Annual status report 2011
Queensland Coral Fishery

Queensland Government

Fishery Profile 2010–11	
Key species Broad range of species from the classes Anthozoa and Hydrozoa including live corals (anemones, soft and hard corals); ornamental corals; live rock; coral rubble and coral sand.	**Total number of commercial licences in 2010–11** 59 licences
Total harvest from all sectors 75 t (comprised of 34 t specialty coral and 41 t other coral [including 34 t live rock and 7 t ornamental])	**Commercial licences accessing the fishery in 2010–11** 25 licences
Commercial harvest 75 t (comprised of 34 t specialty coral and 41 t other coral [including 34 t live rock and 7 t ornamental])	**Fishery season** 1 July 2010 to 30 June 2011
Recreational harvest (2005) No estimate level of harvest for 2010–11	**Fishery symbols** D
Indigenous harvest No estimate level of harvest for 2010–11	**Monitoring undertaken** Commercial logbooks and real time monitoring of quota usage
Charter harvest Not applicable to the fishery	**FOP days monitored in 2010–11** Nil
Allocation between sectors Commercial only fishery. The quantity of coral taken recreationally within the fishery is minimal considering: • collection is not permitted in State and Commonwealth marine parks (the majority of the fishery area); • the limited known distribution of coral outside Marine Parks, and the; • gear restrictions imposed on recreational collection.	**Accreditation under the EPBC Act** Expires 1 July 2012
Total exports 237 546 pieces of harvested coral exported from Queensland in 2010–11	**Logbook validation** Yes—completed in 2008
Commercial Gross Value of Production (GVP) No estimate for 2010–11. The GVP for the Queensland Coral Fishery (QCF) and the Marine Aquarium Fish Fishery (combined) was estimated to be $10–12 million in 2008–09.	**Quota managed** Yes–commercial Total Allowable Catch = 200 t [split between specialty coral (30%) and other coral (70%)]

Introduction

The Queensland Coral Fishery (QCF) is one of a range of harvest (hand collection) fisheries managed by the Fisheries Queensland, part of the Department of Employment, Economic Development and Innovation (DEEDI). Commercially collected coral taxa, coral rubble and sand, and live rock are marketed domestically and internationally. Coral taxa can also be collected recreationally from areas outside of State Marine Parks and the Great Barrier Reef Marine Park (GBRMP).

This report covers fishing activity during the 2010–11 financial year.

Fishery description

The QCF is a small scale, quota managed, hand harvest fishery (commercial Total Allowable Catch = 200 tonnes (t)) with 59 authorities. The quota is split between Specialty coral (30%) and Other coral (Coral products consisting of live rock and coral rubble/ornamental coral/LC1[1]/non-coral) (70%). The QCF commenced as a licenced fishery on 1 July 2006.

Licence holders can collect from all genera of hard and soft corals occurring in the fishery area (approximately 400 species/genera (Roelofs & Silcock 2008)), however choose to target small, vibrant varieties of coral and anemones (Order Actinaria). The collection is in response to the strong market demand for live corals for use in private aquaria. Live rock (i.e. dead coral skeletons with algae and other organisms living on them) is also a major component of the fishery, due to its suitability as a substrate for the smaller, brighter corals in aquarium tanks.

Recreational fishers can collect corals for personal home aquaria. Apparatus restrictions for the QCF (see Fishing methods) limit recreational fishing capacity and

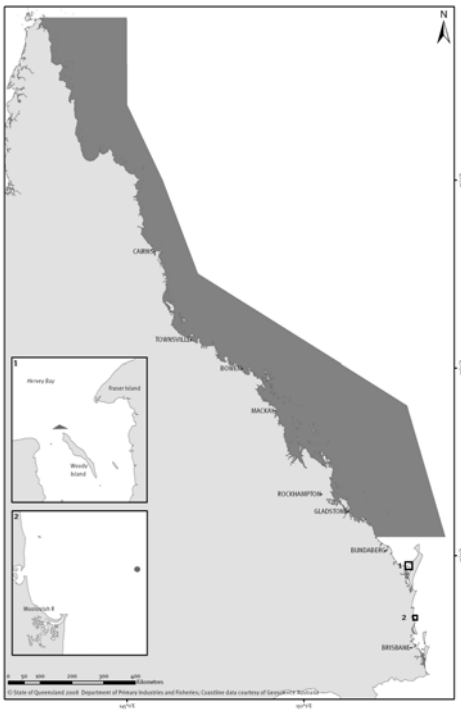

Figure 1: Queensland Coral Fishery area.

regulations imposed under Marine Parks' legislation limit the fishable area for recreational fishers to waters outside of declared Marine Parks.

Fishing methods

The fishery operates along the east coast of Queensland within the bounds of the Offshore Constitutional

Settlement (Figure 1). Commercial operators in the QCF collect coral from waters along the Queensland east coast between 10°41' S and 24°30' S (not including areas closed through general fisheries closures or marine parks zoning under the Commonwealth *Great Barrier Reef Marine Park Act 1975* and the Queensland *Marine Parks Act 1982*. There are two small collection areas south of 24°30' S however access to these is restricted through licence conditions. The fishery area also comprises two spatially defined high use Coral Collection Areas (CCAs) at Cairns and around the Keppel group of islands.

Coral may only be taken by hand or by using hand-held non-mechanical implements, such as a hammer and chisel. Licence holders may also use underwater breathing apparatus (SCUBA or hookah) when taking coral. Where a chisel is used, divers endeavour to remove only the coral itself, taking great care to minimise the amount of substrate that is taken or damaged. These removal methods reduce freight costs (less weight and

[1] LC1 category results have been included in this report but will no longer be a reported category as from July 2009. The Coral Policy defined LC1 as 'Very small live corals with pedal disc ‹5cm diameter often associated with live rock' and was reported against 'other coral' quota pre-July 2009. The category had a 'free trip allowance of 68.2 litres' provided as a concession to operators adjusting to reporting under the new quota regime and new logbook. Fisheries Queensland removed the free quota allowances on 1 July 2009. The LC1 category has been replaced by the LC6 (›1kg) category. Fishers must report number and estimated weight for LC6.

volume) and also limit the environmental footprint of their harvesting. Coral collectors have committed to best practise harvesting methods through the industry's Stewardship Action Plan (Donnelly 2009).

