes over time, and to continue the development of a genetic sequence reference library of local species. *	DBCA	DPIRD, DWER, research institutions

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Action 11.9 Undertake a population survey on key recreational fishing species and investigate factors influencing stock size and demographics, including the impact of recreational fishing pressure.	DPIRD	DBCA
Knowledge gap 11.10 Consolidate and build-on knowledge of threshold indicators for freshwater and estuarine species for assessment of risk and management response.	Research institutions	DBCA, DPIRD
Knowledge gap 11.11 Build a better understanding of the distribution of submergent and emergent macrophytes and the roles they play in the system. ^	DBCA	DWER
Knowledge gap 11.12 Map the distribution of significant biosecurity threats in Djarlgarro Beeliar (river and estuary) and determine the best management approach for invasive fish and parasites to protect the Upper Canning local freshwater communities. *	DBCA, DPIRD	DBCA, DWER, LG
Knowledge gap 11.13 Build a better understanding of fish and invertebrate populations in Djarlgarro and factors that influence their distribution and abundance.	DBCA	DPIRD, DWER, research institutions
Knowledge gap 11.14 Build a better understanding of key habitats (seagrass, mudflats, adjacent wetlands, waterbird habitat, threatened species habitat), their condition, values, and linkages to inform approaches to improved management of Djarlgarro.	DBCA, LG	Research institutions

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Knowledge gap 11.15 Investigate the distribution of locally rare fauna (rakali, echidna, quenda, chuditch, other mammals and reptiles) utilising the waterways and riparian zones of Djarlgarro.	DBCA, LG	Research institutions
Strategy 12: Retain, enhance and extend critical habitat, wildlife refuges and sanctuary areas for biodiversity in the river system.	**Lead**	**Support**
Action 12.1 Continue artificial oxygenation of Djarlgarro Beeliar (Canning River) upstream of the Kent Street Weir, and improve understanding of oxygenation methods, their efficacy and application. *	DBCA	DWER
Action 12.2 Finalise the barriers assessment and map the key barriers limiting the movement of invasive species upstream, including recommendations on management options.	DBCA	DWER
Action 12.3 Investigate potential improvements for fish passage through modification of in-stream structures, where appropriate.	DBCA	DWER, research institutions
Action 12.4 Trial the effectiveness of improving habitat for local fish communities.	DBCA	Community groups, DPIRD, DWER, SERCUL
Action 12.5 Partner with non-government organisations (NGOs) to improve habitat, water quality and protect foreshores. *	DBCA	DPIRD, LG

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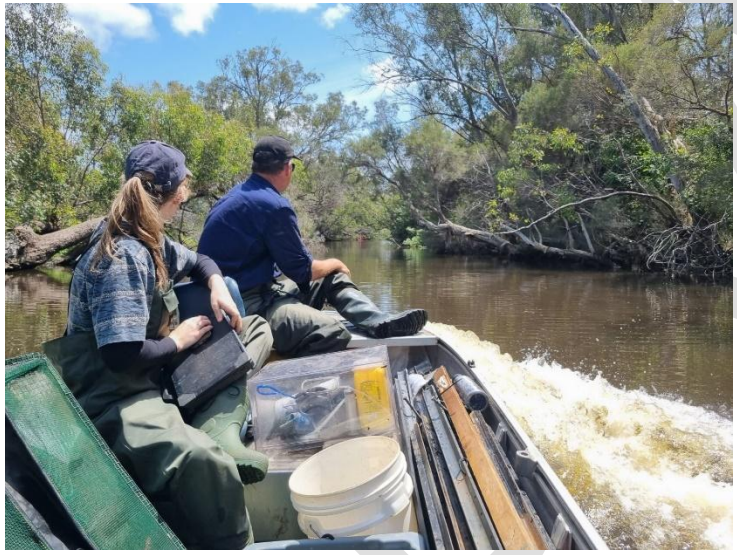
Knowledge gap 12.6 Investigate the impact of freshwater drainage on threatened salt marshes (including Bicentennial Adenia Park) and determine management options for the protection of these ecological communities, including the management of *Typha orientalis*.	DBCA, research institutions	LG, SERCUL
Knowledge gap 12.7 Develop an agreed management approach for the Djarlgarro Kep Wari (Kent Street Weir pool), including a holistic understanding of its values, key drivers of condition, management objectives and best management approaches to improve its condition. ^	DBCA	DWER, LG, research institutions



DBCA's Rivers and Estuaries Science team sampling for aquatic fauna on Djarlgarro Beeliar (Canning River). *Photo – DBCA*

Darter chicks on the lower Djarlgarro Beeliar (Canning River). *Photo - Christine Cheater*

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Healthy River System

FORESHORE

Objective 4: Enhance and revegetate foreshores and implement adaptive foreshore management practices.

Degradation of aquatic habitat and foreshore areas

The ecological health of Djarlgarro Beeliar (Canning River) above the Kent Street Weir has been impacted by the removal of large quantities of woody debris, boulders, and aquatic plants. The **riparian zone** has been **cleared,** favouring weeds, and **tributaries** have often been **straightened**, cleared, and turned into drains.

Some sections of the river upstream of the Kent Street Weir are **landlocked and inaccessible** due to private land ownership (see also Strategy 31). Other areas are degraded due to **uncontrolled access** by vehicles, pedestrians and other river users.

In the Canning Estuary below the Kent Street Weir, the riparian zone has been greatly affected by urban development since the 1960s through the removal of vegetation, introduction of weeds and modification of river banks. **Boat wash** impacts can also lead to **erosion** and loss of fringing vegetation along these foreshores. Inappropriate access by **domestic animals** (e.g. dogs, horses, cows) also occurs along foreshore areas.

Climate change

Western Australia's climate is becoming **drier and warmer**, and there has been a significant reduction in rainfall since the 1970s (BOM, 2020). Associated **decreases in streamflow** and increases in temperatures and **extreme fire weather** adversely impact on the long-term resilience of the Canning waterways.

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FORESHORE

Objective 4: Enhance and revegetate foreshores and implement adaptive foreshore management practices.

