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Supplementary Material

Characterising the woody vegetation in contrasting habitat types in the lower Fitzroy River, Western Australia

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Supplementary Materials

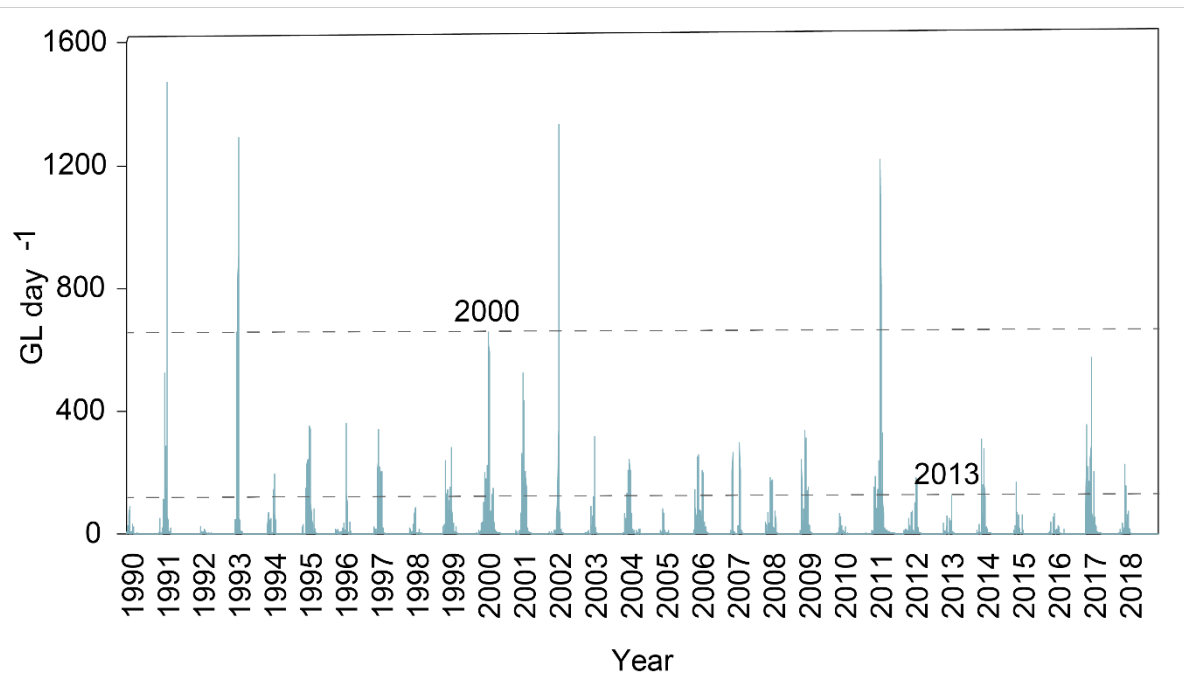


Figure S1. Mean daily discharge from the Fitzroy River at Fitzroy Crossing (site Fitzroy Barrage (AWRC 802003) accessed from bom.gov.au/waterdata). Dashed lines show the maximum discharge in the years investigated in the current study 2000 (1 in 11 AEP) and 2013 (1 in 1 AEP).



Figure S2. Adventitious roots on *Melaleuca* spp. Photos were taken during the dry season of 2019, and demonstrate significant root development during periods of inundation at considerable height/water depth.

Table S1. Environmental data for study sites in the lower Fitzroy River, with sites in four “zones”: floodplain (FP), off-channel wetlands (OC), top of banks (TB), and riverbanks (RB). The nine environmental variables are: distance from the site to the estuary (Dist2Est); distance from the site to the main river channel (DistFrCh); the fire frequency as the proportion of years with a fire between 2005-2010 (FireFreq); inundation duration in a large flood (1 in 11 AEP; in2000); inundation duration in a small flood (1 in 1 AEP; in2013); mean annual pan evaporation (panEvap); mean annual rainfall (rain); mean maximum temperature (maxTemp); and, soil clay content (clayPercent)