Recreational harvesters are not permitted to use SCUBA or hookah gear.

Key species

The commercial Coral Fishery is based on the collection of a broad range of species from the classes Anthozoa and Hydrozoa. The key components of the fishery are:

- Specialty live corals (includes anemones, soft and hard corals)
- Ornamental (non-living) corals
- Live rock (i.e. dead coral skeletons with algae and other organisms living on them)
- Coral rubble (i.e. coarsely broken up coral fragments)
- Coral sand (i.e. finely ground up particles of coral skeleton)–only taken as incidental catch and may not be targeted within Marine Park waters.

Coral taxa from over 36 families are harvested for the live aquarium trade. Recent years have seen a move away from coral collected for ornamental purposes (Families Acroporidae and Pocilloporidae) to colourful individual live corals for home aquaria, especially species with large polyps from the Families Mussidae and Faviidae.

Main management methods used

Under Offshore Constitutional Settlement (OCS) arrangements between the Commonwealth and Queensland governments, management of coral collection adjacent to the east coast of Queensland falls under Queensland law. Fisheries in the Coral Sea (outside of the OCS) are managed by the Commonwealth Government.

The following management measures are in place for the commercial fishery under legislation and policy:

- Limited entry: 59 Commercial Harvest Fishery Licences are endorsed for the coral fishery.
- Quota managed: 200 t commercial Total Allowable Catch [split between specialty coral (30%) and other coral (70%)]
- Limits on the number of boats and collectors operating under a licence at any one time.
- Collection by hand or hand-held implements only, with the aid of artificial breathing apparatus allowed.

Since 1 July 2006 the commercial coral fishery has operated under the Policy for the Management of the Coral Fishery (the Coral Policy). Fisheries Queensland implemented several changes to the operation and management of the fishery on 1 July 2009 following the review of the Coral Policy in 2008. The review outcomes were reported in the 2008 Annual Status Report.

It is important to note that the changes to the *Policy for the Management of the Coral Fishery* that commenced in 2009–10 directly affect the catch statistics in this year's Annual Status Report. As a result it is not possible to compare data to previous years in some cases. Where it has been possible to combine data in order to make comparisons to previous years, it will be stated as such. These changes are discussed in more detail further below in 2010 Annual Status Report under the heading *Changes to management arrangements in the reporting year*.

Catch statistics

Commercial

Approximately 75 t, including 34.5 t of specialty coral (LC2–LC6), and 40.5 t of other coral including 34 t of live rock, coral rubble and LC1, and 6.5 t of ornamental coral was harvested in the QCF in 2010–11 (Figure 2). Overall the total harvest has been decreasing since 2007–08. The reduction in total harvest has been largely driven by decreases in the collection of coral products (Figure 2). Live rock is the main component of the coral product category and is typically only sold domesticly. Industry representatives attribute the decrease to a depressed domestic market following the impacts of the Global Financial Crisis (GFC). Marine aquarium systems for the home are generally expensive to set up and to maintain. Industry contend that the effect of the GFC was for individuals to tighten personal budgets and to decrease spending on personal luxury items and minimise energy use in the household.

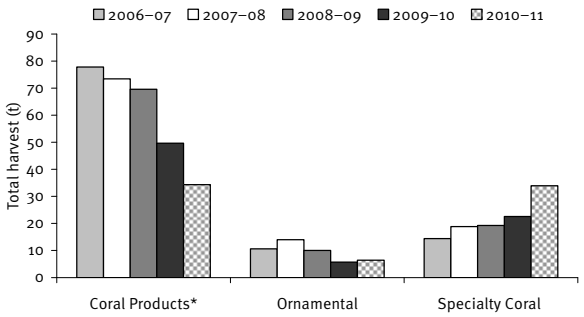

Figure 2: Catch composition (QCF Logbook categories) of all coral collected in the Queensland Coral Fishery for the quota years 2006–07 to 2010–11 (Source: Fisheries Queensland CFISH database, 2 February 2012). * includes Live Rock, Coral Rubble and LC1.

Contrasting the overall decreasing trend in total harvest, the collection of specialty corals increased in 2010–11 (Figure 2, Table 1). The driver of this change appears to be the increased collection of live Acroporid species (Tables 2–4). Recent advances in the husbandry of Acroporid species have led to greater success in specimen survival during transport and has resulted in a burgeoning export market. Acroporid coral are generally known to be fast growing. Fisheries Queensland is working with the industry to document the range of Acroporid species collected to ensure sustainable harvest is occuring.

Table 1: Number of individual pieces and weight of Speciality Coral species collected in the Queensland Coral Fishery from 2006–07 to 2010–11 (Source: Fisheries Queensland CFISH database, 2 February 2012).

Year	No. of individual pieces	Weight (kg)
2006–07	71 823	14 392
2007–08	119 125	18 824
2008–09	150 875	19 240
2009–10	173 075	22 595
2010–11	181 128	33 937

The majority (51 t) of the total harvest (75 t) came from the Cairns Coral Collection Area (CCA), with less than 4 t from the Keppel CCA and approximately 20 t from the Other category in 2010–11 (Figure 3, Tables 2–4). Catches in the Keppel CCA did not exceed the annual review reference points (RRP) for specialty coral, ornamental coral and live rock. Collection of specialty coral (20 t) in the Cairns CCA exceeded the RRP of 13 t while the collection of live rock fell below the 30% trigger limit as well (the nature of these exceedances are discussed in the *Performance against fishery objectives* section of this report). The harvest of specialty coral increased from 10 to 13 t from 2009–10 to 2010–11 in the fishery outside of the two CCAs while the collection of coral products decreased from 8 to 3 t (Figure 3).

