



Revitalising Geographe Waterways

Report on activities 2020–22

Revitalising Geographe Waterways aims to improve water quality, waterway health, and management of Geographe waterways. It is part of the State Government-funded Healthy Estuaries WA program which supports restoration and management activities across regional estuaries.

Revitalising Geographe Waterways has been overseen by the Vasse Taskforce since 2014, with investment from State Government, Taskforce Partners, industry and community.

The current phase of the program runs until 2024 and continues with on-ground actions to reduce nutrients

from urban and rural areas; monitoring and science of priority waterways; implementing key actions in water management plans; and communicating and engaging with the community through partnerships and collaboration.

Improving water quality in Geographe waterways will take ongoing action and commitment. The Revitalising Geographe Waterways program provides the roadmap to achieve long-term improvements.

This report highlights the key achievements and progress of the Revitalising Geographe Waterways program between 2020–22.



Revitalising Geographe
Waterways

VASSE
taskFORCE



Foreword

The Geographe catchment has some of the state's most amazing natural assets, highly productive agricultural land and growing urban areas.

During my time as Vasse Taskforce Chair from late 2021-2023, I was impressed by the commitment of Taskforce partners to manage priority waterways in a sustainable way that balances growth, agricultural productivity and environmental needs.

For eight years, the Revitalising Geographe Waterways program has been working closely with rural and urban communities to reduce nutrients entering waterways, while delivering innovative science that explores ways to accelerate water quality improvements.

This work has been possible through bipartisan support by the State Government, which has ensured continuity of funding over three programs since 2014.

As outgoing Chair, I would like to wish the Vasse Taskforce continued success in their ongoing oversight of water quality in the Geographe catchment and look forward to seeing continued momentum through Revitalising Geographe Waterways.

Hon Jackie Jarvis MLC
Outgoing Chair,
Vasse Taskforce

Garden Guardians of the Bay

Nutrient run-off from urban areas accounts for about 8 per cent of phosphorus and 5 per cent of nitrogen entering Geographe Bay. The Bay OK program was developed in 2010 to raise awareness among gardeners and businesses to reduce nutrients leaving urban areas. Garden Guardians of the Bay (Garden Guardians) is a new behaviour change project focusing on specific gardening practices.

Garden Guardians was launched by GeoCatch in 2021 to encourage low-nutrient gardening practices for urban gardeners.

Garden Guardians encourage gardeners to adopt six gardening behaviours that can reduce nutrient run-off from urban areas: **Growing natives, adding clays to sandy soils, applying soil wetter, using chunky mulch, using slow-release fertiliser and using well-composted manures.**

Six local Geographe gardeners who are passionate about sustainable gardening were chosen to be the faces of the six behaviours. Life-sized cut-outs of the guardians are used to promote the six behaviours with displays at gardening centres and other retail outlets. The gardening behaviours have been promoted through media releases and newspaper features, videos, social media and at the cinema.

Nutrients from urban areas, particularly home gardens, contribute to poor water quality in the Lower Vasse River and Toby Inlet over summer months.

Reducing nutrients from urban gardens is therefore important in improving water quality in our urban waterways.

The Bay OK and Garden Guardians programs remind us that we all have a part to play in improving water quality in our waterways and for the long-term protection of Geographe Bay.

Join the [Garden Guardians of the Bay](#) and do your bit to keep Geographe Bay OK!

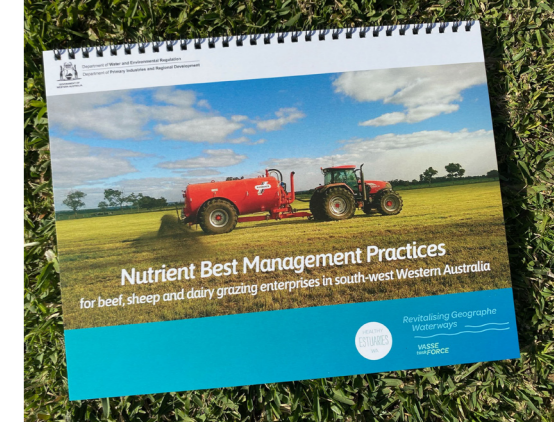


Grazing Best Management Practices

In 2022, best practice guidelines were developed to assist south-west grazing farmers with on-farm management of nutrients. The Best Management Practices BMPs provide valuable information to help grazing farmers maximise productivity, while minimising environmental impacts in local waterways.

