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Sandringham Bay Fish Community Survey

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Background

Several natural and modified wetlands within the catchment adjacent to Sandringham Bay were identified for potential fish habitat restoration. The sites included constructed wetlands currently used as ponded pastures, natural remnant wetlands and riverine lagoons. Initially seven wetland and ponded pasture sites, and three riverine lagoons were selected. However, low water levels and high salinity at some sites restricted sampling to four wetland/ponded pasture sites and three riverine lagoons. Locations and names of the sites sampled in this study are listed in table 1. Fish community surveys were conducted at various sites within Sandringham Bay, Mackay Qld on 7th and 8th of September 2021. Surveys were conducted using a boat (3.7m) mounted Smith-Root 2.5GPP electrofisher unit with a single 6-dropper electrode. A single boat operator and additional netter surveyed all accessible deep and shallow water habitats. Sampling consisted of up to three replicates in larger sites and single replicates in smaller sites in which the duty cycle was used to alternate between power on and power off. Stunned fish were collected and placed in a water-filled tub until the end of the replicate at which point, they were identified, measured, and released. Water quality parameters (pH, Electrical conductivity, Temperature, and Dissolved Oxygen) were measured using a handheld YSI sonde at each site at approximately 10cm depth.

Table 1. Site details

Site Name	Latitude	Longitude	Water Course
Macs Truckstop on-line sump hole	-21.302270°	149.183730°	Alligator Ck
Macs Truckstop extended sump hole wetland	-21.303330°	149.184430°	Alligator Ck
Macs Truckstop Irrigation Dam	-21.296040°	149.177790°	Sandringham Ck
Macs Truckstop Main Wetland	-21.296720°	149.174570°	Sandringham Ck
Sandringham Creek DS of Munburra Rd	-21.295290°	149.157780°	Sandringham Ck
Sandringham Constructed Wetland	-21.297090°	149.147050°	Sandringham Ck
Sandringham Lagoon MID	-21.296720°	149.127660°	Sandringham Ck
Sandringham Lagoon Lower	-21.299840°	149.134670°	Sandringham Ck
Sandringham Lagoon Upper	-21.294330°	149.122510°	Sandringham Ck

Results

Water Quality

Water quality was generally within healthy ranges for most sites. The small sump hole (on-line) at the Macs Truckstop wetlands and the Sandringham constructed wetland exhibited extremely low dissolved oxygen. At these sites the oxygen levels were below lethal levels for most fish species.

Site Name	Sample Date/Time	Temperature (°C)	DO (mg/L)	DO (%sat)	EC (µs/cm)	pH
Macs Truckstop on-line sump hole	7/09/21 08:35	18.0	0.04	0.6	309.5	6.43
Macs Truckstop extended sump hole wetland	7/09/21 09:10	18.0	8.77	92.8	551	7.82
Macs Truckstop Irrigation Dam	7/09/21 10:10	21.4	5.76	66.8	205.8	7.09
Macs Truckstop Main Wetland	7/09/21 12:05	21.7	11.18	128	339.6	9.05

Sandringham Constructed Wetland DS	8/09/21 09:40	19.6	0.83	9.1	149	6.33
Sandringham Constructed Wetland US	8/09/21 09:40	19.3	0.25	2.8	162	6.34
Sandringham Lagoon MID	8/09/21 10:50	21.7	3.94	45.5	145.1	6.54
Sandringham Lagoon Lower	8/09/21 11:35	21.7	3.08	35.4	142.3	6.37
Sandringham Creek DS of Munburra Rd	8/09/21 14:15	19.6	252.7	34.5	252.7	6.44

Fish community

Fish community surveys recorded 16 species in total, 11 potamodromous, 4 diadromous, and 1 of unknown migratory status (Table 2). The main wetland at the Macs Truckstop complex and Sandringham Lagoon had the greatest diversity of species (11 and 10 respectively) (Table 2). Of the wetland sites, the main wetland site exhibited the highest CPUE (Table 3). Catch per unit effort was highest at the Sandringham Lagoon site (Table 4).

Table 2. Catch per unit effort for migratory species classes.

Site/migratory status	Number of species	Average of CPUE (fish/min)
Macs Truckstop on-line sump hole wetland		
Diadromous	1	2.64
Potamodromous	1	2.64
Total	2	5.3
Macs Truckstop extended sump hole wetland		
Diadromous	3	6.00
Potamodromous	4	4.60
Total	7	10.6
Macs Truckstop Irrigation Dam		
Diadromous	4	8.33
Potamodromous	2	0.99
Total	6	9.3
Macs Truckstop Main Wetland		
Diadromous	4	15.52
Potamodromous	7	62.69
Total	11	78.2
Sandringham Constructed Wetland		
Diadromous	2	2.47
Potamodromous	3	0.47
Total	5	2.9
Sandringham Creek DS of Munburra Rd		
Diadromous	4	4.82
Potamodromous	5	6.32
Total	9	11.1
Sandringham Lagoon		
Diadromous	3	3.69

Potamodromous	6	570.31
Unknown	1	0.14
Total	10	574.1

Table 3. Catch per unit effort for individual fish species at Mack's Truckstop wetland and ponded pasture sites.