Site	Zone	Dist2Est km	DistFrCh km	FireFreq	in2000 days	in2013 days	panEvap mm	rain mm	maxTemp °C	clayPercent %
FP01	FP	324	0.928	0.1	80	0	3099	530	35	30
FP02	FP	308	0.282	0	38	0	3099	519	35	10
FP03	FP	64	3.42	0.2	39	0	2785	595	34	30
FP04	FP	306	0.255	0	56	0	3130	505	35	45
FP05	FP	344	0.61	0.3	79	0	3099	539	35	45
FP06	FP	95	2.1	0	76	0	2865	580	34	37
FP07	FP	376	0.356	0.5	0	0	3115	556	35	15
FP08	FP	122	0.365	0.1	112	56	2919	542	34	45
FP09	FP	138	0.887	0.1	40	0	2898	539	34	37
FP10	FP	371	0.156	0.1	0	0	3089	564	35	30
FP11	FP	247	1	0.2	78	0	3090	473	35	37
FP12	FP	269	0.592	0.5	80	0	3090	490	35	37
FP13	FP	390	0.138	0.2	0	0	3115	540	35	30
FP14	FP	362	6.35	0.1	0	0	3115	549	35	45
FP15	FP	288	0.968	0	56	0	3113	509	35	37
FP16	FP	330	0.235	0	36	0	3099	521	35	37
FP17	FP	58	1.495	0	109	55	2785	596	34	15
OC01	OC	119	1.23	0.1	112	56	2919	545	34	40
OC02	OC	247	2.73	0	79	0	3090	473	35	45
OC03	OC	324	0.91	0.1	80	0	3099	530	35	30
OC04	OC	335	3.1	0.1	41	0	3099	523	35	45
OC05	OC	376	1.5	0.5	0	0	3115	556	35	30
OC06	OC	122	0.878	0.1	87	0	2919	545	34	37
OC07	OC	246	1.3	0.2	78	0	3090	473	35	45
OC08	OC	362	6.38	0.1	0	0	3115	549	35	40
OC09	OC	317	0.599	0.1	80	0	3099	529	35	45
RB01	RB	324	0.005	0.1	115	56	3099	530	35	45
RB02	RB	308	0.005	0	115	56	3099	519	35	30
RB03	RB	64	0.005	0	112	56	2785	591	34	7
RB04	RB	306	0.005	0	115	56	3130	499	35	45
RB05	RB	344	0.005	0.4	116	56	3099	531	35	15
RB06	RB	95	0.005	0.1	118	56	2832	579	34	15
RB07	RB	376	0.005	0.5	117	56	3115	556	35	7
RB08	RB	122	0.005	0.1	114	56	2919	545	34	30
RB09	RB	138	0.005	0.2	116	56	2898	542	34	30
RB10	RB	371	0.005	0.1	37	0	3089	564	35	30
RB11	RB	247	0.005	0.2	114	56	3090	473	35	30
RB12	RB	269	0.005	0.5	117	56	3090	490	35	30
RB13	RB	390	0.005	0.2	117	56	3115	540	35	30
RB14	RB	288	0.005	0	114	56	3113	509	35	15
RB15	RB	330	0.005	0	116	56	3099	521	35	7

RB16	RB	58	0.005	0	112	56	2785	592	34	15
TB01	TB	324	0.04	0.1	115	56	3099	530	35	30
TB02	TB	308	0.09	0	115	56	3099	519	35	30
TB03	TB	64	0.035	0	112	56	2785	591	34	45
TB04	TB	306	0.035	0	115	56	3130	499	35	40
TB05	TB	344	0.065	0.4	89	0	3099	531	35	30
TB06	TB	95	0.039	0.1	118	56	2832	579	34	15
TB07	TB	376	0.035	0.5	99	28	3115	556	35	15
TB08	TB	122	0.027	0.1	114	56	2919	545	34	30
TB09	TB	138	0.08	0.2	113	56	2898	542	34	45
TB10	TB	371	0.028	0.1	37	0	3089	564	35	45
TB11	TB	247	0.068	0.2	81	0	3090	473	35	30
TB12	TB	269	0.06	0.5	80	0	3090	490	35	37
TB13	TB	390	0.37	0.2	69	0	3115	540	35	45
TB14	TB	288	0.04	0	114	56	3113	509	35	15
TB15	TB	330	0.048	0	115	8	3099	521	35	30
TB16	TB	58	0.047	0	111	56	2785	592	34	45

Table S2. Count of woody species identified in vegetation surveys at 58 sites along the lower Fitzroy River in four habitat types: riverbank (RB); top of bank (TB); floodplain (FP); and, off-channel wetlands (WL).