Strategy 13: Understand, communicate and manage impacts of climate change, erosion and inundation, based on up-to-date climate projections and risk modelling and mapping.	Lead	Support
Action 13.1 Where flood risk has been identified within the Djarlgarro Beeliar (Canning River) floodplain, ensure it is considered through land use planning processes.	WAPC	DBCA, DWER, LG
Knowledge gap 13.2 Build on existing flood modelling and risk assessment to determine any actions required to mitigate flood risk to land within the Djarlgarro Beeliar (Canning River) floodplain.	DBCA	DWER, LG

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Knowledge gap 13.3 Quantify the known and potential influence of climate change on Djarlgarro (Canning, Southern and Wungong rivers) and use this information to identify priorities for management, including: • Long-term trends in rainfall, runoff and river flow. • Trends in sea/estuary level and influence of saline water upstream. • Spatial changes in inundation and mosquito risk. • Storm surge, flood risk and risk of overtopping and bypassing of the Kent Street Weir. • Temperature, salinity, pH changes and risk to biota. • Risk to vegetation cover and water quality. • Risk to fauna species survivability.	DBCA	BoM, DWER, research institutions
Strategy 14: Investigate and implement innovative and collaborative approaches to foreshore planning and management.	**Lead**	**Support**
Action 14.1 Undertake an assessment and prioritisation process for foreshore erosion risk (Salter Point and other high use areas) and determine priorities for management. *	DBCA	LG
Action 14.2 Evaluate new foreshore management options, including nature-based solutions.	DBCA	Research institutions

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Action 14.3 Raise awareness of the Riverpark boundary and review access requirements to identify and restore areas of inappropriate access by people, pets, vehicles, or livestock using bollards, gates, revegetation, and fauna-friendly fences.	DBCA	DPLH, LG
Action 14.4 Ensure appropriate access for all river users is considered when undertaking river restoration projects.	DBCA, LG	AGLG, community groups, SERCUL
Knowledge gap 14.5 Complete a condition assessment of riparian condition of Djarlgarro (noting NESP assessed Djarlgarro Beeliar (Canning River) above Kent Street Weir in 2025) to create a map of change over time. Use this information to identify priority areas for management using a structured decision making approach and prioritisation tool (see Canham in review for example for Djarlgarro Beeliar).	DBCA, research institutions	LG, Perth NRM
Knowledge gap 14.6 Investigate the cumulative impacts of regional scale land use intensification (urbanisation, industrialisation) on riparian condition in the waterways.	Research institutions	DBCA

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Strategy 15: Retain, increase the amount and improve the condition of natural vegetation within foreshore areas.	Lead	
Action 15.1 Implement, review and update existing Foreshore Management Plans and identify priority areas requiring the development of new Foreshore Management Plans. *	LG	AGLG, community groups, DBCA, SERCUL
Action 15.2 Continue to work with private landowners in landlocked areas to improve riparian condition. *	AGLG, community groups	DBCA, LG, private landholders

Planting along Neerigen Brook, led by AGLG. *Photo – AGLG*

Harrisdale Senior High School students planting at a SERCUL event. *Photo - SERCUL*

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Healthy People

LIFESTYLE

Objective 5: Enhance culture, community lifestyle and connection by providing appropriate places in the river system to socialise, recreate and relax.

Development in the Riverpark

Strategic master planning of the **future use and development** of the Swan Canning Riverpark is needed to ensure the community's recognition or **'sense of place'** of the river landscape is maintained.

Community use

As the city grows, there is an increasing need to **balance the competing recreational, commuting and other community uses** of the river system, whilst ensuring safe and environmentally **appropriate access for all ages and abilities.**

Cultural heritage

Greater opportunity for the community to engage with Aboriginal cultural heritage and historical heritage along the river should be encouraged, especially upstream of the Kent Street Weir. The **Marli Riverpark Interpretation Plan** (Marli Plan) makes accessible the cultural heritage values, including the natural, **Noongar and historic/built values** of the bilya (rivers) (Graham Taylor et al., 2014). The Marli Plan currently

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extends upstream to Nicholson Road Bridge, excluding many of the freshwater sections above the Kent Street Weir. **Interpretive and educational opportunities,** such as **Noongar trails, nodes, and events** that share Aboriginal and non-Aboriginal cultural heritage are needed to **improve the sense of place and connection** with the Canning waterways.

Historic sites such as the Convict Fence, Mason's Landing, Roley Pools and the Sikh Heritage Trail also provide opportunities for interpretation and education.

The Silver Star river steamer ferry near Canning Bridge, 1907.
Photo courtesy State Library of Western Australia

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LIFESTYLE

Objective 5: Enhance culture, community lifestyle and connection by providing appropriate places in the river system to socialise, recreate and relax.

Strategy 16: Improve community access, enjoyment and connectivity through provision of strategically located facilities and public spaces.	Lead	Support
Action 16.1 Implement Locality Plans for the Lower Djarlgarro (Canning) (Canning Bridge to Nicholson Road Bridge), Upper Djarlgarro (Canning) (Nicholson Road Bridge to Stinton Creek confluence) and Southern River (Canning-Southern River confluence to Tonkin Highway crossing). *	DBCA	Commercial users, LG, State Government
Action 16.2 Ensure significant development (for example Hester Park) is supported by strategic master planning that considers the wider Canning waterways context and enhances the river's health, cultural, amenity and 'sense of place' values. *	DBCA, LG	DPLH
Action 16.3 Ensure use and development within and adjacent to the Riverpark is consistent with the Locality Plan principles, Swan Canning Development Control Area policies, Marli Riverpark Interpretation Plan and foreshore riparian improvement plans and strategies. *	DBCA, LG	DPLH

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Strategy 17: Support sustainable tourism, commercial operations, development and riverside events that enhance the community's use and enjoyment of the river.	Lead	Support
Action 17.1 Develop a plan to inform tourism and recreation and provide direction regarding appropriate on-water uses and activity nodes for the Swan Canning Riverpark.	DBCA	LG, State Government, Whadjuk Aboriginal Corporation,
Action 17.2 Co-create cultural heritage events in partnership with the Aboriginal community to celebrate the spirituality of the waterways (for example Blessing of the River, annual River Festival).	DBCA, LG, Whadjuk Aboriginal Corporation	AGLG, community groups, Perth NRM, SERCUL
Strategy 18: Ensure river transport and on-water activities, including ferry services, are planned and coordinated.	**Lead**	**Support**
Action 18.1 Consider an Aquatic Use Review for Djarlgarro Beeliar (Canning River) and make recommendations for managing shared use of resources to balance environmental, cultural, and socio-economic benefits.	DTMI	DBCA

