

Vasse-Wonnerup Integrated Ecological Monitoring Summary 2017-22: Fish component

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March 2022

Final Report

This research was commissioned by the Department of Water and Environmental
Regulation on behalf of the Vasse Wonnerup wetlands Partnership with funding
through the Revitalising Geographe Waterways Program



Government of **Western Australia**
Department of **Water and
Environmental Regulation**

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Background

This project is part of the Revitalising Geographical Waterways' Integrated Ecological Monitoring Study (IEM) which aims to better understand the relationships between water regime, macrophytes and abundance of benthic macroinvertebrates, fish and birds utilising the range of habitats (regions) present in the Vasse-Wonnerup (see <https://rgw.dwer.wa.gov.au/applying-science/vasse-wonnerup-science/>).

This fish component is a subset of the larger IEM study and aims to determine the characteristics of the fish fauna (*i.e.* number of species, abundance, diversity and faunal composition), within the five main regions of the Vasse-Wonnerup at seasonal and annual scales between July 2017 and January 2022. Full details and explanation of the trends in 2017/18 and 2018/19 individually can be found in Tweedley *et al.* (2019a,b) and from 2017 to 2021 in Tweedley *et al.* (2021).

Samples of the fish fauna from the shallow, nearshore waters (< 1.5 m deep) of five regions of the system (*i.e.* Upper and Lower Vasse and Wonnerup estuaries and Wonnerup Inlet; Figure 1) were collected in 12 seasons between July 2017 (winter) and January 2020 (autumn) using a 21.5 m seine net to account for seasonal variation in environmental conditions and the breeding and recruitment cycle of fishes. The overall composition of the fish fauna was determined and the characteristics (*i.e.* number of species, number of fish (density 100 m⁻²), Simpson's (Diversity) Index and faunal composition) calculated. Additional seine net sampling, and catch and release fishing in offshore waters using 160 m gill nets, was conducted in November 2020 and 2021 and January 2021 and 2022 as part of a project to investigate the abundance of Black Bream and develop a report card (Cottingham *et al.*, 2022). The Vasse Channel was added in November 2021 in response to the June 2021 fish kill.