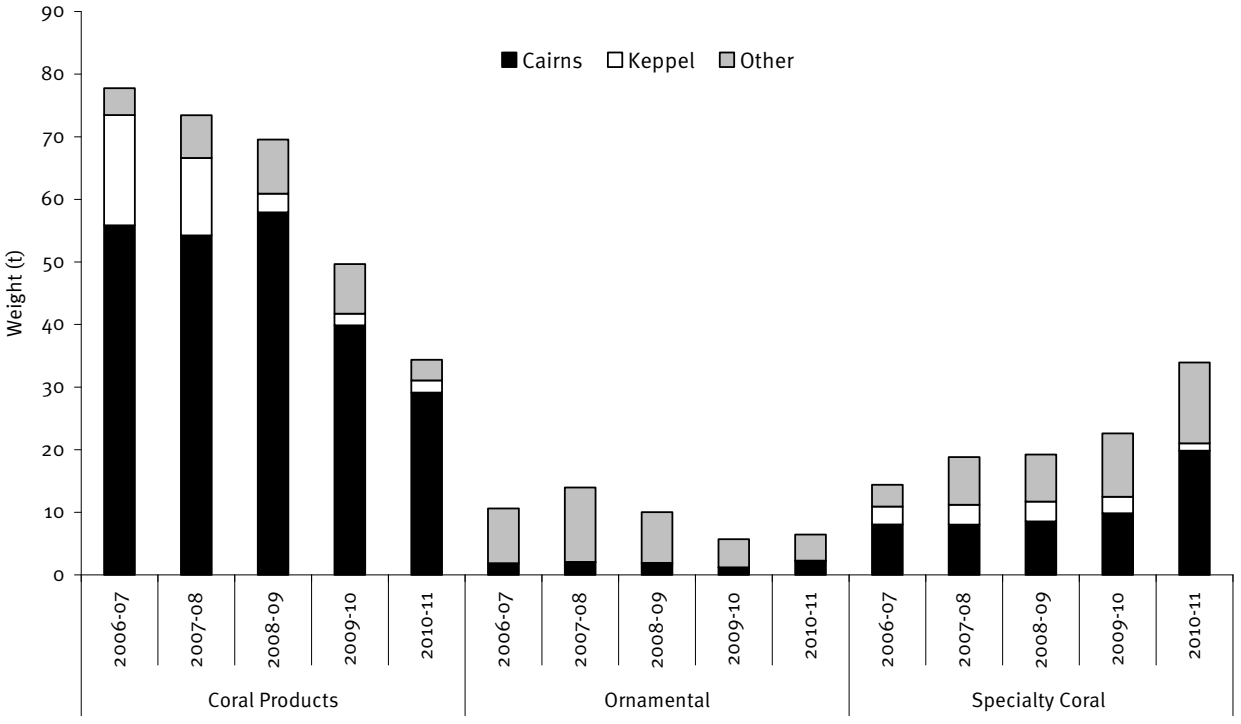

Figure 3. Regional breakdown of QCF logbook general categories in the Queensland Coral Fishery for the quota years 2006–07 to 2010–11 (Source: Fisheries Queensland CFISH database, 2 February 2012).

The number of individual pieces of Specialty Coral collected increased once more in 2010–11 (Table 1, Figure 4). The industry is developing markets and diversifying the species that are collected to meet the drop in domestic and export sales. The Queensland Coral Fishery is particularly resilient in this regard by having a diverse and extensive species base to chose from. Fisheries Queensland are working with industry to ensure that comprehensive lists of the species collected are maintained.

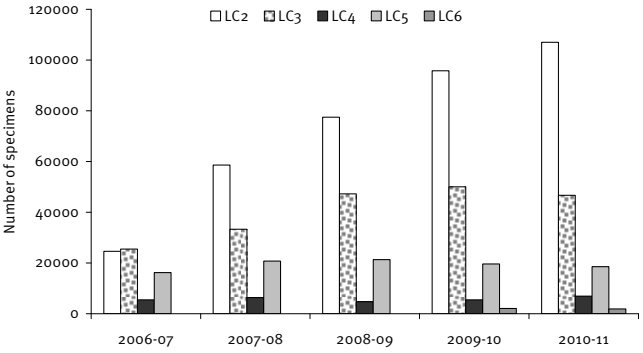

Figure 4. Number of individual pieces of Specialty Coral categories for the quota years 2006–07 to 2010–11. Note the LC6 size category has only been in use since 2009–10 (Source: Fisheries Queensland CFISH database, 2 February 2012).

The majority (51 t) of total harvest (75 t) came from the collection levels of species of low ecological risk, which are tracked through the Performance Measurement System (see Table 5). The low risk species were identified in the 2007 Ecological Risk Assessment of the Queensland Coral Fishery. This risk assessment is planned to be revised in 2012 to take account of new knowledge, the different species mix now being collected, and the predicted effects of climate change related impacts. Gorgonian corals (-53%), Acroporidae (+82%) and live rock collected in the Cairns CCA (-38%) triggered the catch review reference point in 2010–11 (see Table 5 for further details).

Acroporidae (14%), *Catalaphyllia jardinei* (7%) and *Euphyllia* spp. (6%) were the most collected groups/species (by number). A rise in the number of specimens reported under the undifferentiated ' Other Hard Corals' since 2009–10 has been observed. This lack of species detail may warrant a review of reporting requirements under the current Coral Policy to ensure that the species collected are identified and that their ecological risk from the fishery is assessed. Fisheries Queensland, the Great Barrier Reef Marine Park Authority (GBRMPA) and industry jointly developed the current logbook to ensure that collection of internationally important species and those at greater than negligible ecological risk from the fishery were reported in detail. Fisheries Queensland are confident that current reported harvest levels are sustainable given these current reporting arrangements, the monitoring of high use areas and the low level of quota being utlised; however the fishery is in the process of diversifying and a reassessment of management arrangements is timely.