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Strategy 19: Retain, conserve and responsibly manage significant historic heritage places within the river system.	Lead	Support
Action 19.1 Investigate opportunities to extend the Marli Riverpark Interpretation Plan upstream of Nicholson Road to include the Upper Canning, Southern and Wungong rivers, and sites such as Hester Park, John Okey David Park, Wungong Regional Park, and Wright Park Lake.	DBCA	DPLH, LG, Whadjuk Aboriginal Corporation

Enjoying a sit up paddle on the waterways.
Photo - Veronica McPhail

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Healthy People

CULTURE

Objective 6: Empower Whadjuk Noongar people as equal partners in waterway management.

This section has been co-written with the Whadjuk Aboriginal Corporation Djarlgarro subcommittee. In this section, the RPS objectives and strategies have been refined by the Whadjuk Ancestral Custodians of Djarlgarro whilst continuing to deliver the long term RPS strategic outcomes.

Customary practices, sites of significance and cultural responsibilities

The Whadjuk Noongar people have a lifelong commitment and **cultural responsibility** for the protection of the waterways, including specific **places of significance** such as ancestral birthing, burial, hunting and gathering, camping, and fishing sites, which are still visited by Whadjuk Noongar people today.

Whadjuk Noongar people have been displaced from their land, culture and communities over time, limiting their ability to maintain **customary practices**, work on Country or **access** significant sites and food places.

Whadjuk Noongar access to the waterways is limited by existing land ownership arrangements, roads and infrastructure, government policies and practices, social exclusion, invasive plants and some landcare practices that restrict access to the water.

Cultural knowledge

Traditional cultural knowledge regarding management of the river should be preserved for future generations so it is not lost as Whadjuk Noongar Elders pass away.

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Currently, there are limited processes to record, preserve and manage traditional cultural knowledge and facilitate its integration into contemporary river management. **Indigenous Cultural and Intellectual Property (ICIP)** arrangements are also required to preserve this knowledge for future generations.

Whadjuk Noongar empowerment

There is a strong desire for Whadjuk Noongar people to be central to decision making in river management, and once again be the centre and future of the rivers and their health.

Whadjuk Noongar people have immeasurable knowledge and connection to the waterways inherited since Kura (the time since creation).

It is widely acknowledged that Whadjuk Noongar people were historically excluded from their sacred sites along the waterways resulting in a lack of inclusion in decision making, the loss of traditional lore and the interruption of the intergenerational transfer of knowledge. Hence significant intergenerational trauma continues to be felt by some Whadjuk Noongar communities today.

Through truth telling, the true extent of the impact of settlement on the lifestyles of the original Whadjuk Ancestral Custodians can be revealed and understood.

Whadjuk Noongar **empowerment** through Whadjuk Noongar-led programs, projects, cultural education and employment opportunities, such as river ranger programs and river guardian projects, can help ensure river management is inclusive and available to Whadjuk Noongar people into the future.

The Ugle family at the Riverpark interpretive node at Kent Street Weir. *Photo - DBCA*

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CULTURE

Objective 6: Empower Whadjuk Noongar people as equal partners in waterway management.

Strategy 20: Partner with Whadjuk Ancestral Custodians to preserve sites of significance, ensure appropriate access for customary practices and support the fulfilment of cultural responsibilities.	Lead	Support
Action 20.1 Investigate and adopt dual Whadjuk Noongar naming for places of significance throughout the Canning waterways. ^	DBCA, Whadjuk Aboriginal Corporation	DPLH, LG
Action 20.2 Establish proactive partnership arrangements between Whadjuk Ancestral Custodians, DBCA, DPLH and the Noongar Boodja Trust to support the land transfer process for the waterways under the Whadjuk Indigenous Land Use Agreement (ILUA).	DPLH, Noongar Boodja Trust, Whadjuk Aboriginal Corporation	DBCA
Action 20.3 Partner with Whadjuk Ancestral Custodians to establish Back to Country trips, cultural gatherings, programs, and activities that enhance access to the waterways for Whadjuk Noongar people. ^	Whadjuk Aboriginal Corporation	Working Group members

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Action 20.4 Partner with Whadjuk Ancestral Custodians to review government policies and practices and identify opportunities to enhance Whadjuk Noongar access to the waterways for customary practices and to fulfil cultural responsibilities.	DBCA, Whadjuk Aboriginal Corporation	Working Group members
Action 20.5 Partner with Whadjuk Ancestral Custodians to undertake cultural mapping and identify and prioritise culturally important sites for protection, restoration, and customary practices (linked to the Marli Riverpark Plan). ^	DBCA, Whadjuk Aboriginal Corporation	DPLH, LG
Strategy 21: Partner with Whadjuk Ancestral Custodians to preserve traditional cultural knowledge and integrate it into contemporary river management.	**Lead**	**Support**
Action 21.1 Partner with Whadjuk Ancestral Custodians to identify, understand, protect, and restore medicinal plants, traditional food sources and customary practices, including ICIP for the preservation of cultural knowledge.	Whadjuk Aboriginal Corporation	Working Group members
Action 21.2 Partner with Whadjuk Ancestral Custodians and stakeholders to develop a multi-stakeholder Reconciliation Action Plan.	Whadjuk Aboriginal Corporation	Working Group members
Action 21.3 Partner with Whadjuk Ancestral Custodians to develop a process for the collation, preservation, and management of traditional ecological knowledge, (including ICIP arrangements), to guide its inclusion into contemporary river management.	DBCA, Whadjuk Aboriginal Corporation	DWER, DPLH, research institutions

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Strategy 22: Encourage and promote Whadjuk Noongar tourism, commercial operations, employment and economic opportunities around the river system.	Lead	Support
Action 22.1 Partner with Whadjuk Noongar people to identify skills development and employment opportunities for Whadjuk Noongar people, including: • Supporting and establishing Ancestral Custodian Officer / River Ranger / River Guardian Programs. • Supporting initiatives that enhance Whadjuk Noongar employment opportunities in waterway management, tourism, cross-cultural education and landcare (such as a local plant nursery and Whadjuk Cultural Centre). ^	DBCA, Whadjuk Aboriginal Corporation	Working Group members

Healthy People

CONNECTION TO NATURE

Objective 7: Connect people with nature in the river system.

