

Seagrass meadows shape fish assemblages across estuarine seascapes

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Marine Ecology Progress Series 588: 179–189 (2018)

Table S1 Mean (+/- SD) of environmental attributes for the estuaries sampled in southeast Queensland in 2016. See Table 1 for detailed descriptions of variables used.

Estuary	# Sites Sampled	Distance from mouth (m)		S'scape Wide Proximity		Turbidity (NTU)		Salinity (PPT)		Mangrove area (m ²)		Mangrove distance (m)	
		Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd
Brisbane	15	10168.7	2994.8	2089.9	6949.4	8.5	3.4	31.4	1.7	347.5	1100.7	422.4	432.3
Caboolture	20	2666.3	1403.7	2454.5	5447.8	4.9	1.5	32	2	2171.9	2516.6	88.4	94.8
Coochin	24	1509.2	800	556.1	1492.7	5.7	0.5	32.1	0.4	1395.5	1808.1	79.6	75.4
Currumbin	24	1702	860.8	4126	16599.3	5.4	1	33.3	0.6	886.5	1667.2	219.1	233.3
Logan	24	4814.9	2035.5	2224.7	7327.2	11.7	2.9	32.6	1.5	2953.1	1872.1	18.9	44.8
Maroochy	29	2869.2	1351.5	801.5	1777.8	2.9	1.3	33.8	1.1	1289.9	1972.2	129.4	137.1
Mooloolah	25	5040	2400.6	610.6	1447.4	8.7	1.2	33.8	0.9	1023.8	1637.0	658	1167.4
Nerang	27	3334.9	2019.8	110.9	410.8	2.3	0.4	29.2	2	0	0	8722.5	4627.1
Noosa	26	2666.3	1548.7	23548	110446.9	2.7	1.1	34.7	0.5	836.7	1748.1	254.2	301.1
Pimpama	25	3246.7	1962.1	644.8	1530.8	3.5	1.9	34.4	0.4	1689.2	2157.6	92.1	125.4
Pine	24	4706.3	2541.5	1119.5	1980.5	8.6	2.1	30.7	1.2	2266.9	2205	61.4	115.7
Tallebudgera	30	1840.1	959.8	763.2	2059.2	2.2	0.3	34.5	0.6	1252.8	2295.3	362.7	458.2
Tingalpa	25	2254.1	811.8	846.3	1654.2	5.9	0.8	31.5	1.1	2476.5	1754.1	22.4	36.2

Estuary	Missing Habitats	Intertidal flats area (m ²)		Intertidal flats distance (m ²)		Urban area (m ²)		Urban distance (m)		Seagrass area (m)		Seagrass distance (m)	
		Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd	Mean	sd
Brisbane	Snag, seagrass, rock	57.5	222.5	4975.9	3020.9	2058.2	1831.9	108.6	185.1	0	0.0	12435.7	2994.8
Caboolture	Seagrass, rock	3887.3	3676.4	62.4	93.9	645	1625.8	517.4	513.2	0	0.0	13029.3	1403.7
Coochin	Seagrass	453.1	971.1	113.7	78.2	405.8	1136.6	792.8	579.9	0	0.0	25022.2	800
Currumbin	Rock	863.7	2067.6	427.4	494.3	4104.6	1887.3	13.5	27.5	1445.5	489.9	126.8	167.9
Logan	Seagrass	1145.5	3101.6	655.1	751.8	0	0	1484.3	416.6	0	0.0	4278.9	2035.5
Maroochy	-	3375.2	3358.4	89.5	152.9	1156.1	1879.4	238.5	216.5	3129.8	3103.3	604.8	565.3
Mooloolah	Seagrass	0	0	5040	2400.6	652.8	1081.8	727.5	717.4	0	0	5040	2400.6
Nerang	-	818.2	1713.9	284.2	464.6	3679.6	2188.5	24.1	35.6	2176.1	3019.6	665.6	711.7
Noosa	-	882.6	2027.5	207.8	181.7	590.3	1331.7	310.4	350.5	1521.5	3374.9	1288.3	1138.2
Pimpama	Seagrass	1690.7	3077.8	75.8	62.6	526.3	1190.6	1946.8	1558.5	162.5	812.6	3355.7	1962.1
Pine	Seagrass	2470	3247.8	1152.8	1325.3	1076.8	1601.7	276.4	288.7	0	0	23898.3	2541.5
Tallebudgera	-	1992.6	3094.3	91	78.3	553.8	1211.1	319.2	313.5	1134.4	1094.2	418.2	290.7
Tingalpa	Seagrass	111	539.9	1346.8	743.7	858.7	1675.1	308.1	292.2	1162.3	4077.5	1882.1	811.8

Table S2 List of identified species on underwater video stations, and the habitat to which they were assigned based on existing literature from the region (Sheaves & Johnston 2009, Olds et al. 2012, Froese & Pauly 2017).