Table 2: Number of individual pieces and weight of coral species collected in the Cairns Coral Collection Area in the Queensland Coral Fishery for the quota years 2006–07 to 2010–11 (Source: Fisheries Queensland CFISH database, 2 February 2012). Note: shaded boxes identify reporting years when logbook categories did not exist for these species.

Species or common name	Number of individual pieces					Weight (kg)				
	2006-07	2007-08	2008-09	2009-10	2010-11	2006-07	2007-08	2008-09	2009-10	2010-11
Acanthastrea lordhowensis				65	118				5	61
Acroporidae	3841	5531	5961	10646	20005	2274	2285	2182	2419	4906
Actinaria	766	1055	2001	584	226	150	118	170	57	58
Agariciidae	127	103	173	182	164	43	16	13	20	24
Alcyoniidae	3510	5893	5811	5610	4909	184	241	234	240	1034
Antipathidae (black corals)				52	18				14	8
Blastomussa merletti				1131	1341				298	425
Blastomussa spp. - unspecified	942	1107	2363	14		589	418	550	1	
Blastomussa wellsi				1415	1397				195	376
Catalaphyllia jardinei	2542	3005	3236	3567	5323	267	251	295	341	1070
Caulastrea spp - unspecified	381	576	588	1		148	99	81	0	
Clavulariidae	29	18	3	497	622	26	17	0	125	235
Coral rubble	-	-	-	-	10	53	-	243	-	1
Corallimorph	279	325	1239	1740	1918	75	29	131	165	430
Cynarina lacrymalis (button coral)	1758	2410	1378	1709	1894	173	212	102	145	399
Dendrophylliidae	391	1760	989	585	407	114	223	109	46	36
Duncanopsammia axifuga	1308	2262	2300	2138	3219	193	263	270	331	602
Entacmaea quadricolor				1016	1062				110	198
Euphyllia spp. - unspecified	2305	4842	5880	6651	5789	856	1235	1392	1278	1765
Euphyllia glabrascens	1781	2474	2881	2822	2238	256	248	285	352	704
Faviidae	1042	2017	2313	3409	3825	559	727	854	807	1335
Fungiidae	1558	2575	2684	3764	3788	262	335	307	427	1068
Gardineroseris spp.	13	9				16	1			
Goniopora/Alvepora	3877	4653	4994	2566	3007	681	580	550	289	484
Gorgoniacea	1036	1169	1238	734	447	229	127	146	76	158
Helioporidae	18	27	37	-	-	1	4	5	-	-
Merulinidae	144	152	254	372	117	59	33	30	41	17
Milleporidae	71	30	50	21	36	7	2	3	72	3
Mussidae, excluding *Blastomussa* spp, *Scolymia* spp	3009	4361	3969	2210	2366	861	727	875	464	759
Nephtheidae	2709	4649	4905	4555	4436	155	186	205	192	650
Oculinidae	372	355	382	446	223	116	55	53	51	33
Other hard corals	5		4	4842	11 579	4348	3719	3997	1249	3214
Paralcyoniidae	486	77	9	73	50	47	27	23	6	14
Pectiniidae	361	559	865	1472	514	47	55	98	162	79
Pennatulacea-sea pens	62	15	10	3	8	8	1	1	0	1
Plerogyra sinuosa				1861	1543				226	337
Pocilloporidae	763	924	1193	493	122	260	304	290	88	59
Poritidae	307	296	663	347	627	103	187	223	53	168
Sarcophyton spp.	-	-	47	-	-	-	-	7	-	-
Scolymia spp. - unspecified	535	762	846	503	252	197	108	75	51	55
Scolymia vitensis				855	615				79	141
Stylasteridae - lace coral	233	1079	333	499	294	21	86	26	37	19
Trachyphyllia geoffroyi	2739	2653	1593	2607	3680	186	180	116	175	349
Tubipora musica	967	1119	1588	28	-	351	230	201	2	-
Tubiporidae	47	25	5	706	367	12	1	1	103	63
Turbinaria spp.	371	623	577	569	339	199	240	150	86	54
Xeniidae	3445	4758	6252	5429	5612	207	193	257	231	698
Zoanthidae	173	107	274	967	719	16	10	33	138	117
Total	44308	64355	69890	79759	95226	14350	13 771	14583	11245	22208

Table 3: Number of individual pieces and weight of coral species collected in the Keppel Coral Collection Area in the Queensland Coral Fishery for the quota years 2006–07 to 2010–11 (Source: Fisheries Queensland CFISH database, 2 February 2012). Note: shaded boxes identify reporting years when logbook categories did not exist for these species.