Community awareness

Urbanisation has created a growing disconnect between people's everyday lives and the environment. Many people are **unaware of the rivers**, the essential environmental services they provide, and that human health is dependent on a healthy environment.

Community awareness and appreciation of the waterways in the degraded sections of the upper Canning, Southern and Wungong rivers is often less than in the more accessible lower reaches.

Community planting event held on National Tree Day, 2019, led by Armadale Gosnells Landcare Group. *Photo - AGLG*

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CONNECTION TO NATURE

Objective 7: Connect people with nature in the river system.

Strategy 23: Create, protect and enhance spaces and facilities that enable the community to connect with nature and the ecological values of the river system, particularly within the Riverpark.	Lead	Support
Action 23.1 Undertake strategic projects to enhance green and blue corridors and linkages, including multi-use paths and trail networks (aligned to the Marli Riverpark Plan and Naturelink Perth).	DBCA, LG	NatureLink Perth, Perth NRM, Water Corporation, Whadjuk Aboriginal Corporation

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Strategy 24: Implement education and engagement initiatives to increase appreciation and understanding of the river system values and threats, and to increase the adoption of river protection behaviours.	Lead	Support
Action 24.1 Work with stakeholders to explore funding mechanisms or opportunities for the development of a shared river health awareness campaign with simple messages and actions that connect people as carers of the waterways and wetlands.	DBCA, LG	AGLG, community groups, DPIRD, Perth NRM, SERCUL, Water Corporation
Action 24.2 Explore collaborative opportunities to partner, align, expand, or cross-promote existing behaviour change programs and align them, where possible (aligned to Kep Katitjin – Gabi Kaadadjan Waterwise Action Plan 3).	DBCA, DWER	LG, Perth NRM, SERCUL, Water Corporation
Action 24.3 Explore opportunities to engage new audiences by working with the health and wellness industry to link human health (for example yoga, meditation, art) with waterway and wetland health.	Working Group members	Health and wellness industry
Action 24.4 Develop a strategy to engage a younger audience in river and wetland restoration activities (for example engage TAFE, high schools and universities in work experience and volunteering opportunities).	DBCA	AGLG, community groups, LG, Perth NRM, SERCUL

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Action 24.5 Consider community group signage at restoration sites (including contact details/how you can help) to assist in the recruitment of volunteers.	DBCA, LG, Perth NRM	Community groups, SERCUL
Knowledge gap 24.6 Investigate the socio-ecological factors that influence community behaviour and determine how these can be used for the benefit of the river system.	DBCA	Research institutions

Castlereagh School planting event with SERCUL. *Photo - SERCUL*

Community plant event held by Bannister Creek Catchment Group (BCCG). *Photo - BCCG*

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Enablers

SUSTAINABLE RESOURCING

Objective 8: Obtain ongoing and sufficient resourcing for improved management of the river system.

Funding sources

Broader scale investment is required to empower stakeholders and the community to self-organise to protect and restore the waterways.

New investment from diverse sources, including philanthropic organisations, corporate bodies and research institutions, is needed to ensure a **whole of community** approach to waterways protection.

KPMG staff at a corporate planting event run by SERCUL on Yule Brook. *Photo - SERCUL*

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SUSTAINABLE RESOURCING

Objective 8: Obtain ongoing and sufficient resourcing for improved management of the river system.

Strategy 25: Prepare an investment plan for protection of the river system.	Lead	Support
Action 25.1 Better understand the total investment required to maintain and improve the river system to minimum targets and identify the financial mechanisms required to fund the capital and maintenance cost for projects that would improve water quality in waterways and wetlands.	DBCA	Working Group members
Action 25.2 Increase investment through partnerships and collaborative arrangements with research institutions, corporate bodies, and philanthropic organisations for a whole community approach to waterways management. *^	DBCA	Whadjuk Aboriginal Corporation, Working Group members

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Strategy 26: Develop a targeted research strategy that addresses critical information gaps for the river system, including the impacts of climate change, and that supports partnerships and co-investment.	Lead	Support
Action 26.1 Partner with research institutions and other organisations to increase investment and address priority knowledge gaps. *^	DBCA	LG, research institutions
Action 26.2 Investigate sources of funding for fish breeding and habitat projects and explore partnership opportunities with peak recreational fishing organisations.	DBCA, DPIRD	Industry associations, research institutions

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Enablers

COLLABORATION

Objective 9: Collaborate and effectively work together to protect and improve the river system.

Collaboration and coordination

For activities occurring outside of the Swan Canning Development Control Area (DCA) and regional parks, DBCA has the **role of 'influencer'**, including for all catchment-based activities that affect the health of the waterways.

Further, no single government agency is responsible for managing water quality in the drainage network before it enters the waterways. Many agencies can influence water quality in their sections, but none are mandated to do so (OAG, 2014).

Management, therefore, requires **collaborative arrangements** with the State agencies and Local Governments that have legislated responsibilities for the Canning waterways under the *Swan and Canning Rivers Management Act 2006*.

Support to land managers and community groups

River restoration has relied on a **cooperative partnership** between State and Local Government, community groups and volunteers. Successful implementation of the Djarlgarro Plan requires the capacity of all stakeholders to be significantly and sustainably enhanced.

Volunteers have varying capacity to undertake river restoration activities and **require support** to undertake these projects. Large sections of the volunteer base are also **aging, and recruitment and succession planning** is a significant issue for many community environment groups.

Strategy 28 has been co-written by the Whadjuk Aboriginal Corporation's Djarlgarro subcommittee. In this section, RPS strategy 28 has been refined by the Whadjuk Ancestral Custodians of Djarlgarro whilst continuing to deliver the long-term RPS strategic outcomes.