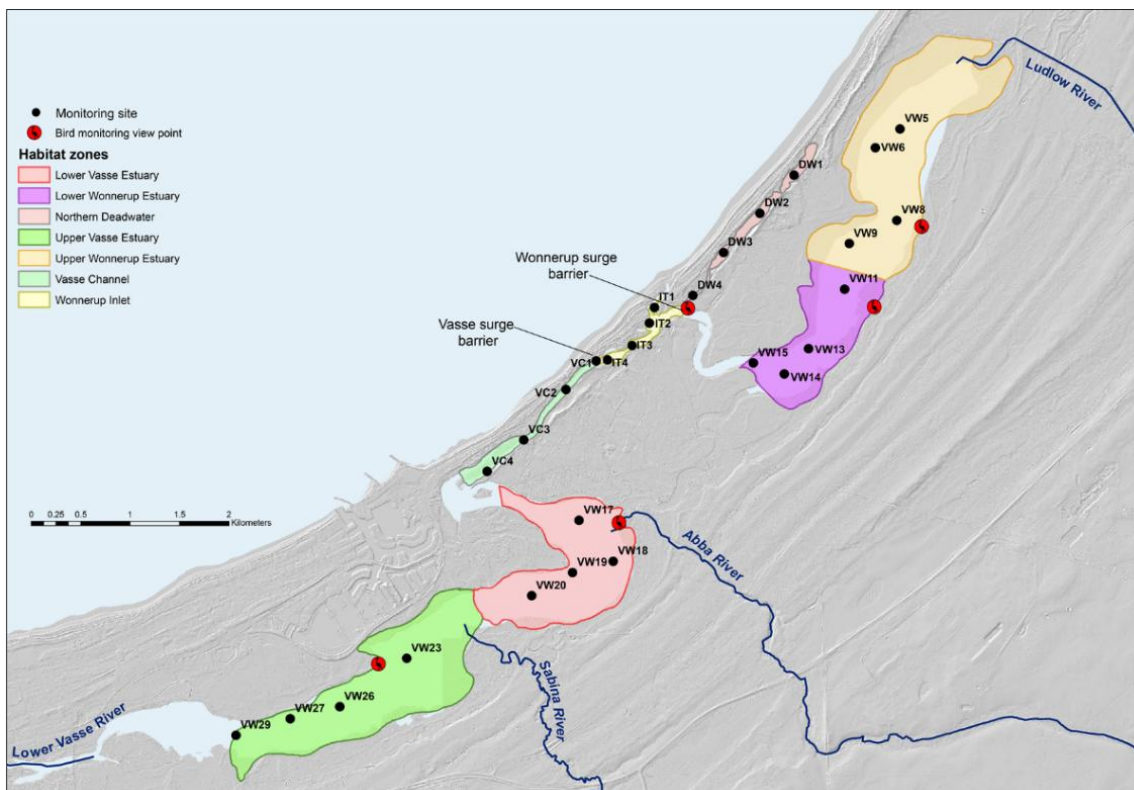


Figure 1. Map of the Vasse-Wonnerup showing the four sites sampled in each region. Map supplied by the Department of Water and Environmental Regulation.

Results

Table 1. Summary of the mean values for the number of fish species, total density (fish 100 m⁻²) and Simpson's (Diversity) Index and the key species present in the nearshore waters (< 1.5 m deep) each of the five regions of the Vasse-Wonnerup in each of the 12 seasons between July 2017 and March 2020. The values for each of these metrics across all seasons and regions are reflected in their colour shading from red (low) through yellow (intermediate) to green (high values). The fish species most abundant in each region and season combination are also provided. Sampling was conducted using a 21.5 m seine net, which could not be employed in when sites were dry and was not effective when water depths were < 0.5 m. As such no values were calculated (grey shading) when such conditions were present. NS = No sampling conducted.

		Region				
Metric	Season/year	Upper Vasse	Lower Vasse	Wonnerup Inlet	Lower Wonnerup	Upper Wonnerup
Number of species	Jul-17	1.25	1.75	2.13	0.63	1.88
	Oct-17	1.50	2.13	3.00	1.88	2.63
	Jan-18	0.00	1.00	4.63	Shallow	Shallow
	Mar-18	Dry	1.50	4.63	0.25	Dry
	Jul-18	0.50	0.63	2.88	0.38	0.38
	Oct-18	0.25	0.63	2.75	0.75	0.88
	Jan-19	Shallow	Shallow	3.75	Shallow	Shallow
	Mar-19	Shallow /dry	Shallow	2.75	Shallow	Shallow/dry
	Jul-19	0.25	0.13	0.88	1.13	0.38
	Oct-19	0.63	1.50	3.63	1.75	1.75
	Jan-20	Shallow	1.00	3.88	Shallow	Shallow
	Mar-20	1.25	1.50	2.75	Shallow	Shallow
	Nov-20	1.63	1.88	5.50	1.63	0.88
	Jan-21	NS	NS	4.38	NS	NS
	Nov-21	NS	NS	6.38	NS	NS
Jan-22	NS	NS	6.25	NS	NS	
Density (fish 100 m ²)	Jul-17	9.38	4.85	50.65	35.45	8.94
	Oct-17	23.06	20.80	124.68	39.44	125.54
	Jan-18	0.00	4,048.81	1,889.87	Shallow	Shallow
	Mar-18	Dry	7.11	413.79	0.22	Dry
	Jul-18	57.65	13.47	97.52	1.51	0.43
	Oct-18	17.46	103.77	169.18	5.39	3.77
	Jan-19	Shallow	Shallow	650.43	Shallow	Shallow
	Mar-19	Shallow /dry	Shallow	614.66	Shallow	Shallow/dry
	Jul-19	1.19	0.11	1.62	24.89	0.65
	Oct-19	2.48	86.53	103.13	363.79	30.60
	Jan-20	Shallow	351.72	1,033.73	Shallow	Shallow
	Mar-20	29.53	37.50	228.34	Shallow	Shallow
	Nov-20	153.13	322.31	1,243.64	79.09	1,060.67
	Jan-21	NS	NS	182.87	NS	NS
	Nov-21	NS	NS	1,284.91	NS	NS
Jan-22	NS	NS	1,373.06	NS	NS	