Species or common name	Number of individual pieces					Weight (kg)				
	2006-07	2007-08	2008-09	2009-10	2010-11	2006-07	2007-08	2008-09	2009-10	2010-11
Acanthastrea lordhowensis				7473	5099				1089	651
Acroporidae	1351	1595	1265	709	736	119	198	124	96	70
Actinaria	1	26	83	1	7	0	2	4	<1	1
Agariciidae	9	48	218	79	-	1	7	20	11	-
Alcyonacea	20	-	-	10	-	1		-	10	-
Alcyoniidae	2749	2280	1267	744	337	125	91	116	77	13
Blastomussa spp. - unspecified	387	14				65	2			
Blastomussa wellsi				43	355				5	24
Catalaphyllia jardinei	2378	2101	1979	1264	373	405	322	237	202	54
Caulastrea spp. - unspecified	10	-	9			2	-	1		
Coral rubble	-	-	-	-	-	1056	-	-	-	-
Corallimorph	75	-	50	97	52	10	350	3	8	4
Cynarina lacrymalis (button coral)	-	-	5	-	-	-	-	<1	-	-
Dendrophylliidae	727	765	833	744	265	100	98	99	68	31
Duncanopsammia axifuga	1528	1296	1316	513	510	262	158	144	73	78
Entacmaea quadricolor				-	21				-	3
Euphyllia spp.	1025	596	1001	212	221	188	87	116	37	38
Euphyllia glabrascens	245	93	10	-	4	37	13	1	-	1
Faviidae	2552	4107	3094	911	207	525	619	361	207	34
Fungiidae	79	103	146	28	21	11	27	98	5	2
Goniopora/Alvepora	1469	2332	1274	943	163	274	311	184	180	36
Gorgoniacea	284	174	405	23	59	12	9	17	1	4
Milleporidae	18	1	-	-	-	2	1	-	-	-
Mussidae not *Blastomussa* spp, *Scolymia* spp	2361	5711	12 300	760	196	447	985	1378	165	43
Nephtheidae	575	440	333	151	141	23	18	13	74	6
Oculinidae	1	9	13	3		0	1	2	0	
Other hard corals			1	206	291	1850	1080	314	27	47
Paralcyoniidae	75	25	1	-	-	3	1	<1	-	-
Pectiniidae	153	327	1382	1358	9	19	48	137	151	1
Plerogyra sinuosa				364	170				58	23
Pocilloporidae	7	-	82	-	-	1	-	55	-	-
Poritidae	25	12	25	-	-	11	2	5	-	-
Scolymia spp. - unspecified	107	326	533	128	64	8	32	52	9	5
Scolymia vitensis				14	10				1	1
Stylasteridae - lace coral	8	7	-	-	-	1	1	-	-	-
Trachyphyllia geoffroyi	104	39	95	-	-	27	8	6	-	-
Tubipora musica	619	738	186	-	-	77	83	18	-	-
Tubiporidae	-	-	-	46	42	-	62	-	3	4
Turbinaria spp. - unspecified	237	330	214	35	15	50	73	93	4	2
Xeniidae	1229	1009	350	8	100	49	40	14	66	4
Zoanthidae	25	-	6	210	88	2	-	60	8	4
Total	20433	24504	28476	17077	9556	5762	4727	3675	2637	1183

Table 4: Number of individual pieces and weight of coral species collected outside of the Cairns and Keppel Coral Collection Areas in the Queensland Coral Fishery for the quota years 2006–07 to 2010–11 (Source: Fisheries Queensland CFISH database, 2 February 2012). Note: shaded boxes identify reporting years when logbook categories did not exist for these species.

Species or common name	Number of individual pieces					Weight (kg)				
	2006-07	2007-08	2008-09	2009-10	2010-11	2006-07	2007-08	2008-09	2009-10	2010-11
Acanthastrea lordhowensis				8711	7776				1634	1502
Acroporidae	1237	5939	7349	2696	5311	6088	4692	6271	3383	3435
Actinaria	196	504	431	201	175	31	71	34	22	21
Agariciidae	20	26	73	61	967	3	2	77	13	117
Alcyoniidae	476	308	862	1178	1337	20	12	38	107	206
Antipathidae (black corals)				2	-				<1	-
Blastomussa merletti				178	127				17	34
Blastomussa spp. - unspecified	63	649	1432	6	-	8	93	170	1	-
Blastomussa wellsi			1	1273	1472			<1	161	186
Catalaphyllia jardinei	835	6602	8481	8641	6310	244	768	839	830	1086
Caulastrea spp - unspecified	40	217	230	14	-	8	16	20	1	-
Clavulariidae	-	-	18	7	-	-	-	2	1	-
Coral rubble	-	-	-	-	67	26	317		361	4
Corallimorph	47	105	290	1644	1116	9	7	22	156	126
Cynarina lacrymalis (button coral)	122	1304	2044	1671	852	11	100	160	128	118
Dendrophylliidae	118	521	2787	1840	1996	12	88	306	159	174
Duncanopsammia axifuga	521	1967	1524	2204	2557	79	213	163	222	336
Entacmaea quadricolor			2	462	574			2	35	71
Euphyllia spp. - unspecified	1080	1609	3894	4267	5707	256	297	482	656	1005
Euphyllia glabrascens	609	1156	1267	1723	2151	100	216	140	217	260
Faviidae	624	2081	4882	6273	5535	128	506	1022	1092	1363
Fungiidae	1010	1645	2775	2345	3602	156	201	283	403	758
Goniopora/Alvepora	358	447	1078	1421	1694	157	60	120	192	312
Gorgoniacea	230	104	301	194	179	206	37	24	13	35
Heliopora coerulea				118	136				540	280
Helioporidae	51	69	3			282	271	<1		
Merulinidae	73	97	35	56	92	5	76	70	7	22
Milleporidae	53	565	174	413	5	79	141	57	188	3
Mussidae not *Blastomussa* spp, *Scolymia* spp	560	2258	7522	3895	4181	120	422	1014	579	996
Nephtheidae	355	487	675	1155	975	14	21	27	46	144
Oculinidae	11	25	84	164	109	1	3	12	22	21
Other hard corals	-	1	-	4644	9493	1191	1675	1177	412	1134
Paralcyoniidae	10	-	2	42		<1	-	<1	4	-
Pectiniidae	140	632	2307	2902	1897	14	123	273	337	359
Plerogyra sinuosa				473	813				96	206
Pocilloporidae	676	2448	1158	810	661	2743	7314	1804	1294	1256
Poritidae	21	58	43	61	136	2	7	26	38	11
Sarcophyton spp.	-	-	-	-	2	-	-	-	-	<1
Scolymia spp. - unspecified	498	2484	5344	10585	7475	49	242	486	808	931
Scolymia vitensis				522	178				46	85
Siderastrea	-	16	-	-	-	-	19	-	-	-
Stylasteridae - lace coral	61	162	109	214	304	4	12	9	15	32
Trachyphyllia geoffroyi	117	4334	3775	3537	1434	10	287	267	241	269
Tubipora musica	40	108	207	34	-	9	27	24	2	-
Tubiporidae	-	-	-	236	228	-	-	-	39	37
Turbinaria spp.	714	1370	862	689	339	1367	3165	1254	341	90
Xeniidae	22	213	162	423	277	1	9	6	17	11
Zoanthidae	16	28	103	763	378	1	3	7	120	69
Total	11004	40539	62286	78748	78618	13434	21510	16689	14994	17105

Research permits

Fisheries Queensland issued seven General Fisheries Permits allowing the limited harvest of coral species for research purposes in 2010–11. The permit holders are required to submit annual reports summarising the collection that has occurred within the permit period. These indicate that there was minimal collecting during the reporting period. The quantities of each species collected will be considered during future sustainability assessments as required.