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COLLABORATION

Objective 9: Collaborate and effectively work together to protect and improve the river system.

Strategy 27: Develop improved ways to work together in river management and planning, including improved communication, networks and knowledge sharing.	Lead	Support
Action 27.1 Refine the collaborative arrangements in place to support implementation of the Djarlgarro Plan, including mechanisms and opportunities for information sharing, reporting, evaluation, and adaptive management.	DBCA	Whadjuk Aboriginal Corporation, Working Group members
Action 27.2 Establish a collaborative framework with water and environment agencies for improved catchment and drainage outcomes for the river system. *	DBCA, DWER, Water Corporation	
Action 27.3 Monitor stakeholder capacity through the Perth NRM Capacity Assessment Program and establish collaborative partnerships (with NRM groups, LGs, Whadjuk Ancestral Custodians, universities, NGOs, and others) to address their capacity needs.	Perth NRM	

Action 27.4 Develop or improve volunteer support programs, foster the establishment of new community environment groups along the waterways (where they do not currently exist) and explore collaborative opportunities between existing volunteer groups.	AGLG, LG, Perth NRM, SERCUL	Community groups
Action 27.5 Enhance alliances with NGOs and philanthropic organisations participating in river and wetland protection activities. *	DBCA	Perth NRM, SERCUL
Strategy 28: Empower Whadjuk Noongar Ancestral Custodians and enhance Whadjuk Noongar participation and partnering in waterways management.	**Lead**	**Support**
Action 28.1 Support Whadjuk Aboriginal Corporation's cultural authority and a 'right people, right Country' approach by establishing: • a Whadjuk database of Ancestral Custodians, • consultation protocols, and • cultural sensitivity, awareness, and competency training.	Whadjuk Aboriginal Corporation	DBCA
Action 28.2 Partner with Whadjuk Ancestral Custodians to develop arrangements for Whadjuk Noongar participation and partnering in waterways planning and management, including participation on steering groups, joint partnerships, and funding applications. ^	DBCA, Whadjuk Aboriginal Corporation	Working Group members
Action 28.3 Partner with Whadjuk Ancestral Custodians to initiate opportunities for cooperative management of regional parks and Ramsar sites within the Canning Catchment.	DBCA, Whadjuk Aboriginal Corporation	Community groups, LG, SERCUL, Perth NRM

Action 28.4 Support Whadjuk Noongar participation in existing NRM networks by: • Building relationships between Whadjuk Ancestral Custodians and NRM networks and working together to create opportunities for Whadjuk Noongar empowerment and leadership. • Providing cultural competency and inclusivity training to land managers and community groups to support cross-cultural collaborations with Whadjuk Noongar people. • Exploring funding opportunities for Whadjuk Noongar partnerships and participation. ^	DBCA, Whadjuk Aboriginal Corporation	Working Group members
Strategy 29: Develop RPS implementation plans at a river reach scale with stakeholders and biennially report on the implemenation of the River Protection Strategy.	**Lead**	**Support**
Action 29.1 Align implementation of the Djarlgarro Plan with the RPS implementation process.	DBCA	Whadjuk Aboriginal Corporation, Working Group members

Strategy 30: Engage openly and constructively with Ancestral Custodians, natural resource management groups, government agencies and service providers, volunteers, proponents, developers, operators, the development industry and the community to ensure sustainable use, protection and improvement of the river system.	Lead	Support
Action 30.1 Create platforms for champions and networks (including elected members, executives, LG Councillors, universities, industry experts and community leaders) to learn, promote and support each other in advocating as a collective voice for the waterways and wetlands. *	DBCA, Perth NRM	Whadjuk Aboriginal Corporation, Working Group members

Participants at an aquatic weed workshop run by SERCUL. *Photo - SERCUL*

North Metropolitan TAFE students core sampling sediment at Roley Pool. *Photo - DBCA*

Enablers

POLICY AND PLANNING

Objective 10: Policy and planning protects and enhances the ecological and community benefits and amenity of the river system.

Fragmentation

Parks, conservation areas, recreation nodes and public spaces around the river system are fragmented.

Linkages are needed to provide important **connections between wildlife habitats**, for **natural water flows** and **drainage**, and for **public recreational space** and movement.

Innovative ways of attracting additional funding are encouraged for the management of existing parks and reserves, including the Canning River Regional Park and Wungong Regional Park.

Land tenure and private ownership

Strong coordination between State Government departments and Local Governments is needed to reduce fragmentation of management across land tenure boundaries. Further collaboration and funding are required to improve long-term land management and the transfer of land from DPLH to land managers, including Local Governments.

Large sections of foreshore above Kent Street Weir remain in **private ownership**, which impacts the effectiveness of land management (for example only treating weeds and invasive species on one side of the river) and is a primary factor in the fragmentation of the spaces around the river system.

Land use planning

State Planning Policies adopted under the *Planning and Development Act 2005* are to be applied to this Plan as they relate to planning and development relevant to the DCA, including the recently released SPP2.9 Water.

Land use planning plays an important role in ensuring that future development is appropriately located and serviced and ensures that water quality, water quantity, and environmental, social and cultural values are managed and protected (WAPC, 2025).

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POLICY AND PLANNING

Objective 10: Policy and planning protects and enhances the ecological and community benefits and amenity of the river system.