Species	Family	Vegetation zone				Total count
		RB	TB	FP	WL	
<i>Acacia colei</i>	Fabaceae	3	3		8	14
<i>Acacia</i> sp.	Fabaceae			7		7
<i>Atalaya hemiglauc</i>	Sapindaceae		231	4	14	249
<i>Azadirachta indica</i> *	Meliaceae		1			1
<i>Barringtonia acutangula</i>	Lecythidaceae	250	62		51	363
<i>Bauhinia cunninghamii</i>	Fabaceae		6	6	6	18
<i>Bridelia tomentosa</i>	Phyllanthaceae	2	114			116
<i>Calotropis procera</i> *	Apocynaceae		17		2	19
<i>Carissa lanceolata</i>	Apocynaceae			3		3
<i>Corymbia greeniana</i>	Myrtaceae			8		8
<i>Corymbia bella</i>	Myrtaceae		42	37	7	86
<i>Eucalyptus camaldulensis</i>	Myrtaceae	18	57	2	135	212
<i>Eucalyptus microtheca</i>	Myrtaceae	4	44	193	69	310
<i>Eucalyptus</i> sp.	Myrtaceae				1	1
<i>Ficus aculeata</i>	Moraceae		2		25	27
<i>Ficus coronulata</i>	Moraceae	14	37			51
<i>Ficus racemosa</i>	Moraceae	3				3
<i>Ficus</i> sp.	Moraceae			1	5	6
<i>Lophostemon grandiflorus</i>	Myrtaceae		11			11
<i>Melaleuca argentea</i>	Myrtaceae	131				131
<i>Melaleuca leucadendra</i>	Myrtaceae	130			2	132
<i>Melaleuca nervosa</i>	Myrtaceae			11		11
<i>Melaleuca</i> sp.	Myrtaceae	1			2	3
<i>Melia azerdarach</i>	Meliaceae		3	1		4
<i>Nauclea orientalis</i>	Rubiaceae	12	2			14
<i>Pandanus</i> sp.	Pandanaceae	1				1
<i>Parkinsonia aculeata</i> *	Fabaceae	2				2
<i>Planchonia careya</i>	Lecythidaceae		1			1
<i>Santalum lanceolatum</i>	Santalaceae		5			5
<i>Terminalia platyphylla</i>	Combretaceae	1	20	3	36	60
<i>Vachellia farnesiana</i> *	Fabaceae		2			2
<i>Ventilago viminalis</i>	Rhamnaceae		1			1
						1872

* indicates non-native species

Table S3. Outputs from SIMPER analysis*Groups Floodplain & Off channel*

Average dissimilarity = 74.31

Species	Group Floodplain	Group Off channel	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Eucalyptus camaldulensis	0.07	1.32	13.66	1.35	18.38	18.38
Eucalyptus microtheca	1.53	1.19	10.38	1.25	13.97	32.35
Terminalia platyphylla	0.08	0.85	9.42	1.09	12.67	45.02
Barringtonia acutangula	0.00	0.67	7.21	0.69	9.71	54.73
Corymbia sp.	0.36	0.40	6.09	0.78	8.20	62.93
Atalaya hemiglauca	0.19	0.46	4.97	0.81	6.68	69.61
Acacia coleii	0.00	0.40	4.60	0.63	6.19	75.80
Bauhinia cunninghamii	0.26	0.28	4.26	0.73	5.74	81.54
Ficus sp.	0.06	0.17	2.18	0.42	2.93	84.47
Ficus aculeata	0.00	0.25	2.11	0.35	2.83	87.31
Corymbia greeniana	0.15	0.00	1.54	0.35	2.08	89.38
Melaleuca sp.	0.00	0.13	1.36	0.35	1.83	91.21
Eucalyptus sp.	0.00	0.11	1.35	0.35	1.81	93.03
Melaleuca leucadendra	0.00	0.13	1.27	0.35	1.70	94.73
Calotropis procera*	0.00	0.13	1.12	0.35	1.51	96.24