Grazing BMPs for high rainfall grazing land were developed with input from farmers, scientists, catchment groups and fertiliser industry representatives.

They follow internationally recognised nutrient principles of applying fertiliser: **right source, right rate, right time, and right place**, and provide additional information for farmers on how to meet best practice and why it is relevant to the south-west grazing industry.



Grazing BMPs can be found in the Nutrient Best Management Practices document.

The Grazing BMPs allows farmers to compare their current operations with best practice standards to improve nutrient management on farm and demonstrate sustainable farming practices. GeoCatch will be supporting farmers to develop tailored nutrient plans for their properties based on the BMPs. The [Grazing BMPs](#) are available on the Revitalising Geographe Waterways website.

uPtake trials

uPtake is a partnership project between government agencies, fertiliser and grazing industry, universities, farmers, and catchment groups to undertake phosphorus trials across south-west Western Australia (WA) to improve confidence in the science behind fertiliser recommendations.

Teams from the Departments of Water and Environmental Regulation and Primary Industries and Regional Development have established and monitored 50 uPtake trials on farms across the south-west to validate national critical values for phosphorus. Critical values determine the amount of phosphorus needed to grow pasture for a given soil type. Results have demonstrated that the national values are relevant to soil types and contemporary pasture species grown in south-west WA. This has been an important finding to increase confidence in the science supporting fertiliser applications for both the fertiliser industry and farmers.

uPtake has communicated results of the project by partnering with catchment and industry groups to hold field days and workshops, and share results via traditional and social media reaching more than 1,500 farmers.

Reducing unnecessary use of phosphorus through improved confidence in the science has the potential to significantly reduce phosphorus loss from grazing properties and improve water quality in south-west waterways and estuaries, saving farmers money and saving the environment. For more information on the uPtake project visit the [Healthy Estuaries WA](#) website.





Community members visit the new culverts and penstock on a GeoCatch-hosted bus tour in 2021

Sediment removal in the Lower Vasse River

The Lower Vasse River is highly valued by the local community and reducing algal blooms over summer months is a priority for the community, City of Busselton, and Revitalising Geographe Waterways.

The Lower Vasse River has accumulated a layer of nutrient-rich organic sediments over many years. Over summer months these sediments release nutrients into the river contributing to algal blooms. Removal of sediments to improve water quality was identified as a priority by the Lower Vasse River

Management Advisory Group. Removing sediments is also a key action in the Lower Vasse River Waterway Management Plan (2019).

In autumn 2022, the City undertook Stage 1 of the sediment removal project between the Butter Factory and Causeway Road. The project successfully removed an estimated 630 tonnes of dry matter sediments. Funding has been secured for stages 2 and 3, with the aim to cover 2.5 km of the lower reach of the river. Stage 2 will start in autumn 2023.

Vasse Diversion Drain culvert upgrade

The Vasse Diversion Drain was installed in the 1920s to divert high flows from the upper Vasse and Sabina Rivers to protect the township of Busselton from flooding. The Vasse Diversion Drain is a critical part of Busselton's flood protection infrastructure.

The Vasse Diversion Drain was upgraded by the Water Corporation in 2021, and included the installation of two new penstocks to provide and regulate flow from the drain into the Lower Vasse River. The two penstocks replaced a 900 mm culvert, and have the ability to double the flow from the drain into the Lower Vasse River.

The penstocks were installed by the Water Corporation based on advice from modelling through the Reconnecting Rivers project, undertaken by the Department of Water and Environmental Regulation (the department). The modelling looked at various options for redirecting flows back into the Lower Vasse River and Vasse Estuary to improve water quality while managing flood risks. The upgrade now represents the maximum flow that can be diverted to the Lower Vasse River without increasing flood risk.