Strategy 31: Continue to secure appropriate foreshore reserves in public ownership, ensure foreshore reserves are appropriately managed, and undertake long-term planning to increase the provision of regional open space adjacent to the waterways.	Lead	Support
Action 31.1 Identify opportunities for foreshore land acquisition and management through appropriate legislative pathways.	DBCA	DPLH, LG
Action 31.2 Identify and prioritise land for transfer to end managers, including establishing adequate funding arrangements and long-term management agreements.	DPLH, LG	DBCA
Action 31.3 Identify Unallocated Crown Land along the foreshore and ensure adequate management arrangements are in place.	DPLH, LG	DBCA
Action 31.4. Identify opportunities for ceding of land at subdivision stage, where Bush Forever that adjoins the Canning, Southern and Wungong rivers is zoned urban under the Metropolitan Region Scheme.	DPLH/WAPC	DBCA

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Action 31.5 Investigate opportunities to include appropriate areas of Hester Park in the Canning River Regional Park.	DBCA, DPLH LG	
Action 31.6 Ensure adequate funding for the long-term management of Regional Parks and foreshore areas.	DBCA	LG
Strategy 32: Implement, collaborate on, and continuously improve legislation, policy, guidance and land use planning to ensure adequate provision for foreshore areas, ecological linkages and wetland buffers, and protection of flood function, ecological health, amenity and community connection to the river system.	**Lead**	**Support**
Action 32.1 Ensure restoration projects comply with the *Environmental Protection Biodiversity Conservation Act 1999* and *Biodiversity Conservation Act 2016* to protect and enhance threatened species, ecological communities, and their habitats.	DBCA	Working Group members
Action 32.2 Develop a position statement on fire management for metropolitan foreshore areas and plan and execute fire management in accordance with this position statement.	DBCA	DFES, DWER, LG
Action 32.3 Identify and protect waterway foreshore areas through land use planning processes.	WAPC	DBCA, DWER, LG
Action 32.4. Ensure that assessment of bushfire hazard risk documentation accompanying planning proposals accounts for revegetation of the foreshore area.	LG, WAPC	DBCA, DWER, DFES

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Action 32.5 Ensure that Bushfire Risk Management Plans account for revegetation of the foreshore area.	LG	DBCA, DWER, DFES
Action 32.6 Finalise a new wetland dataset and mapping for the Swan Coastal Plain.	DBCA	DWER
Action 32.7 Investigate improvements that can be made to cross-government wetland policy, guidance and process.	DBCA, DWER, WAPC	
Action 32.8 Identify and protect wetlands and their buffers through land use planning processes.	WAPC	DBCA, LG

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Enablers

APPLIED KNOWLEDGE AND EVALUATION

Objective 11: Implement strategies and approaches for managing the river system that are adaptive and based on appropriate knowledge, monitoring and evaluation, with river health reported clearly and regularly.

Information dissemination

More high-level public reporting would continue to improve capacity of government, community, and stakeholders to make collective decisions about the needs and priorities for protecting the river (OAG, 2014).

Waterway health data is currently not collated into a framework that allows the community and stakeholders to easily understand the **current state** of the waterways or trends in ecological condition. In addition, the **ad-hoc exchange of information** between organisations makes it difficult to ensure management decisions are based on appropriate knowledge.

Monitoring and evaluation

A process to **monitor and measure success** is needed to review and evaluate the effectiveness, efficiency, appropriateness and impact of river management programs and projects.

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APPLIED KNOWLEDGE AND EVALUATION

Objective 11: Implement strategies and approaches for managing the river system that are adaptive and based on appropriate knowledge, monitoring and evaluation, with river health reported clearly and regularly.

Strategy 33: Improve information systems to facilitate sharing of data and research with the community to inform planning, decision making and management.	Lead	Support
Action 33.1 Improve access to data, maps, priorities, and information on river system condition trends. *^	DBCA, research Institutions	LG
Strategy 34: Provide high quality, timely and appropriate advice to all stakeholders, including statutory authorities and the community.	**Lead**	**Support**
Action 34.1 Actively engage and provide guidance to stakeholders that are responsible for implementing the Djarlgarro Plan to assist in timely approvals.	DBCA	Whadjuk Aboriginal Corporation, Working Group members

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Strategy 35: Regularly review approaches to monitoring and evaluation to ensure they are appropriate and adequately resourced to meet information needs for reporting against the objectives of the RPS.	Lead	Support
Action 35.1 Develop and implement a process for stakeholders to collectively monitor, evaluate, report, and improve on the delivery of actions in the Djarlgarro Plan.	DBCA	Working Group members, Whadjuk Aboriginal Corporation
Strategy 36: Monitor, report and share water quality and biodiversity outcomes.	**Lead**	**Support**
Action 36.1 Investigate the development of a river health report card for high level reporting to the community and government on overall system health.	DBCA	DWER
Strategy 37: Encourage participation in citizen science, research and monitoring.	**Lead**	**Support**
Action 37.1 Continue surveillance and improve understanding of the iconic estuarine dolphin population through the Dolphin Watch citizen science program. *	DBCA	Community groups, volunteers

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Action 37.2 Support citizen science approaches to improve knowledge of local fauna and their distribution (such as Australian Museum FrogID, DPIRD Fishwatch, MyPestGuide Reporter and Pest and Disease Identification Service (PaDIS) iNaturalist project) for the freshwater section of Djarlgarro Beeliar (Canning River) upstream of the Kent Street Weir. *	DBCA, LG, DPIRD	SERCUL, community groups, volunteers

Community planting event held by Bannister Creek Catchment Group.
Photo - SERCUL

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Implementation

Please note there may be some changes prior to finalisation of the Djarlgarro Plan as the implementation approach of the RPS is under consideration.

The Djarlgarro Plan will be implemented through the RPS implementation planning process. In consultation with stakeholders, shorter-term implementation plans will be co-developed with State and Local government agencies, regional Aboriginal corporations and NRM groups. These implementation plans will be prepared at the river reach scale, with Djarlgarro (the Canning, Southern and Wungong rivers) being one of the proposed five river reaches under the RPS.

As some actions in the Djarlgarro Plan are relevant across the Swan Canning river system, they may be included in several RPS implementation plans across different river reaches. These implementation plans will enable stakeholders to collectively share, measure, track and demonstrate progress towards achievement of the Djarlgarro Plan as well as the overarching RPS.

It is intended that a Djarlgarro implementation working group will be established and will include key delivery partners such as Whadjuk Ancestral Custodians, State and local governments and NRM groups. The implementation plan will outline the roles responsibilities, resources and timelines for management actions and the underlying projects required to deliver them.

This is an aspirational plan. Many of its actions will require additional resources to be delivered and a collaborative, partnership approach is needed for its implementation. The focus is on identifying transformative projects with the potential for system-wide change – whole of river and multi-agency – that make significant advances towards our shared vision.

Priority activities that cannot be funded immediately will be added to a Djarlgarro prospectus, forming a list of projects that can be implemented should appropriate funding be secured. Having a prospectus of priority projects allows stakeholders to be proactive when sourcing funding, enabling them to self-organise, collaborate and deliver lasting outcomes that protect and enhance Djarlgarro for generations to come.