Groups Floodplain & Riverbank

Average dissimilarity = 98.26

Species	Group Floodplain	Group Riverbank	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Barringtonia acutangula	0.00	1.90	22.11	3.78	22.51	22.51
Eucalyptus microtheca	1.53	0.09	17.56	1.67	17.87	40.38
Melaleuca argentea	0.00	1.30	15.89	1.47	16.17	56.54
Melaleuca leucadendra	0.00	1.11	11.71	1.41	11.92	68.47
Ficus coronulata	0.00	0.44	4.66	0.73	4.74	73.20
Corymbia sp.	0.36	0.00	4.07	0.49	4.14	77.35
Eucalyptus camaldulensis	0.07	0.36	4.02	0.61	4.09	81.44
Bauhinia cunninghamii	0.26	0.00	2.73	0.52	2.78	84.22
Nauclea orientalis	0.00	0.24	2.14	0.47	2.18	86.39
Atalaya hemiglauca	0.19	0.00	1.78	0.45	1.81	88.20
Corymbia greeniana	0.15	0.00	1.62	0.35	1.65	89.85
Terminalia platyphylla	0.08	0.06	1.34	0.35	1.37	91.22
Bridelia tomentosa	0.00	0.13	1.34	0.37	1.37	92.59
Melaleuca nervosa	0.11	0.00	1.08	0.25	1.10	93.69
Pandanus sp.	0.00	0.06	0.85	0.25	0.87	94.56
Acacia coleii	0.00	0.08	0.83	0.26	0.84	95.40

Groups Off channel & Riverbank

Average dissimilarity = 83.21

Species	Group Off channel	Group Riverbank	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Barringtonia acutangula	0.67	1.90	11.43	1.60	13.74	13.74
Melaleuca argentea	0.00	1.30	11.11	1.51	13.35	27.09
Eucalyptus microtheca	1.19	0.09	9.90	1.23	11.89	38.98
Eucalyptus camaldulensis	1.32	0.36	9.46	1.24	11.36	50.34
Melaleuca leucadendra	0.13	1.11	8.24	1.35	9.90	60.25
Terminalia platyphylla	0.85	0.06	7.02	1.09	8.44	68.69
Acacia colei	0.40	0.08	3.67	0.69	4.42	73.10
Ficus coronulata	0.00	0.44	3.42	0.73	4.10	77.20
Atalaya hemiglauc	0.46	0.00	3.33	0.68	4.00	81.20
Corymbia sp.	0.40	0.00	2.99	0.68	3.60	84.80
Bauhinia cunninghamii	0.28	0.00	2.05	0.52	2.47	87.27
Ficus aculeata	0.25	0.00	1.68	0.35	2.02	89.29
Nauclea orientalis	0.00	0.24	1.63	0.46	1.96	91.25
Melaleuca sp.	0.13	0.06	1.35	0.43	1.63	92.87
Ficus sp.	0.17	0.00	1.31	0.35	1.58	94.45
Eucalyptus sp.	0.11	0.00	0.99	0.35	1.19	95.64

Groups Floodplain & Top of bank

Average dissimilarity = 79.76

Species	Group Floodplain	Group Top of bank	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Atalaya hemiglauc	0.19	1.72	13.71	2.24	17.19	17.19
Eucalyptus camaldulensis	0.07	1.00	9.03	1.43	11.32	28.52
Eucalyptus microtheca	1.53	0.94	8.76	1.30	10.98	39.50
Bridelia tomentosa	0.00	0.99	8.22	1.03	10.31	49.81
Barringtonia acutangula	0.00	0.81	6.82	1.01	8.55	58.36
Corymbia sp.	0.36	0.64	6.51	0.89	8.16	66.53
Terminalia platyphylla	0.08	0.54	4.59	0.85	5.76	72.29
Bauhinia cunninghamii	0.26	0.27	3.54	0.75	4.44	76.72
Ficus coronulata	0.00	0.35	3.29	0.49	4.13	80.86
Calotropis procera*	0.00	0.26	2.59	0.46	3.25	84.10
Acacia colei	0.00	0.19	1.51	0.47	1.90	86.00
Vachellia farnesiana*	0.00	0.13	1.31	0.37	1.65	87.65
Melia azedarach	0.06	0.08	1.30	0.34	1.63	89.28
Corymbia greeniana	0.15	0.00	1.28	0.35	1.61	90.89
Nauclea orientalis	0.00	0.13	0.96	0.38	1.20	92.09