Recreational

The quantity of coral taken recreationally within the fishery is minimal considering the limited known distribution of coral outside Marine Parks and the gear restrictions imposed. At present there are no data available on the level of recreational harvest of coral species. Fisheries Queensland commenced the latest state-wide recreational fishing survey in 2010 using improved methodology to provide updated and improved estimates of recreational fishing participation and catch. Although the survey is not designed with a separate reporting category for coral, the survey methodology does allow for the reporting of a wider range of species including coral.

Indigenous

Indigenous use of corals has not been documented and any participation in the fishery is considered to be minimal (McCormack 2006).

Spatial issues/trends

Annual harvest levels are monitored for the two Coral Collection Areas through the Performance Measurement System (Table 5). Harvest in these areas did not exceed the review reference points.

Fisheries Queensland, the GBRMPA and the industry representative body, Pro-Vision Reef, developed an intergrated action plan to manage spatial issues should they arise through bleaching, flooding or other extreme events leading to coral stress. This action plan relies on coordination of monitoring and assessment activities under the Coral Bleaching Response Plan (GBRMPA) and the Coral Stress Response Plan for Marine Aquarium Fish and Coral Fisheries (Fisheries Queensland) to predict/identify regions likely to experience stress. Depending on the level of risk to the coral communities, mitigation is actioned by industry through the Stewardship Action Plan (Pro-Vision Reef). Decisions as to the most appropriate response to alleviate collection pressure and give the coral ecosystem the best chance for recovery are made by a joint industry/government/community taskforce. The effectiveness of this coordinated approach was demonstrated in 2011 when flooding impacted on the Keppel region. A moratorium on collection was initiated by industry as the most appropriate response. Regular monitoring of the region through Reef Health Impact Surveys (RHIS) has occurred since the initial flooding to determine the rate of recovery. The taskforce has met twice since the commencement of the collection moratorium in July 2011 to consider the results of each survey. The taskforce decided to extend the moratorium to the end of April 2012 when the results of the next RHIS will be considered.

Socio-economic characteristics and trends

Collectors have indicated that domestic sales have been poor since the Global Financial Crisis in 2008. Marine aquaria are expensive to set up and maintain and provide further stress on already strained household budgets. The downward trend in domestic sales appears to have positively impacted exports from the fishery. The number of coral specimens exported from Queensland more than doubled from 104 075 specimens[2] in 2009–10 to 237 546 in 2010–11. The majority of exports (83%) went to markets in France, United States of America and the United Kingdom.

Biological and ecological information

Monitoring programs

Fishery dependent monitoring

Logbook data provides Fisheries Queensland with detailed information on catch trends in the commercial fishery. No independent monitoring is currently being undertaken.

[2] These figures should not be directly compared with the collection figures from the commercial fishery logbook. Collectors are able to post-process (fragment) the collected specimens to meet specific market demands and attain maximum value for their product.

Commercial fishers working in catch-based quota fisheries (except trawl), are required to report catch via Fisheries Queensland's Automatic Interactive Voice Recognition (AIVR) system. Fisheries Queensland uses notices given through the AIVR to monitor quota usage and uses a chain of auditable records to detect the possible development of a black market for illegally caught product.

There are two individual coral categories for the Coral Fishery: Other Coral and Speciality Coral that are managed through quota arrangements. To take coral commercially, fishers must obtain a coral licence, symbol endorsement and current quota units and must meet reporting arrangements. Currently the reporting requirements for the fishery include lodging a Prior Notice 3 or 6 hours (depending on location) prior to the fisher landing the product. The notice requires fishers to record a nominated landing time and location as well as the numbers of bins of coral on board the vessel. The total number of bins is calculated to a total weight via a set conversion figure and the weight is then deducted from their quota account.

Interactions with protected species

Due to the selective, relatively benign harvesting method and high attendance of fishing gear, operators pose negligible risk to protected species. Commercial operators report interactions with protected species in a Species of Conservation Interest (SOCI) logbook. There have been no reported interactions with SOCI during 2010–11.

Ecosystem impacts

The physical impact of the QCF on the broader ecosystem is considered negligible due to the selective fishing methods used and the small number of individual animals that are collected relative to the available resource.

The Ecological Risk Assessment (ERA) (Roelofs 2008) of the fishery indicated that QCF operations are not likely to negatively impact on natural food webs and critical predator/prey relationships. Broader ecosystem impacts from natural events, such as cyclone damage to reefs and coral bleaching are likely to have greater ecological impacts than the fishery operations. Donnelly (2011) incorporated the outputs of the 2008 ERA when assessing the likely risks to coral species collected in the QCF to impacts related to climate change. The assessment concluded that the overall risk to key species was low. Donnelly (2011) however also concluded that for the fishery to remain resilient and respond/adapt to likely climate change scenarios then a more rapid logbook information collection is urgently required. Fisheries Queensland will incorporate the conclusions by Donnelly (2011) in a review of the ERA planned for 2012. A copy of the Climate Change Vulnerability Assessment of the Queensland Marine Aquarium Supply Industry report can be downloaded from the GBRMPA website.