Species	Assigned habitat-association category	Frequency of occurrence (proportion of sites)					
		Log Snag	Sand/mud	Urban structure	Mangroves	Rock Outcrop	Seagrass
<i>Acanthopagrus australis</i>	Mangroves	0.91	0.41	0.93	0.93	0.67	0.43
<i>Ambassis marianus</i>	Mangroves	0.43	0.10	0.29	0.57	0.16	0.31
<i>Atule mate</i>	Mangroves	0.02	0.07	0.05	0.02	0	0
<i>Caranx sexfasciatus</i>	Mangroves	0.02	0	0.03	0	0.05	0.02
<i>Ephiniphelus coioides</i>	Mangroves	0	0	0.02	0	0	0
<i>Epinephelus malabaricus</i>	Mangroves	0.02	0	0.05	0	0.02	0
<i>Lutjanus argentimaculatus</i>	Mangroves	0.10	0	0.10	0	0.09	0
<i>Lutjanus fulviflamma</i>	Mangroves	0.05	0	0.05	0.02	0.03	0
<i>Lutjanus russelli</i>	Mangroves	0.19	0	0.24	0.07	0.19	0.02
<i>Monodactylus argenteus</i>	Mangroves	0.10	0	0.07	0.03	0.03	0.02
<i>Scomberoides lysan</i>	Mangroves	0	0.02	0	0	0.02	0
<i>Selenotoca multifasciata</i>	Mangroves	0.05	0.03	0	0.03	0.02	0
<i>Siganus fuscescens</i>	Mangroves	0.05	0	0.19	0.03	0.02	0.02
<i>Siganus lineatus</i>	Mangroves	0	0	0	0	0.02	0
<i>Tetractenos hamiltoni</i>	Mangroves	0.07	0.03	0.05	0.07	0.07	0.03
<i>Torquigener pleurogramma</i>	Mangroves	0	0.02	0	0.03	0	0
<i>Belone belone</i>	Seagrass	0	0	0	0	0.02	0
<i>Brachaluteres jacksoniensis</i>	Seagrass	0	0	0	0	0.02	0
<i>Choerodon cephalotes</i>	Seagrass	0	0	0	0	0.02	0
<i>Diagramma pictum</i>	Seagrass	0	0	0	0	0.02	0
<i>Girella tricuspidata</i>	Seagrass	0.17	0.03	0.38	0.12	0.16	0.19
<i>Herklotsichthys castelnaui</i>	Seagrass	0.14	0.07	0.14	0.16	0.05	0.07
<i>Lethrinus laticaudis</i>	Seagrass	0.16	0.02	0.05	0.19	0.09	0.17
<i>Lethrinus nebulosus</i>	Seagrass	0.02	0	0	0	0	0
<i>Meuschenia trachylepis</i>	Seagrass	0	0	0.02	0	0	0
<i>Monacanthus chinensis</i>	Seagrass	0	0	0.03	0	0.03	0.05
<i>Nuchequula gerreoides</i>	Seagrass	0	0	0.05	0	0	0
<i>Pelates sexlineatus</i>	Seagrass	0.02	0	0.02	0	0	0.10
<i>Petroscirtes variabilis</i>	Seagrass	0.03	0	0	0	0.02	0.02
<i>Plectorhinchus gibbosus</i>	Seagrass	0.02	0	0.02	0	0.02	0.02
<i>Rhabdosargus sarba</i>	Seagrass	0.02	0	0.03	0.05	0	0.03
<i>Scarus ghobban</i>	Seagrass	0	0	0.02	0	0.02	0
<i>Sphyraena obtusata</i>	Seagrass	0.03	0	0.05	0.02	0.02	0.03
<i>Abudefduf bengalensis</i>	Structure	0	0	0.07	0	0.03	0
<i>Acanthurus dussumieri</i>	Structure	0	0	0.10	0	0.07	0
<i>Acanthurus triostegus</i>	Structure	0	0	0.02	0	0	0
<i>Anampses geographicus</i>	Structure	0	0	0.02	0	0	0

