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Summary of Torres Strait and QLD East Coast lobster commercial catch monitoring by MG Kailis Pty Ltd 2001-2017

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Important disclaimer

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Acknowledgments

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Executive summary

The size distributions of commercial ornate rock lobster *Panulirus ornatus* catches taken in Torres Strait and on the Queensland east coast have been recorded during several historical studies, and more recently monthly at the MG Kailis Pty Ltd facility in Cairns. The historical data have been used to inform on growth, sex ratios, timing of emigration, habitat selection and size selectivity and several papers have reported the outcomes of these studies. A more routine monthly size monitoring program was instigated at the MG Kailis Pty Ltd premises in Cairns in 2001 as a component of FRDC funded research on the biology and stock assessment of the Queensland east coast lobster population. Initially about 600 lobsters were measured each month to determine the resolution of the size distributions, with the number reduced to 200 in 2008 - this monitoring program has continued to date.

The Torres Strait and QLD east coast fisheries have evolved from frozen tail product only to predominantly live product. Hence, size monitoring has also evolved from tail width measurements to predominantly whole weight measurements. Concurrent recording of several morphological characters allowed the calculation of morphometric relationships; most yielding highly correlated (R^2>0.95) results. These relationships allowed the standardisation of size measurements through time and as carapace length is globally the most commonly used measure for spiny lobsters, we used carapace length in this report.

A total of 50517 lobsters were measured from commercial catches between July 2001 and September 2016; the largest from Torres Strait and the QLD east coast measuring 169 mm and 185 mm carapace length respectively. This reflects the difference in life strategy of the two sub-populations; Torres Strait lobsters adopting a one-way breeding emigration and QLD east coast lobsters re-entering the fishery after breeding.

The size distributions of Torres Strait lobsters were remarkably consistent between years, with median values around 105 mm CL in each year. The 90 mm CL size limit combined with the annual emigrations of 3 year old lobsters to breed has resulted in catches being comprised almost solely of age 2+ lobsters. In contrast, the QLD east coast catches are comprised of several age cohorts, and there have been significant differences in age composition between years.

1 Introduction

The size distributions of commercial ornate rock lobster *Panulirus ornatus* catches taken in Torres Strait have been documented during several historical studies to determine timing of emigration (Skewes et al. 1994), adult growth (Skewes et al. 1997) and assessment of stocks (Pitcher et al. 1997). During 1988 to 2001 the size distribution of the island-based commercial lobster catch was monitored in central Torres Strait as a component of research documenting catch and effort of the Torres Strait islander fishery. This monitoring project concluded in 2001 with the subsequent introduction of the Torres Strait docket book program, designed to capture commercial catch data from processing facilities at all island communities. However, size monitoring was not included in the docket book program.

Monitoring of the size distribution of the Queensland east coast commercial tropical rock lobster catch was initiated at the MG Kailis Pty Ltd premises in Cairns in July 2001 as a component of FRDC funded research on the biology and stock assessment of the Queensland east coast lobster population (Pitcher et al. 2005). This program was concluded in March 2003 at the end of the research project.

Subsequently, several owners of TVH vessels operating in Torres Strait proactively provided further size distribution data during 2004 and 2005 to supplement data obtained during annual scientific population surveys for stock assessment research. The collection of this data prompted a discussion amongst the stakeholders as to the strategic and tactical need for commercial catch size monitoring and the most cost effective way to collect the data.

In 2006 a coordinated monthly program of monitoring the size distributions of both Torres Strait and QLD east coast commercial catches was initiated, based at the MG Kailis Pty Ltd premises in Cairns. This method was identified as more efficient than the previous method reliant on voluntary collection of data by individual vessel owners. Initially a total of ~600 lobsters were measured each month to determine the resolution of the size distributions. The number of lobsters measured from both the Torres Strait and QLD east coast fisheries each month was then reduced to 200 in 2008 and this monitoring program has continued to date.

Although not comprehensive spatially the ongoing monitoring program provides consistent monthly size data that can be used to compare size and age compositions of both Torres Strait and QLD East Coast populations between years. The size at age data are used as inputs to the Torres Strait TRL stock assessment model to determine selectivity of the commercial fishery and also to provide information on inter-annual growth (Plagányi et al. 2017).