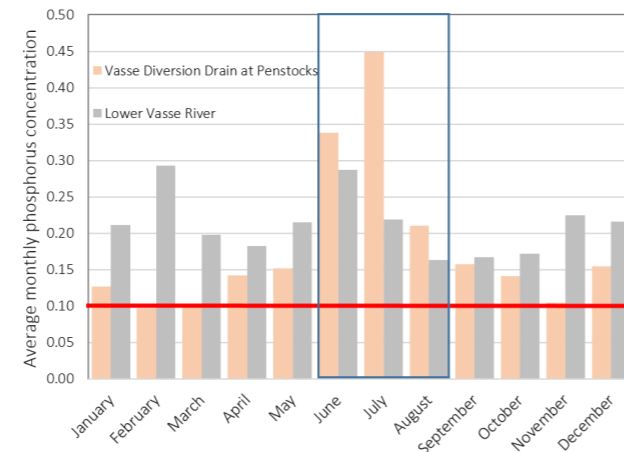


Figure 1: Monthly phosphorus concentrations in the Vasse Diversion Drain

Management of the penstocks is undertaken by the Water Corporation, based on an operating plan that considers flood risk and water quality. Water quality monitoring shows that the highest nutrient flows occur in winter and the lowest in spring (see figure 1). Opening both penstock in spring after high-nutrient winter flows provides the best water quality for Lower Vasse River at the end of spring.



Installation of the culverts and penstock



The completed penstocks



Micro-dredge removing sediments in the Lower Vasse River



Dewatering sediments in geotextile bags

Geographe Bay seagrass health

Seagrasses are sensitive to nutrients and can be at risk from excess nutrient flow into Geographe Bay from the catchment. The Keep Watch seagrass monitoring program measures seagrass health annually.

The Keep Watch program has been running for more than 10 years and is a partnership project between GeoCatch, Water Corporation, Edith Cowan University and the Department of Biodiversity, Conservation and Attractions.

Annual monitoring records seagrass shoot density, epiphyte (algal) cover and nutrient content across eight sites in Geographe Bay.

Shoot densities in Geographe Bay are above, or in the upper range of, other temperate *Posidonia sinuosa* seagrass meadows in WA.



Measuring seagrass shoot density in 2022

Algal epiphyte load on seagrass can be a good indicator of nutrient enrichment and observations have fluctuated over time, but are not currently a major concern.

More than 10 years of sampling data has shown that Geographe Bay's seagrasses are healthy and not showing declines from nutrients from the catchment. Seagrass monitoring will continue into the future. For a copy of the latest report, visit the [GeoCatch](https://www.geocatch.com.au) website.



Black Winged Stilts feeding in shallow water

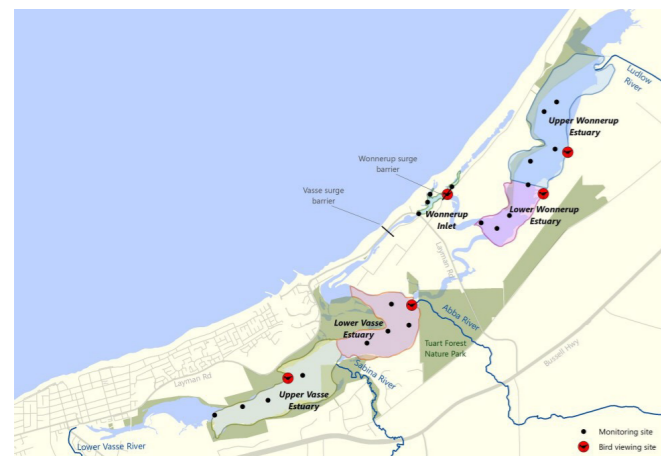
Vasse Wonnerup Wetlands ecological monitoring

The Vasse Wonnerup wetlands are recognised on a local, state, national and international level for their conservation, social and cultural values. Critical to maintaining these values is understanding the interrelationship between different aspects of the wetlands, particularly water regime and ecology.

Seawater has been let into the Vasse Wonnerup Wetlands since 1988 to improve water quality and reduce the risk of fish kills. Since 2015, the department has been monitoring the impacts of seawater inflow into the Vasse Estuary. Trials have shown significant improvements in water quality (particularly dissolved oxygen and reduced algal blooms) with seawater inflows. The long-term impacts of changing the water regime (water levels, inundation and salinity) on the ecology of the wetlands was, however, unknown.