In May 2009, Fisheries Queensland implemented the *Coral Stress Response Plan for the Coral and Marine Aquarium Fish Fisheries,* providing a gradient of management responses commensurate with the level of impact. This helps to ensure that fishery activities do not exacerbate already stressed environments. The plan represents a partnership between industry and government and formally links with the industry association Pro-vision Reef Inc's *Stewardship Action Plan* and the Great Barrier Reef Marine Park Authorities' *Coral Bleaching Response Plan.* The Coral Stress Response Plan can be downloaded at http://www.dpi.qld.gov.au/documents/Fisheries_CommercialFisheries/Coral-stress-aquarium-fisheries-v6.pdf

Sustainability Assessment

Performance against fishery objectives

Fisheries Queensland implemented the QCF Performance Measurement System (PMS) in 2009. Analysis of performance of the QCF against these measures indicated that three review reference points triggered during the 2010–11 reporting year (Table 5). Preliminary investigations of the underlying causes behind the triggered reference points have been made to determine cause and effect as well as timeframes for mitigation if deemed appropriate. In this regard, Fisheries Queensland plans to address matters relating to the triggered reference points for target species and Coral Collections Areas during the revision of the ERA for the QCF. The PMS will be reviewed to account for outcomes of the ERA and any new perceived risks from the fishery.

Several of the categories and species have changed in the manner they are reported in the logbook and as such it is not possible to compare them to the previous year's data.

Table 5: Performance measures and outcomes for the Queensland Coral Fishery.

Performance measure	Performance
Target species	
1. Annual catch (kg) of species of greater than negligible ecological risk (listed below) is ›30% higher or lower than mean catch over the previous 2 years Or 2. Greater than 80% of the annual catch of a species of greater than negligible ecological risk occurs in a single 6 x 6 nm logbook site. Species greater than negligible risk from the QCF as determined by the coral fishery ERA are: • *Trachyphyllia geoffroyi* • *Acanthastrea lordhowensis* • *Blastomussa merletti* • *Blastomussa wellsi* • *Scolymia vitensis* • *Duncanopsammia axifuga* • *Euphyllia glabrascens* • *Plerogyra* spp • *Catalaphyllia jardinei* • *Acropora* spp • *Gorgoniidae* spp • *Entacmea quadricolor* • Live rock (Cairns and Keppel regions only)	*1. Indicator partially measured* *Triggered for*: • Gorgonian corals (-53%) • Acroporidae (+82%) • Live rock—Cairns (-38%) *Comment* • Similar to 2009–10 the decline in harvest of Gorgonian corals in 2010–11 is attributed to a continued decrease in demand and decrease in effort. • Acroporid coral harvest has increased in recent years, especially in the Cairns region. This appears due to improvements in husbandry techniques for live export of Acroporid corals and increased demand from export markets, particularly from the USA. Industry representatives have advised that they collect from a broad range of Acroporid species. Acroporid corals are generally known to be fast growing species. Fisheries Queensland will seek to document the full range of species collected from the Acroporid family which will be assessed in the 2012 revision of the fishery ERA. • The domestic market for live rock collection was particularly affected by the economic impacts of the Global Financial Crisis with decreases in demand for fish, coral and live rock from domestic aquarists being noted since 2009–10. Some collectors have reported a 20–30% decrease in domestic sales in the reporting year. Fisheries Queensland is satisfied that the decrease in live rock collection in the Cairns region is not due to sustainability issues and does not intend to investigate this matter further. *Not triggered for*: • *Trachyphyllia geoffroyi* • *Duncanopsammia axifuga* • *Euphyllia glabrascens* • *Catalaphyllia jardinei* • Live rock (Keppel region only) Not measured for the following[#]: • *Acanthastrea lordhowensis* • *Blastomussa merletti* • *Blastomussa wellsi* • *Scolymia vitensis* • *Entacmea quadricolor* • *Plerogyra* spp. [#]Three years of data unavailable for analysis. Separate reporting for these species began in 2009–10. *2. Not triggered*

<table>
<tr><th>Performance measure</th><th>Performance</th></tr>
<tr><td>Total annual catch in high use management areas (reported through logbooks)—the Review Reference Points are:
Cairns
▪ 80 t live rock (inc. rubble & LC1 rock)
▪ 13 t live coral (specialty coral)
▪ 5 t ornamental coral
Keppel
▪ 24 t live rock (inc. rubble & LC1 rock)
▪ 11 t live coral (specialty coral)
▪ 1 t ornamental coral</td><td>Triggered for Cairns specialty coral by 7 t
<table><tr><th>Catch component</th><th>Year</th><th>Cairns (t)</th><th>Keppel (t)</th></tr><tr><td rowspan="5">Coral Products (live rock etc.)</td><td>2006-07</td><td>56</td><td>18</td></tr><tr><td>2007-08</td><td>54</td><td>12</td></tr><tr><td>2008-09</td><td>58</td><td>3</td></tr><tr><td>2009-10</td><td>40</td><td>2</td></tr><tr><td>2010-11</td><td>29</td><td>2</td></tr><tr><td rowspan="5">Ornamental</td><td>2006-07</td><td>2</td><td></td></tr><tr><td>2007-08</td><td>2</td><td>0</td></tr><tr><td>2008-09</td><td>2</td><td>0</td></tr><tr><td>2009-10</td><td>1</td><td>0</td></tr><tr><td>2010-11</td><td>2</td><td>0</td></tr><tr><td rowspan="5">Specialty Coral</td><td>2006-07</td><td>8</td><td>3</td></tr><tr><td>2007-08</td><td>8</td><td>3</td></tr><tr><td>2008-09</td><td>9</td><td>3</td></tr><tr><td>2009-10</td><td>10</td><td>3</td></tr><tr><td>2010-11</td><td>20</td><td>1</td></tr></table>
Comment
The majority of the increase in harvest in the Cairns CCA of specialty coral beyond the trigger comprised Acroporidae and unspecified coral species in the Other Hard Corals categories. As noted above, the harvest of Acroporid specimens has increased following advances in the husbandry that has resulted in a more viable live export product. Export markets have quickly grown to accommodate the greater potential in trade. Acroporid corals are diverse and Fisheries Queensland intends to investigate this harvest to determine the main species being collected. These species will be assessed in the next ERA planned to occur in 2012.
Fisheries Queensland intends to investigate further the increasing take of unspecified coral species under the Other Hard Corals. Of particular interest are the species that comprise this harvest and what the collection means to their sustainability. The ecological risk to these species will be assessed in the revision of the QCF ERA. Depending on the ERA revision outcomes, future iterations of the commercial coral fishery logbook may need adjusting to ensure the level of species detail being recorded is representative.</td></tr>
<tr><td>Greater than 75% of quota used in <6 months</td><td>Not triggered
Only 33% of the Other Coral quota used in 2010–11.
Only 36% of the Specialty Coral quota used in 2010–11.</td></tr>
</table>