In addition to the direct application of this information for stock assessment, size at age data also inform managers and stakeholders on important external influences that affect lobster growth and recruitment timing. Major environmental perturbations such as Coral Sea cyclones, seagrass dieback and thermal induced bleaching have all occurred during the timeframe of monitoring at the MG Kailis Pty Ltd facility. To date there appears remarkable consistency in size and age of the TRL population, despite these influences, but future influences are far less certain. Model forecasts of the influence of ocean warming indicate there will be both positive and negative impacts for Torres Strait lobsters (Norman-Lopez et al. 2013), through increased individual growth and survival offset by increased growth of larval predators. The actual impacts of future warming scenarios are much less certain, but it is likely the population and hence the fishery will be impacted.

The ongoing size monitoring program outlined in this report will allow managers and stakeholders to directly assess changes in lobster population size structure; which will in turn allow any necessary changes in management. Although not an explicit component of the proposed harvest strategy the size distribution data will be important information to account for in future management decisions, particularly as *P. ornatus* is the fastest growing lobster in the world.

2 Methods

Historically, ornate rock lobsters (*Panulirus ornatus*) taken commercially in Torres Strait and on the QLD east coast have been measured by CSIRO and PNG researchers to address various aspects of the life history of this species. However, prior to 2000 there was no ongoing monitoring of the size distributions of commercial catches.

During 2001 to 2003 lobsters landed at the MG Kailis Pty Ltd facility in Cairns, QLD were sub-sampled by staff monthly and measured (carapace length to the nearest millimetre) and sexed to provide data for a FRDC co-funded project (Project No. 2002-008). Subsequently, during 2004 and 2005 to extend this data-set for Torres Strait lobsters, several fishers provided voluntary measures (carapace length or tail width to the nearest millimetre).

In 2006 the scope of the ongoing Torres Strait research program was broadened to include a component to monitor the size distributions of the Torres Strait and QLD east coast catches. By this time a greater proportion of the catch was taken live, in contrast to previous years when most was sold as frozen tails. Hence, all lobsters sub-sampled since 2006 have been weighed whole (to the nearest 10 grams).

We standardised all length and weight measurements using morphometric relationships developed using historical data from several research projects (Table 1). The relationships were all highly correlated (R^2>0.95). As carapace length is globally the most commonly used measure for spiny lobsters, we used carapace length in this report.

Table 1 Relationships between several commonly measured morphometric features of the ornate rock lobster (*Panulirus ornatus*) from Torres Strait and the QLD east coast. TW = tail width (mm), CL = carapace length (mm), TL = tail length (mm), Tailwt in grams, Totwt in grams.

Sex	Relation	Relationship	Range	R^2
M	tw/cl	CL=(1.493*TW)-0.132	cl:6-160	0.998
F	tw/cl	CL=(1.371*TW)+2.485	cl:6-160	0.997
All	tw/cl	CL=(1.433*TW)+1.089	cl:6-160	0.992
All	tw/tl	TL=(1.920*TW)+1.413	tw:6-80	0.996
All	cl/tl	CL=(0.778*TL)+0.014	cl:6-120	0.994
All	tw/tailwt	TAILWT=0.00114*(TW^2.97537)	tw:22-98	0.974
All	cl/totwt	TOTWT=0.00258*(CL^2.76014)	cl:6-120	0.992
All	cl/tailwt	TAILWT=0.00097*(CL^2.77007)	cl:30-150	0.954
All	Totwt/tailwt	TOTWT=2.677*TAILWT		0.994
	or	TAILWT=37.35% of TOTWT		

These size data are stored in a Microsoft Access database on a shared server maintained by CSIRO.

3 Results

3.1 Commercial ornate rock lobster size data

A total of 50517 lobsters were measured from commercial catches between July 2001 and September 2016 (Table 2). The largest lobster measured from Torres Strait catches was 169 mm carapace length, whilst the largest lobster measured from QLD east coast catches was 185 mm carapace length. This reflects the difference in life strategy of the two sub-populations; Torres Strait lobsters adopting a one-way breeding emigration and QLD east coast lobsters re-entering the fishery after breeding.