To better understand the relationship between water regime and the ecological values that support waterbirds, the integrated ecological monitoring program was developed with the Vasse Wonnerup Wetlands Science Advisory Group.

Between March 2017 and January 2021 Murdoch University, the Department of Biodiversity, Conservation and Attractions, and our department monitored fish, aquatic plants, benthic macroinvertebrates, water birds and water regime as part of the integrated ecological monitoring program. In 2021, Edith Cowan University undertook a statistical analysis of the three years of data collected in the monitoring program. The report can be found on the [Revitalising Geographe Waterways](#) website.



Integrated monitoring regions and sites

Key findings of the integrated ecological monitoring program:

- The ecology of the wetlands varies significantly over different seasons and years including different species, abundance and diversity.
- The five regions of the system (upper and lower Wonnerup and Vasse estuaries, and the Wonnerup Inlet) support different ecological values.
- Aquatic plant density is highest in spring, declining over summer months.
- In winter, the macroinvertebrate community is mostly freshwater insects and crustaceans. In summer and autumn, salt-tolerant estuarine snails and worms dominate.
- Fish were most abundant in summer, with signs of spawning in spring. Fish numbers and species were much higher in the Wonnerup Inlet, showing this region as an important fish nursery and habitat.
- The species and number of waterbirds were highly seasonal with the highest number of ducks and black swans occurring in winter through to spring, coinciding with higher density of aquatic plants and fresh water.
- Highest numbers of small waders, including avocets and stilts, were recorded in summer with lower water levels.

Management of the Vasse surge barrier has adapted in light of findings from the integrated ecological monitoring program. Seawater will still be let into the estuary to improve water quality, but later in the summer and to lower water levels. Better understanding of the impact of the water regime on the ecology of the wetlands has been critical in protecting it while also trying to improve water quality and reduce the risk of fish kills.



Eurasian Curlew visiting Vasse Wonnerup in Feb 2021 (courtesy: Kim Williams)

Revitalising Geographe Waterways

Program highlights 2020-22

Urban Nutrients

34 Bay OK gardening workshops and events, presentation and displays reaching over

2250 gardeners

2 Bay OK low nutrient gardens

Review of Stormwater Infrastructure to prioritise future stormwater retrofitting projects

Removal of an estimated **600 tonnes** of sediment from the **Lower Vasse River**

104 properties connected to the new deep sewerage at Quindalup **reducing nutrients entering Toby Inlet**

Rural Nutrients

56 farmers undertook *soil testing & nutrient mapping* on **10,112 ha** of farmland reducing phosphorus entering waterways

10 Nutrient Plans developed helping farmers to improve all areas of nutrient management

14 Grazing Matcher farmer meetings with 12 farm businesses to optimise pasture management

Updated Dairy Effluent Code of Practice

2 soil amendment trials showing **90% reduction** in phosphorus run-off

6 uPtake Sites trialling phosphorus application and timing

Waterway management

Upgrade to the Vasse Diversion drain culvert, **doubling potential flows** to the Lower Vasse River

Development of the Lower Vasse River **Living Stream Concept Plan**

24 km of riparian fencing and **22 ha** of riparian revegetation planting over **20,300** seedlings

Research and Monitoring

Fortnightly monitoring of water quality at **22** locations across the catchment and continuous flow monitoring at **8 sites**

Seasonal ecological monitoring and integrated ecology report on the Vasse Wonnerup wetlands looking at waterbirds, macroinvertebrates, fish and aquatic plants

Keep Watch annual seagrass health monitoring program continued at **8 sites** in the nearshore Geographe Bay

Sediment sampling in the Vasse Estuary to inform proposed sediment removal program

Sediment Study on the Toby Inlet

Black Bream Health Monitoring and pit tagging of **80 fish** in the Vasse Estuary

Community Engagement and Communication

83% Confidence rating in the Revitalising Geographe Waterways program from feedback at community presentations

76 community events, webinars, workshops and field trips attracting over **3,200** participants

120 articles on the GeoCatch and RGW website

78% confidence in the science that informs waterway management from feedback at community presentations

Over **300** social media posts reaching **250,000** people

How are we tracking?