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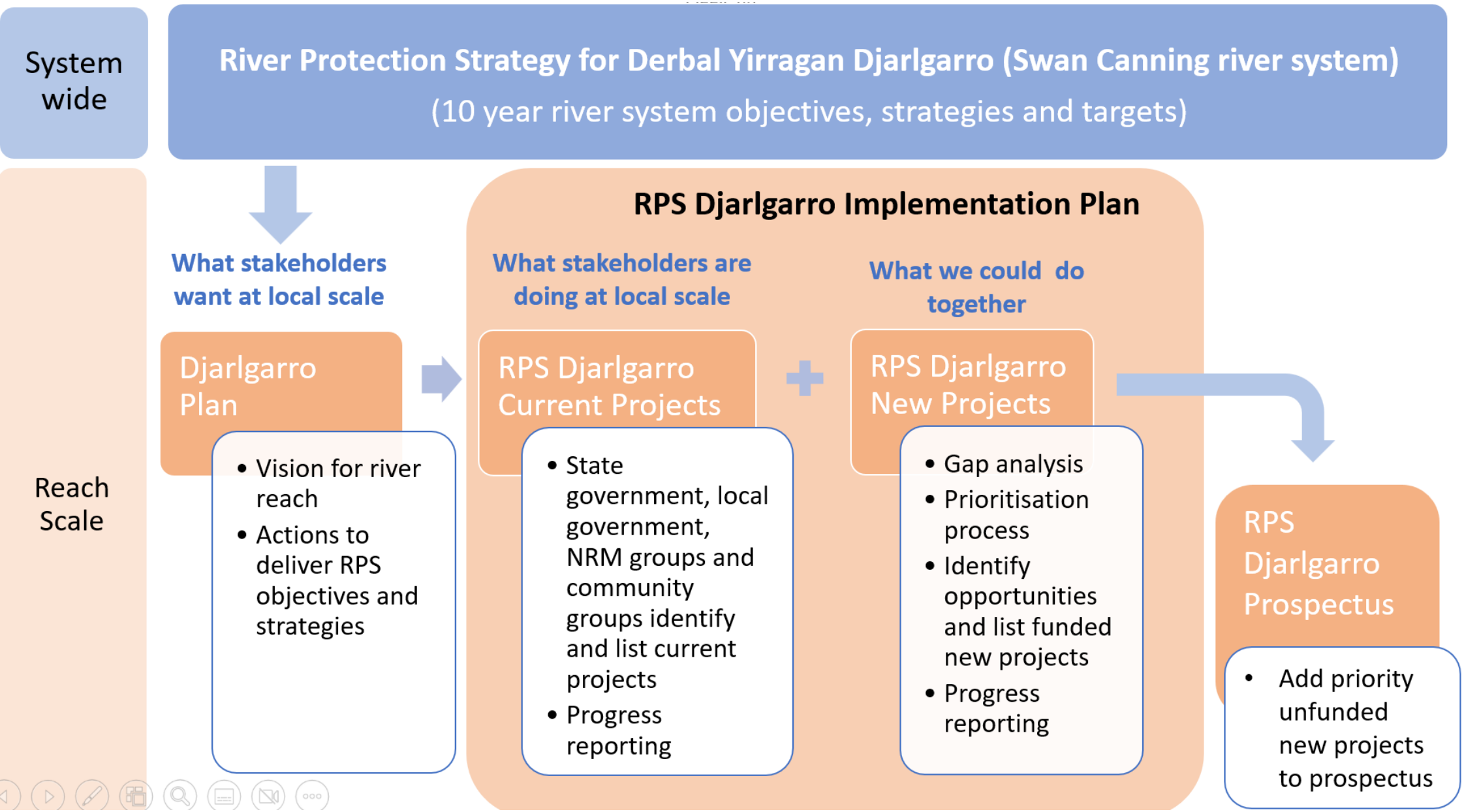
System wide
River Protection Strategy for Derbal Yirragan Djarlgarro (Swan Canning river system)
(10 year river system objectives, strategies and targets)
Reach Scale
What stakeholders want at local scale
Djarlgarro Plan
• Vision for river reach
• Actions to deliver RPS objectives and strategies
RPS Djarlgarro Implementation Plan
What stakeholders are doing at local scale
RPS Djarlgarro Current Projects
• State government, local government, NRM groups and community groups identify and list current projects
• Progress reporting
What we could do together
RPS Djarlgarro New Projects
• Gap analysis
• Prioritisation process
• Identify opportunities and list funded new projects
• Progress reporting
RPS Djarlgarro Prospectus
• Add priority unfunded new projects to prospectus

Glossary

Ancestral Custodian	The original inhabitants of Australia. Also known as Traditional Owners.
'At source' management	The prevention and reduction of pollutants at their source as part of a treatment train approach to water sensitive design.
Bandung	Rough white hills of the Darling Range, near Maamba Reserve.
Bandung Boojoordee	The Lesmurdie Falls area.
Beeliar	The name of the Whadjuk clan (Midgegooroo's family group) who coexisted on the land bounded by the lower and middle reaches of Djarlgarro Beeliar (Canning River) to the north, and the ocean to the west.
Beeloo	The name of the Whadjuk clan (Munday's family group) who coexisted on the land bounded by the lower and middle reaches of Djarlgarro Beeliar (the Canning River) to the south and Derbal Yirragan (the Swan River) and Mandoon (the Helena River) to the north.
Beenabup	Canning River entrance
Bilya / beeliar	River
Boodja	Noongar land
Booragoon	The section of the Canning River between the mouth of the Canning River at Canning Bridge to Mount Henry Bridge.
Booroloyn	An area of Mandoon (the Helena River) where Mundaring Weir is now located.
Boorree Boorree	At the foot of Babok Gully. Now known as Brixton Street wetlands.
Buneenboro/Boonenboro	Perth Water