Table 2 Number of lobsters *Panulirus ornatus* measured from commercial catches during 2001 to 2016 at MG Kailis Pty Ltd Cairns and mean carapace length (CI95), maximum carapace length, number and percent females.

Location	Year	Month	Mean CL	Count	CI95CL	Maximum CL	Number Females	Percent Females
East Coast	2001	7	105.41	251	2.93	158	114	45%
East Coast	2001	8	116.90	473	1.82	187	183	39%
East Coast	2001	9	109.17	199	2.84	164	100	50%
East Coast	2001	10	113.83	112	3.06	154	49	44%
East Coast	2001	11	119.22	903	1.20	180	383	42%
East Coast	2002	2	113.17	829	1.03	195	364	44%
East Coast	2002	3	117.01	959	0.90	154	397	41%
East Coast	2002	4	118.13	88	2.84	150	36	41%
East Coast	2002	8	126.88	120	4.20	178	53	44%
East Coast	2002	9	116.79	1016	1.32	178	484	48%
East Coast	2003	2	106.65	938	1.02	147	447	48%
East Coast	2003	3	115.48	304	1.74	153	103	34%
East Coast	2006	2	119.57	604	0.97	156	242	40%
East Coast	2006	3	124.73	701	1.24	163	254	36%
East Coast	2006	4	128.35	602	1.28	165	217	36%
East Coast	2006	5	126.16	612	1.45	174	216	35%
East Coast	2006	6	123.62	601	1.61	185	242	40%
East Coast	2006	7	123.13	638	1.56	172	216	34%
East Coast	2006	8	122.79	610	1.67	171	232	38%
East Coast	2006	9	123.14	601	1.63	174	245	41%
East Coast	2007	2	107.73	600	1.13	162	222	37%
East Coast	2007	3	110.19	600	1.22	163	242	40%
East Coast	2007	4	118.09	600	1.45	174	246	41%
East Coast	2007	5	114.16	599	1.35	162	234	39%
East Coast	2007	6	115.10	600	1.33	159	230	38%
East Coast	2007	7	122.48	599	1.55	173	250	42%
East Coast	2008	2	115.13	200	1.95	164	68	34%
East Coast	2008	3	105.61	200	2.03	150	80	40%
East Coast	2008	4	111.85	200	2.14	153	69	35%
East Coast	2008	5	118.27	199	2.51	164	79	40%
East Coast	2008	6	123.62	199	2.74	174	118	59%
East Coast	2008	7	108.48	200	2.25	165	107	54%
East Coast	2008	8	117.94	200	2.54	164	93	47%