Species	Common name	Average of CPUE (fish/min)
Macs Truckstop extended sump hole wetland		
<i>Ambassis agassizii</i>	Agassizi's glassfish	2.76
<i>Gambusia holbrooki</i>	Mosquito fish	1.40
<i>Hypseleotris compressa</i>	Empire gudgeon	3.53
<i>Hypseleotris species 1</i>	Midgley's carp gudgeon	0.61
<i>Lates calcarifer</i>	Barramundi	0.61
<i>Megalops cyprinoides</i>	Tarpon	2.24
<i>Porochilus rendahli</i>	Rendahli's catfish	1.07
Total (Average of replicate totals) N=2		7.95
Macs Truckstop Irrigation Dam		
<i>Anguilla reinhardtii</i>	Long-finned eel	0.08
<i>Gambusia holbrooki</i>	Mosquito fish	0.09
<i>Hypseleotris compressa</i>	Empire gudgeon	8.19
<i>Lates calcarifer</i>	Barramundi	0.07
<i>Megalops cyprinoides</i>	Tarpon	0.07
<i>Porochilus rendahli</i>	Rendahli's catfish	0.94
Total (Average of replicate totals) N=2		9.30
Macs Truckstop Main Wetland		
<i>Ambassis agassizii</i>	Agassizi's glassfish	12.01
<i>Anguilla reinhardtii</i>	Long-finned eel	0.17
<i>Craterocephalus stercusmuscarum</i>	Flyspecked hardyhead	41.46
<i>Gambusia holbrooki</i>	Mosquito fish	0.13
<i>Hypseleotris compressa</i>	Empire gudgeon	15.22
<i>Lates calcarifer</i>	Barramundi	0.13
<i>Leiopotherapon unicolor</i>	Spangled perch	1.89
<i>Megalops cyprinoides</i>	Tarpon	0.08
<i>Melanotaenia splendida splendida</i>	Eastern rainbowfish	3.89
<i>Mogurnda adspersa</i>	Purple-spot gudgeon	0.16
<i>Porochilus rendahli</i>	Rendahli's catfish	3.34
Total (Average of replicate totals) N=3		78.23

Table 4. Catch per unit effort for individual fish species at Sandringham Creek sites.

Species	Common name	Average of CPUE (fish/min)
Sandringham Constructed Wetland		
<i>Hypseleotris compressa</i>	Empire gudgeon	1.18
<i>Megalops cyprinoides</i>	Tarpon	1.29
<i>Melanotaenia splendida splendida</i>	Eastern rainbowfish	0.24
<i>Oxyeleotris lineolatus</i>	Sleepy cod	0.12
<i>Xiphophorus maculatus</i>	Platy	0.12
Total		2.94
Sandringham Creek DS of Muburra Rd		
<i>Ambassis agassizii</i>	Agassizi's glassfish	0.17
<i>Anguilla reinhardtii</i>	Long-finned eel	0.17
<i>Craterocephalus stercusmuscarum</i>	Flyspecked hardyhead	0.33
<i>Giurus margaritacea</i>	Snakehead gudgeon	0.50
<i>Hypseleotris compressa</i>	Empire gudgeon	4.16
<i>Hypseleotris species 1</i>	Midgley's carp gudgeon	0.33
<i>Lates calcarifer</i>	Barramundi	0.17
<i>Megalops cyprinoides</i>	Tarpon	0.33
<i>Melanotaenia splendida splendida</i>	Eastern rainbowfish	4.99
Total		11.14
Sandringham Lagoon		
<i>Ambassis agassizii</i>	Agassizi's glassfish	0.36
<i>Anguilla reinhardtii</i>	Long-finned eel	0.75
<i>Craterocephalus stercusmuscarum</i>	Flyspecked hardyhead	39.63
<i>Gambusia holbrooki</i>	Mosquito fish	40.57
<i>Giurus margaritacea</i>	Snakehead gudgeon	0.12
<i>Hypseleotris compressa</i>	Empire gudgeon	3.72
<i>Hypseleotris species 1</i>	Midgley's carp gudgeon	0.24
<i>Megalops cyprinoides</i>	Tarpon	0.46
<i>Melanotaenia splendida splendida</i>	Eastern rainbowfish	489.55
<i>Ophisternon bengalense</i>	One-gilled eel	0.14
Total (Average of replicate totals) N=3		574.05

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