Water quality monitoring and modelling is important for managers to track water quality over time. The department collects continuous flow data at eight locations, and conducts fortnightly water quality monitoring at 22 sites within the Geographe catchment.

Water quality is highly variable across the Geographe catchment, mostly because of differences in soil type. In general water quality is considerably better in the western end of the catchment compared with the east, with poorer water quality in waterways flowing to the Vasse Wonnerup wetlands (Figure 3). Monitoring over the past 10 years shows an improvement in some waterways and declines in others. To see monitoring results of specific waterways over time, visit the Revitalising Geographe Waterways website.

Nutrient concentration targets have been set to show nutrient levels where algal blooms are unlikely (red line on graphs). These targets can be expressed as load reduction targets, and modelling is used to show progress towards targets. Figure 2 shows how we are tracking towards our target of about 50 per cent reduction in phosphorus off the catchment. Progress towards targets has increased since the start of Revitalising Geographe Waterways and continues to improve.

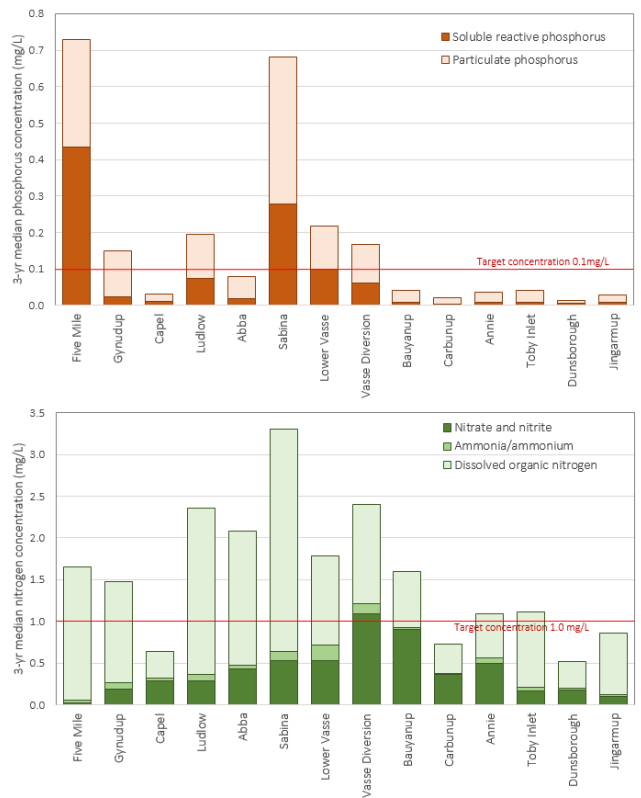


Figure 3: Winter medium total phosphorus and total nitrogen across Geographe waterways 2019–21

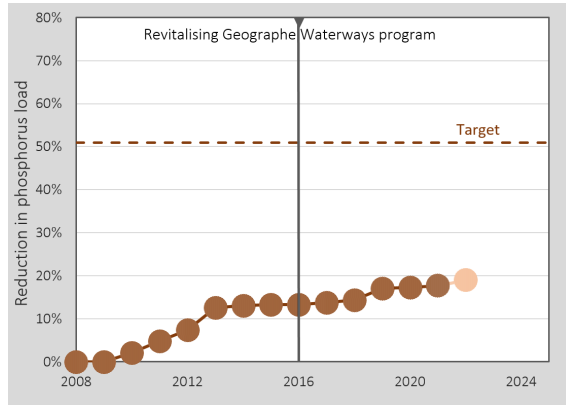


Figure 2: Tracking catchment management against target loads

Where to next?

Revitalising Geographe Waterways is funded until December 2024 through the State Government’s Healthy Estuaries WA program. The Vasse Taskforce is working on the next investment plan to support continuation of Revitalising Geographe Waterways, and actions to improve water quality in the Geographe catchment.

Underpinning this will be an updated water quality improvement plan that will use monitoring, modelling and reviewed best management practices to prioritise future works to reduce catchment nutrients and manage Geographe waterways. For more information on Revitalising Geographe Waterways, visit the [program website](#).



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