East Coast	2008	9	113.45	200	2.33	164	86	43%
East Coast	2009	2	114.57	200	1.74	149	109	55%
East Coast	2009	3	127.58	200	1.92	167	83	42%
East Coast	2009	4	131.25	200	1.98	171	85	43%
East Coast	2009	5	129.21	200	2.29	167	87	44%
East Coast	2009	6	123.49	200	2.53	163	83	42%
East Coast	2009	7	121.51	200	2.75	168	88	44%
East Coast	2009	8	112.72	200	2.39	159	86	43%
East Coast	2009	9	129.81	200	2.60	170	76	38%
East Coast	2010	2	120.61	200	2.43	169	68	34%
East Coast	2010	3	111.52	200	2.26	156	77	39%
East Coast	2010	4	128.61	200	2.38	168	65	33%
East Coast	2010	5	101.70	200	1.58	153	79	40%
East Coast	2010	6	129.39	200	2.51	176	76	38%
East Coast	2010	7	124.04	200	2.70	174	71	36%
East Coast	2010	8	116.79	200	2.71	172	79	40%
East Coast	2010	9	118.97	200	2.99	176	89	45%
East Coast	2011	2	111.23	200	1.98	158	81	41%
East Coast	2011	3	113.56	200	2.26	168	65	33%
East Coast	2011	4	114.68	200	2.20	160	88	44%
East Coast	2011	5	115.70	200	2.28	158	72	36%
East Coast	2011	6	118.60	200	2.43	166	79	40%
East Coast	2011	7	118.55	200	2.43	170	90	45%
East Coast	2011	8	115.87	200	2.22	166	88	44%
East Coast	2011	9	118.26	200	2.41	163	86	43%
East Coast	2012	2	108.61	200	1.84	145	77	39%
East Coast	2012	3	116.07	200	2.26	158	87	44%
East Coast	2012	4	106.47	200	1.90	150	81	41%
East Coast	2012	5	110.70	200	2.39	156	88	44%
East Coast	2012	6	110.37	200	2.24	158	74	37%
East Coast	2012	9	116.58	199	2.64	172	84	42%
East Coast	2013	2	117.08	200	2.58	157	73	37%
East Coast	2013	3	114.50	200	2.10	156	78	39%
East Coast	2013	4	112.08	200	2.40	161	94	47%
East Coast	2013	5	107.36	200	2.13	151	67	34%
East Coast	2013	6	111.86	200	2.21	158	69	35%
East Coast	2013	7	112.46	200	2.09	164	80	40%
East Coast	2013	8	111.29	200	2.52	171	63	32%
East Coast	2013	9	118.84	200	2.56	165	66	33%
East Coast	2014	2	121.07	200	2.07	162	70	35%
East Coast	2014	3	100.175	200	1.31	152	91	46%
East Coast	2014	5	108.16	200	2.22	159	88	44%
East Coast	2014	6	120.57	200	2.92	185	65	33%
East Coast	2014	8	114.3	200	2.69	176	76	38%
East Coast	2015	1	111.105	200	2.01	155	66	33%
East Coast	2015	2	118.93	200	2.17	156	71	36%
East Coast	2015	4	104.735	200	2.04	152	82	41%
East Coast	2015	5	111.125	200	2.51	156	82	41%
East Coast	2015	7	116.46	200	2.70	169	77	39%
East Coast	2015	9	113.565	200	2.86	175	86	43%

East Coast	2016	1	113.245	200	2.01	154	71	36%
East Coast	2016	2	116.7	200	1.98	164	76	38%
East Coast	2016	3	117.65	200	2.49	165	67	34%
East Coast	2016	8	100.9	100	2.13	141	42	21%
East Coast	2016	9	111.83	200	2.57	168	76	38%
Torres	2004	8	105.05	382	1.09	147	191	50%
Torres	2004	9	109.65	394	1.13	152	221	56%
Torres	2005	2	108.45	167	1.50	139	52	31%
Torres	2005	3	106.31	80	2.10	133	20	25%
Torres	2005	4	103.53	214	1.08	130	70	33%
Torres	2005	5	103.76	252	1.04	131	116	46%
Torres	2005	6	107.94	149	1.55	136	58	39%
Torres	2005	7	104.64	335	1.96	142	171	51%
Torres	2005	8	106.79	203	1.42	130	133	66%
Torres	2006	2	110.60	613	1.13	148	224	37%
Torres	2006	3	104.42	338	1.16	150	148	44%
Torres	2006	4	108.83	493	1.38	157	198	40%
Torres	2006	6	110.42	334	1.49	151	134	40%
Torres	2006	7	115.11	603	1.25	166	257	43%
Torres	2006	8	112.38	603	1.22	166	248	41%
Torres	2007	2	100.55	600	0.90	152	253	42%
Torres	2007	3	100.18	700	0.68	144	258	37%
Torres	2007	4	99.58	601	0.60	133	270	45%
Torres	2007	5	100.45	498	0.65	145	207	42%
Torres	2007	6	113.60	100	3.80	161	33	33%
Torres	2007	7	108.12	100	2.91	152	43	43%
Torres	2008	1	111.91	193	1.92	141	56	29%
Torres	2008	2	104.32	285	1.35	139	116	41%
Torres	2008	3	96.31	919	0.89	148	401	44%
Torres	2008	4	98.71	819	0.93	145	407	50%
Torres	2008	5	98.83	871	0.81	142	385	44%
Torres	2008	6	100.58	658	0.94	149	317	48%
Torres	2008	7	101.80	760	0.80	146	386	51%
Torres	2008	8	96.77	200	1.28	120	108	54%
Torres	2008	9	102.18	600	0.94	150	251	42%
Torres	2009	3	103.98	200	1.40	138	77	39%
Torres	2009	4	105.38	199	2.02	156	110	55%
Torres	2009	5	105.03	200	1.65	143	98	49%
Torres	2009	6	103.57	200	1.21	130	115	58%
Torres	2009	7	113.35	200	2.07	151	94	47%
Torres	2009	8	114.16	199	1.81	162	89	45%
Torres	2009	9	109.60	200	1.75	151	96	48%
Torres	2010	2	100.38	200	1.38	152	90	45%
Torres	2010	3	102.15	200	1.28	135	97	49%
Torres	2010	4	102.71	200	1.16	138	76	38%
Torres	2010	5	102.36	200	0.98	133	94	47%
Torres	2010	6	105.80	200	1.30	147	106	53%
Torres	2010	7	108.27	200	1.53	141	112	56%
Torres	2010	8	108.80	200	1.58	139	107	54%
Torres	2010	9	110.14	200	1.52	136	113	57%