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Burdgarro	The section of the Canning River upstream of the Southern River confluence to Goolommup.
Derbal Yirragan	Swan River
Development Control Area	DBCA has planning and development authority over the DCA, which includes public and private land, under the *Swan and Canning Rivers Management Act 2006* and the Swan and Canning Rivers Management Regulations 2007.
Dhadja (and mirinydj)	Bush food
Djarlgarro/Dyarlgarro	Canning, Southern and Wungong rivers. Also a section of the Canning River between its confluence with Southern River and the Kent Street Weir (see Whadjuk Noongar Clans and Placenames Map).
Djarlgarro Beeliar	Canning River
Djididjidi	Willy wagtail
Djildjit	Fish
Dreaming	The Dreaming, or Nyitting in Noongar, has different meanings for different Aboriginal groups across Australia. The Dreaming refers to Aboriginal creation stories, which give meaning to everything. In Noongar country, the Nyitting relates to the Waugal, a mythical serpent who created the rivers and the land formations of the south-west.
Dutanboro/Dootanboro	Melville Water
Gabbeedjil	The Canning River and Bull Creek confluence. Meaning place with lots of water or wetlands.
Galyagab	The tribal homeland of the Waugal.
Gargangara	The section of the Canning River that flows through the Canning gorge below the Canning Dam to Goolommup.
Golygolyiny	The returning of Waugal to his tribal homeland.

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Goolommup	The section of the Canning River in the middle reaches between Burdgarro and Gargangarra.
Janda-kot-Djanda	Jandakot Lake, now known as Forrestdale Lake.
Jerrbinyin	Lesmurdie Falls; meaning beautiful place.
Kalbyamba	The section of the Canning River between Kent Street Weir and Shelley Bridge.
Karda	Goanna
Koomoorl/goormoorl/goomal	Possums
Karragulen/Karragullen	Cannington station; meaning place of the red-tailed black cockatoo.
Katta-Moorda	Darling Range
Kura	The time of creation (Dreamtime)
Kweeyar/kooyar/kwooyar	Frog
Kwongan/Gwonggan/Kwongkan	Swan Coastal Plain
Landlocked	Areas of river foreshore that are in private ownership where the public cannot access the foreshore.
Lead	Organisation has legislative, policy and/ or accepted group/ organisational responsibility relevant to the area or to delivery of the action.
Mirinydj (and dhadja)	Bush food
Monup	Forrestfield
Moyoop	Snakes
Mulgang	The name of the Whadjuk clan or family group who coexisted by the upper reaches of Djarlgarro (the Canning River) on the eastern side of Katta-Moorda (the Darling Range) now referred to as the Jarrahdale State Forest.
Nearshore	Area of shallow water beyond the low tide mark, less than 1.5m deep.

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Ngangaramup	Part of the Darling Range where white stones are seen.
Ngowergup	Gorge of the Canning River.
Noongar/ Nyungah	The name for the Aboriginal people of the south-west of Western Australia.
Noorik/noorook	Egg
Nyeeranup Jeejilyanup	The area near Victoria Reservoir on Munday/Bickley Brook.
Nyina	To rest, sleep
Offshore	Area of deeper water greater than 1.5m deep.
Regulations	Environmental Protection (Unauthorised Discharges) Regulations 2004
River reach	A subsection of the river system that will be defined by ecological, topographical and cultural factors, as well as land tenure boundaries.
Riverpark	The Riverpark is made up the river and adjacent public land reserved as parks and recreation. DBCA is responsible for the management of the Riverpark, in conjunction with the local government.
Support	Organisation may not have legislative or policy responsibility, but has relevant data/ information, group/ organisational interest, and/ or may assist in delivering the output/ outcome of the action.
Yakkan/yarkan	Turtle
Yubby-Cowing	The area of the Canning River where Canning Bridge is now located.
Yonga	Kangaroo (male)
Wadjup	The section of the Canning River between Shelley Bridge to Mt Henry Bridge, including the Canning Flats.
Wagoorup	The mouth of the Canning River.
Wardoo	The lower section of the Southern River between its confluence with

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	Wungong River/Brook and the Canning River.
Warrine	A local species of yam (*Dioscorea lustifolia*) that was an important food source for Whadjuk people.
Warru-binjerup	Munday Swamp
Waugal/Waarkal	A mythical serpent or carpet snake who created the rivers and the land formations of the south-west.
Waydj	Emu
Whadjuk	The name of the Noongar dialectal group from Perth. Whadjuk is situated beneath Yued and above the Pinjarup dialectal groups.
Woondaming	An area near Maamba Reserve.
Woordan	Ocean

Noongar consonants Sounds

b	as in bin or spin
bw	as in bwana (Swahili name for boss)
d	as in dark or string
dj	as in judge
dw	as in twitch
k	as in skill (between English g and k)
kw	as in quiet
-l, -l-	as in lamp or nil
-ly	as in million
m	as in man
n	as in nil
ng	as in sing
ny	as in onion, nuisance
-p	as in cob, spin
-r	as in carol
-rd-	as in card (like an American would say it)
-rt	as in cart (like an American would say it)
-rl	as in whirl (like an American would say it)
-rn	as in torn (like an American would say it)
-t	as in sting (between English d and t)
-tj	as in chair
w	as in wet
y	as in yell

Source: Noongar Boodjar Language Cultural Aboriginal Corporation.

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Dedication

The Djarlgarro Plan is dedicated to Elder Greg Ugle RIP, a highly respected member of the Whadjuk community, and former Chair of the Whadjuk Aboriginal Corporation's Cultural Advice Committee.

Greg openly shared his wisdom, humour and foresight during the development of this Plan and was very keen to have the plan published to help others; being an example of people of First Nations and contemporary cultures working together to protect the waterways.

> *This is our book, this is what we've produced. This Plan is Perth based, but can be nationally applied. This Plan has to be heard in parliament. A vision is essential. If we have this, then change can be achieved.*
>
> *We're the carers of our waterways. We want to help support other countries to do what was done here. Here we can be that little ripple starting* (Greg Ugle RIP, August 2023).

Greg had to pull out of the Djarlgarro subcommittee in January 2025 to look after his health, but was committed to seeing the plan through. Greg's last words to us were

Carry on I will be watching.

Elder Greg Ugle RIP, 1954 – 2025
with great granddaughter Daenerys in February 2024
Photo - DBCA

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