Melaleuca nervosa	0.11	0.00	0.86	0.25	1.08	93.17
Santalum lanceolatum	0.00	0.09	0.86	0.26	1.08	94.25
Ficus aculeata	0.00	0.07	0.80	0.26	1.00	95.26

Groups Off channel & Top of bank

Average dissimilarity = 65.56

Species	Group Off channel	Group Top of bank	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Atalaya hemiglauca	0.46	1.72	9.35	1.76	14.27	14.27
Barringtonia acutangula	0.67	0.81	6.38	1.14	9.74	24.00
Bridelia tomentosa	0.00	0.99	6.37	1.04	9.71	33.72
Eucalyptus camaldulensis	1.32	1.00	6.11	1.18	9.32	43.03
Eucalyptus microtheca	1.19	0.94	5.79	1.09	8.84	51.87
Terminalia platyphylla	0.85	0.54	5.59	1.16	8.53	60.40
Corymbia sp.	0.40	0.64	4.70	0.96	7.17	67.58
Acacia colei	0.40	0.19	3.19	0.76	4.86	72.44
Bauhinia cunninghamii	0.28	0.27	2.83	0.75	4.32	76.76
Ficus coronulata	0.00	0.35	2.48	0.50	3.78	80.54
Calotropis procera*	0.13	0.26	2.41	0.56	3.68	84.21
Ficus aculeata	0.25	0.07	1.92	0.44	2.93	87.14
Ficus sp.	0.17	0.00	1.10	0.35	1.67	88.81
Vachellia farnesiana*	0.00	0.13	0.97	0.37	1.47	90.28
Melaleuca sp.	0.13	0.00	0.87	0.35	1.33	91.61
Melaleuca leucadendra	0.13	0.00	0.83	0.35	1.27	92.88
Eucalyptus sp.	0.11	0.00	0.81	0.35	1.24	94.12
Nauclea orientalis	0.00	0.13	0.76	0.37	1.16	95.28

Groups Riverbank & Top of bank

Average dissimilarity = 82.84

Species	Group Riverbank	Group Top of bank	Av.Diss	Diss/SD	Contrib%	Cum.%
	Av.Abund	Av.Abund				
Atalaya hemiglauca	0.00	1.72	11.83	2.83	14.28	14.28
Melaleuca argentea	1.30	0.00	9.45	1.54	11.41	25.70
Barringtonia acutangula	1.90	0.81	8.54	1.46	10.31	36.00
Melaleuca leucadendra	1.11	0.00	7.39	1.39	8.92	44.93
Bridelia tomentosa	0.13	0.99	6.52	1.08	7.88	52.80
Eucalyptus camaldulensis	0.36	1.00	6.50	1.34	7.85	60.65
Eucalyptus microtheca	0.09	0.94	6.39	1.33	7.71	68.36
Corymbia sp.	0.00	0.64	4.32	0.80	5.22	73.58
Ficus coronulata	0.44	0.35	4.16	0.82	5.02	78.60
Terminalia platyphylla	0.06	0.54	3.62	0.85	4.37	82.97

Calotropis procera*	0.00	0.26	2.01	0.46	2.42	85.39
Nauclea orientalis	0.24	0.13	1.95	0.59	2.35	87.75
Bauhinia cunninghamii	0.00	0.27	1.87	0.56	2.26	90.01
Acacia colei	0.08	0.19	1.61	0.54	1.95	91.96
Vachellia farnesiana*	0.00	0.13	1.00	0.37	1.21	93.17
Santalum lanceolatum	0.00	0.09	0.68	0.26	0.82	93.98
Melia azedarach	0.00	0.08	0.67	0.26	0.81	94.79
Lophostemon grandiflorus	0.00	0.11	0.65	0.26	0.79	95.58