Performance measure	Performance
Ecosystem	
Bleaching severity & interaction with fishery is › Level 2 as defined in Fisheries Queensland Coral Stress Response Plan.	*Not triggered*
Proportion of industry adopting identified best practice protocols* Greater than 80% of active operators have adopted best practice protocols *Measure reflects protocols formalised in the industry developed Stewardship Action Plan implemented in 2009	*Not triggered* Membership statistics indicate that the indicator was not triggered in 2010–11 with the 81% of active D licences members of Pro-vision Reef.
Social	
Number of DEEDI ministerial letters referring to sustainability concerns with the Coral Fishery: More than five Ministerial Letters are prepared per calendar year.	*Not triggered*
Greater than 10% of the active vessels in the fleet are used to commit an offence under the Fisheries Regulation 2008.	*Not triggered* No commercial offences relating to the QCF were detected in 2010–11.
Economic	
Quota usage 1. Less than 25% of fishery quota used in ›6 months. 2. More than 10 licence holders use ‹25% of their quota holding	1. *Not triggered* Other Coral: 33% of the quota used in 2010–11 Specialty Coral: 36% of the quota used in 2010–11 2. *Triggered* Other coral: 19 licence holders Specialty coral: 12 licence holders *Comment:* Extreme weather conditions (cyclones and floods) that occurred during the 2010–11 reporting period may have affected operators of smaller vessels by limiting accessability to fishery habitats. Fisheries Queensland will liaise with industry members to investigate the reasons for low quota use in the reporting year and whether arrangements under the Policy for the Management of the Coral Fishery are contributing to the observed decline in commercial activity.

Current sustainability status & concerns

Fisheries Queensland is satisfied that there are no resource concerns in this fishery at the current participation levels and with the suite of management controls that are in place. Natural catastrophic events such as coral bleaching and cyclones are likely to have more localised impact on coral and anemone resources than fishery activity at the present level of effort in the fishery. The Coral Stress Response Plan and industry commitment to sustainable fishing practices through their Stewardship Action Plan provide confidence that should these impacts arise, responsible and sustainable fishing will ensue.

Fisheries Queensland decided that collected coral species in the QCF will not be assessed under the Stock Status Assessment Program. The *Framework for Defining*

Stock Status contains a list of general principles that guides the choice of species for inclusion in the annual status determination process. Key species in the QCF only meet the first of the general principles (Principle 1 – the species is considered a key commercial target and by-product species). Fisheries Queensland considers this is insufficient justification for inclusion in the stock status assessment program. Monitoring of coral species that are greater than negligible risk from the fishery through the PMS and the regular review of the ERA will continue to ensure species in the QCF are managed in an ecological sustainable manner.

Research

Recent research and implications

Harrison (2011) comprehensively summarised current knowledge of sexual reproduction in scleractinian (hard) corals and confirmed the knowledge that hermaphroditic broadcast spawning is the dominant pattern among coral species studied so far (about 444 species). The summarised information on reproductive behaviour will be used in the review of the ERA for the QCF planned for 2012.

Harrison (2011) also noted the timing and success of coral reproduction is particularly sensitive to environmental factors and that climate change will likely exacerbate these stress effects. A Climate Change Vulnerability Assessment has been the recent focus of the QCF and provides an excellent synthesis of research on climate change and the implications this has on the future management of the fishery (Roelofs 2008; Donnelly 2011). The next stage of this process is to develop adaptation strategies that aim to ensure industry is well placed to meet the challenges and opportunities anticipated to arise from climate change.

The importance of coral reef assemblages in supporting diverse and functional reef ecosystems was assessed by Pratchett et al. (2011). The authors concluded that extensive (>60%) loss of coral nearly always resulted in fish diversity declines. Generally speaking, the most affected fish group, in terms of ecosystem function, were corallivores and the least impacted were herbivores. These results will be considered in the review of the QCF and the Marine Aquarium Fish Fishery ERA planned for 2012.

Collaborative research

There has been no collaborative research this year.

Fishery management

Compliance report

During 2010–11, fourteen commercial fishing vessels were inspected in the QCF. No offences were detected during the course of these inspections corresponding to a compliance rate of 100% on units inspected.

Changes to management arrangements in the reporting year

There were no changes to management arrangements in 2010–11.

Communication and education

Stakeholders, industry members and Commonwealth and state natural resource management agencies are kept well informed of issues relating to the QCF through communication strategies incorporated within the Stewardship Action Plan and the Coral Stress Response Plan. The strategies were tested in 2011 following significant flooding of the Fitzroy River into the Keppels region. Following community advice of flooding impacts in the Keppels, Fisheries Queensland commenced discussions with Coral Taskforce members in January 2011 culminating in a specified no-take response strategy that was voluntarily implemented by industry. The Taskforce comprised of Fisheries Queensland, GBRMPA, Department of Environment and Resource Management (DERM) and Pro-vision Reef (industry organisation) as set out under the Coral Stress Response Plan. Information flow to and from the Taskforce was facilitated by communication networks of the GBRMPA, DERM and Pro-vision Reef.

Promotion of regulations applying to both commercial and recreational fishers, including those relating to harvest fisheries, is an ongoing role for Fisheries Queensland.

Complementary management

There are no adjacent fisheries for coral however live rock can be collected in the Coral Sea Fishery managed by the Commonwealth. Given that live rock is locally generated there is no specific need to develop complementary management practices with the Coral Sea Fishery.

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Front cover image

Diver collecting coral on the Great Barrier Reef.