		Region				
Metric	Season/ year	Upper Vasse	Lower Vasse	Wonnerup Inlet	Lower Wonnerup	Upper Wonnerup
Simpson's Diversity	Jul-17	0.09	0.41	0.09	0.00	0.33
	Oct-17	0.13	0.33	0.41	0.27	0.35
	Jan-18	0.00	0.00	0.30	Shallow	Shallow
	Mar-18	Dry	0.14	0.25	0.00	Dry
	Jul-18	0.00	0.00	0.45	0.00	0.00
	Oct-18	0.00	0.00	0.23	0.00	0.00
	Jan-19	Shallow	Shallow	0.30	Shallow	Shallow
	Mar-19	Shallow /dry	Shallow	0.37	Shallow	Shallow/dry
	Jul-19	0.00	0.00	0.14	0.20	0.00
	Oct-19	0.09	0.08	0.34	0.04	0.25
	Jan-20	Shallow	0.00	0.25	Shallow	Shallow
	Mar-20	0.06	0.05	0.20	Shallow	Shallow
	Nov-20	0.02	0.02	0.44	0.09	0.01
	Jan-21	NS	NS	0.44	NS	NS
	Nov-20	NS	NS	0.60	NS	NS
Jan-21	NS	NS	0.24	NS	NS	
Key species	Jul-17	<i>P. olorum</i> & Atherinidae	<i>P. olorum</i> & Atherinidae	<i>F. lateralis</i> , Atherinidae & <i>M. cephalus</i>	<i>P. olorum</i> & Atherinidae	<i>P. olorum</i> & Atherinidae
	Oct-17	<i>P. olorum</i> , Atherinidae & <i>C. auratus</i>	<i>P. olorum</i> & Atherinidae	<i>F. lateralis</i> , Atherinidae, <i>A. forsteri</i> & <i>S. burrus</i>	<i>P. olorum</i> & Atherinidae	<i>P. olorum</i> , Atherinidae & <i>A. vaigiensis</i>
	Jan-18	None	Atherinidae & <i>P. olorum</i>	<i>P. olorum</i> , Atherinidae, <i>F. lateralis</i> & <i>S. burrus</i>	Shallow	Shallow
	Mar-18	Dry	Atherinidae	Atherinidae, <i>F. lateralis</i> , <i>P. olorum</i> & <i>R. sarba</i>	<i>P. olorum</i> & Atherinidae	Dry
	Jul-18	Atherinidae	Atherinidae	Atherinidae, <i>F. lateralis</i> & <i>A. foresteri</i>	Atherinidae	Atherinidae
	Oct-18	Atherinidae	Atherinidae	Atherinidae, <i>F. lateralis</i> , <i>P. olorum</i> & <i>A. foresteri</i>	Atherinidae	Atherinidae
	Jan-19	Shallow	Shallow	Atherinidae, <i>F. lateralis</i> & <i>A. butcheri</i>	Shallow	Shallow
	Mar-19	Shallow /dry	Shallow	Atherinidae, <i>F. lateralis</i> & <i>A. butcheri</i>	Shallow	Shallow/dry
	Jul-19	Atherinidae	Atherinidae	Atherinidae, <i>F. lateralis</i> & <i>A. forsteri</i>	None	None
	Oct-19	Atherinidae	Atherinidae	Atherinidae, <i>F. lateralis</i> & <i>P. olorum</i>	Atherinidae	Atherinidae
	Jan-20	Shallow	None	Atherinidae, <i>F. lateralis</i> & <i>A. butcheri</i>	Shallow	Shallow
	Mar-20	None	None	Atherinidae, <i>F. lateralis</i> & <i>A. butcheri</i>	Shallow	Shallow
	Nov-20	Atherinidae & <i>C. auratus</i>	Atherinidae & <i>C. auratus</i>	Atherinidae, <i>F. lateralis</i> & <i>P. olorum</i>	<i>P. olorum</i> & Atherinidae	Atherinidae & <i>P. olorum</i>
	Jan-21	NS	NS	Atherinidae, <i>F. lateralis</i> & <i>P. olorum</i>	NS	NS
	Nov-21	NS	NS	Atherinidae, <i>F. lateralis</i> , <i>A. forsteri</i> & <i>S. punctatus</i>	NS	NS
Jan-22	NS	NS	Atherinidae, <i>F. lateralis</i> , <i>M. cephalus</i> & <i>S. punctatus</i>	NS	NS	