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		Log Snag	Sand/mud	Urban structure	Mangroves	Rock Outcrop	Seagrass
<i>Apogon cavitensis</i>	Structure	0	0	0	0	0.02	0
<i>Apogon fasciatus</i>	Structure	0	0	0	0	0.02	0
<i>Apogon limenus</i>	Structure	0	0	0.02	0	0	0
<i>Arothron hispidus</i>	Structure	0	0	0	0.03	0	0
<i>Arothron manilensis</i>	Structure	0	0.03	0.02	0	0.02	0
<i>Atypichthys latus</i>	Structure	0	0	0.02	0	0	0
<i>Chaetodon auriga</i>	Structure	0	0	0.03	0	0.02	0
<i>Chaetodon flavirostris</i>	Structure	0	0	0.02	0	0	0
<i>Chaetodon unimaculatus</i>	Structure	0	0	0.02	0	0	0
<i>Chaetodon vagabundus</i>	Structure	0	0	0.02	0	0	0
<i>Chaetodontoplus meredithi</i>	Structure	0	0	0.02	0	0	0
<i>Cheilinus chlorourus</i>	Structure	0	0	0.02	0	0	0
<i>Cheilodactylus vestitus</i>	Structure	0	0	0.05	0	0.05	0
<i>Coradion altivelis</i>	Structure	0	0	0.02	0	0	0
<i>Coris pictoides</i>	Structure	0	0	0.02	0	0	0
<i>Dicotylichthys punctulatus</i>	Structure	0	0.02	0.09	0	0.09	0.02
<i>Gymothorax pseudothyroideus</i>	Structure	0.02	0	0	0	0	0
<i>Halichoeres marginatus</i>	Structure	0	0	0.02	0	0	0
<i>Heniochus diphreutes</i>	Structure	0	0	0.02	0	0	0
<i>Johnius borneensis</i>	Structure	0	0	0	0	0.02	0
<i>Kyphosus sydneyanus</i>	Structure	0	0	0.02	0	0	0
<i>Labroides dimidiatus</i>	Structure	0	0	0.02	0	0	0
<i>Microcanthus strigatus</i>	Structure	0.24	0	0.38	0.05	0.16	0.02
<i>Neotrygon kuhlii</i>	Structure	0.02	0.03	0	0	0.02	0.02
<i>Ostracion cubicus</i>	Structure	0	0	0.02	0	0	0
<i>Parapeneus signatus</i>	Structure	0	0	0.02	0	0.02	0
<i>Parma oligolepis</i>	Structure	0	0	0.02	0	0	0
<i>Platax sp.</i>	Structure	0	0	0	0	0	0.02
<i>Pomacentrus moluccensis</i>	Structure	0	0	0.02	0	0	0
<i>Pomadasys kaakan</i>	Structure	0	0.03	0.03	0	0.02	0.02
<i>Prionurus microlepidotus</i>	Structure	0	0	0.05	0	0	0
<i>Pseudodax molluncanus</i>	Structure	0	0	0.03	0	0	0
<i>Pseudolabrus guentheri</i>	Structure	0.03	0	0.12	0	0.05	0
<i>Scolopsis bilineata</i>	Structure	0	0	0.02	0	0	0
<i>Thalassoma nigrofasciatum</i>	Structure	0	0	0	0	0.02	0
<i>Thalssoma lunare</i>	Structure	0	0	0.05	0	0.05	0
<i>Unidentified Labridae</i>	Structure	0.02	0	0	0	0	0
<i>Amblyeleotris wheeleri</i>	Sand/mud	0	0	0.02	0	0	0
<i>Dasyatis fluviarum</i>	Sand/mud	0.02	0.07	0.03	0	0.03	0
<i>Gerres subfasciatus</i>	Sand/mud	0.52	0.12	0.41	0.55	0.22	0.29

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		Log Snag	Sand/mud	Urban structure	Mangroves	Rock Outcrop	Seagrass
<i>Gerres filamentosis</i>	Sand/mud	0	0	0	0.02	0	0
<i>Himantura uarnak</i>	Sand/mud	0	0.02	0	0.02	0.02	0
<i>Mugil cephalus</i>	Sand/mud	0.28	0.19	0.17	0.09	0.29	0.19
<i>Neoarius graeffei</i>	Sand/mud	0.05	0.02	0	0.03	0	0
<i>Omobranchus punctatus</i>	Sand/mud	0.02	0	0	0.02	0.02	0
<i>Platycephalus fuscus</i>	Sand/mud	0	0.03	0	0.02	0	0
<i>Pomatoschistus minutus</i>	Sand/mud	0	0.07	0	0	0.03	0.09
<i>Sillago cilliata</i>	Sand/mud	0.05	0.10	0.09	0.07	0.03	0.09
<i>Sillago maculata</i>	Sand/mud	0	0	0	0	0	0.02
Unidentified <i>Blenidae</i>	Sand/mud	0	0	0.02	0	0.02	0
Unidentified <i>Gobidae</i>	Sand/mud	0.03	0.05	0.07	0.09	0.02	0.02
<i>Upeneus tragula</i>	Sand/mud	0	0	0.02	0	0	0

LITERATURE CITED

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