Acanthopagrus butcheri (Black Bream); Atherinidae (Hardyheads); *Aldrichetta forsteri* (Yelloweye Mullet) *Favonigobius lateralis* (Southern Longfin Goby), *Mugil cephalus* (Sea Mullet), *Pseudogobius olorum* (Bluespot Goby) & *Sillaginodes punctatus* (King George Whiting).

Table 2. Summary of the mean values for the number of fish species, catch rate (fish h⁻¹) and Simpson's (Diversity) Index and the key species present in the offshore waters (> 1.5 m deep) of Wonnerup Inlet, Deadwater and Vasse Channel regions of Vasse-Wonnerup in November 2020 and 2021 and January 2021 and 2022. The values for each of these metrics across all seasons and regions are reflected in their colour shading from red (low) through yellow (intermediate) to green (high values). The fish species most abundant in each region and season combination are also provided. NS = No sampling conducted.

Metric	Season/year	Region		
		Vasse Channel	Wonnerup Inlet	Deadwater
Number of species	Nov-20	NS	6.00	6.00
	Jan-21	NS	4.75	3.50
	Nov-21	3.00	5.50	4.00
	Jan-22	3.50	4.75	7.50
Catch rate (hour ⁻¹)	Nov-20	NS	22.00	50.00
	Jan-21	NS	29.00	81.50
	Nov-21	228.50	30.00	23.00
	Jan-22	80.00	38.50	70.50
Simpson's Diversity	Nov-20	NS	0.68	0.80
	Jan-21	NS	0.55	0.48
	Nov-21	0.19	0.67	0.52
	Jan-22	0.21	0.61	0.64
Key species	Nov-20	NS	<i>A. forsteri</i> , <i>P. octolineatus</i> & <i>P. saltatrix</i>	<i>A. forsteri</i> , <i>M. cephalus</i> & <i>P. octolineatus</i>
	Jan-21	NS	<i>P. octolineatus</i>	<i>M. cephalus</i> & <i>P. octolineatus</i>
	Nov-21	<i>M. cephalus</i> , <i>A. forsteri</i> & <i>A. butcheri</i>	<i>G. subfasciatus</i> , <i>P. saltatrix</i> & <i>S. schomburgkii</i>	<i>A. forsteri</i> , <i>P. octolineatus</i> & <i>S. schomburgkii</i>
	Jan-22	<i>M. cephalus</i> & <i>A. forsteri</i>	<i>M. cephalus</i> & <i>G. subfasciatus</i>	<i>M. cephalus</i> , <i>S. schomburgkii</i> & <i>P. octolineatus</i>

Acanthopagrus butcheri (Black Bream), *Aldrichetta forsteri* (Yelloweye Mullet), *Gerres subfasciatus* (Common Silverbidy), *Mugil cephalus* (Sea Mullet), *Pelates octolineatus* (Western Striped Grunter), *Pomatomus saltatrix* (Tailor) and *Sillago schomburgkii* (Yellowfin Whiting).

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