Torres	2011	2	106.51	200	1.28	138	87	44%
Torres	2011	3	108.70	200	4.23	138	93	47%
Torres	2011	4	106.05	200	1.44	144	97	49%
Torres	2011	5	103.96	200	1.21	134	96	48%
Torres	2011	6	106.30	200	1.33	137	89	45%
Torres	2011	7	106.88	200	1.34	144	92	46%
Torres	2011	8	103.83	200	1.22	134	101	51%
Torres	2011	9	106.53	200	1.50	138	87	44%
Torres	2012	2	109.06	199	1.84	144	84	42%
Torres	2012	3	105.09	200	1.24	138	93	47%
Torres	2012	4	102.88	200	1.17	133	110	55%
Torres	2012	5	105.61	200	1.41	144	91	46%
Torres	2012	6	104.69	200	1.24	134	94	47%
Torres	2013	2	99.16	200	0.84	120	91	46%
Torres	2013	3	100.91	200	1.07	134	108	54%
Torres	2013	4	105.24	200	1.27	135	82	41%
Torres	2013	5	102.51	200	1.06	131	87	44%
Torres	2013	6	111.28	200	1.54	145	96	48%
Torres	2013	7	113.02	200	1.91	151	92	46%
Torres	2013	8	107.63	200	1.68	149	107	54%
Torres	2013	9	105.08	200	1.57	151	87	44%
Torres	2014	2	105.97	200	1.82	140	88	44%
Torres	2014	3	103.45	200	1.34	136	94	47%
Torres	2014	5	106.56	200	1.60	139	95	48%
Torres	2014	6	112.41	200	2.04	158	75	38%
Torres	2014	8	109.54	200	1.49	142	91	46%
Torres	2015	1	112.46	200	2.09	155	44	22%
Torres	2015	2	102.88	200	1.33	134	76	38%
Torres	2015	4	100.04	200	1.25	137	93	47%
Torres	2015	5	102.73	200	1.59	149	94	47%
Torres	2015	7	108.65	200	2.01	197	94	47%
Torres	2015	9	109.64	200	1.85	160	99	50%
Torres	2016	1	108.02	200	4.68	138	67	34%
Torres	2016	2	102.13	200	1.47	144	73	37%
Torres	2016	3	98.63	200	1.00	125	101	51%
Torres	2016	8	102.625	200	1.42	142	113	57%
Torres	2016	9	102.585	200	1.76	165	96	48%

3.2 Temporal changes in mean lobster size

The mean sizes of lobsters taken each month throughout each year have been generally consistent between 2005 and 2016 (Figure 1), with few increasing or decreasing trends evident throughout any year. However, in Torres Strait years 2007, 2009 and 2010 showed significant increasing trends and on the QLD east coast years 2007 and 2011 also showed significant increasing trends. It was anticipated, given the rapid growth rate of this species, that there would be a general increasing trend throughout each year. In particular, in Torres Strait where the fishery targets only one year-class it was expected that increasing mean size would be clearly evident.

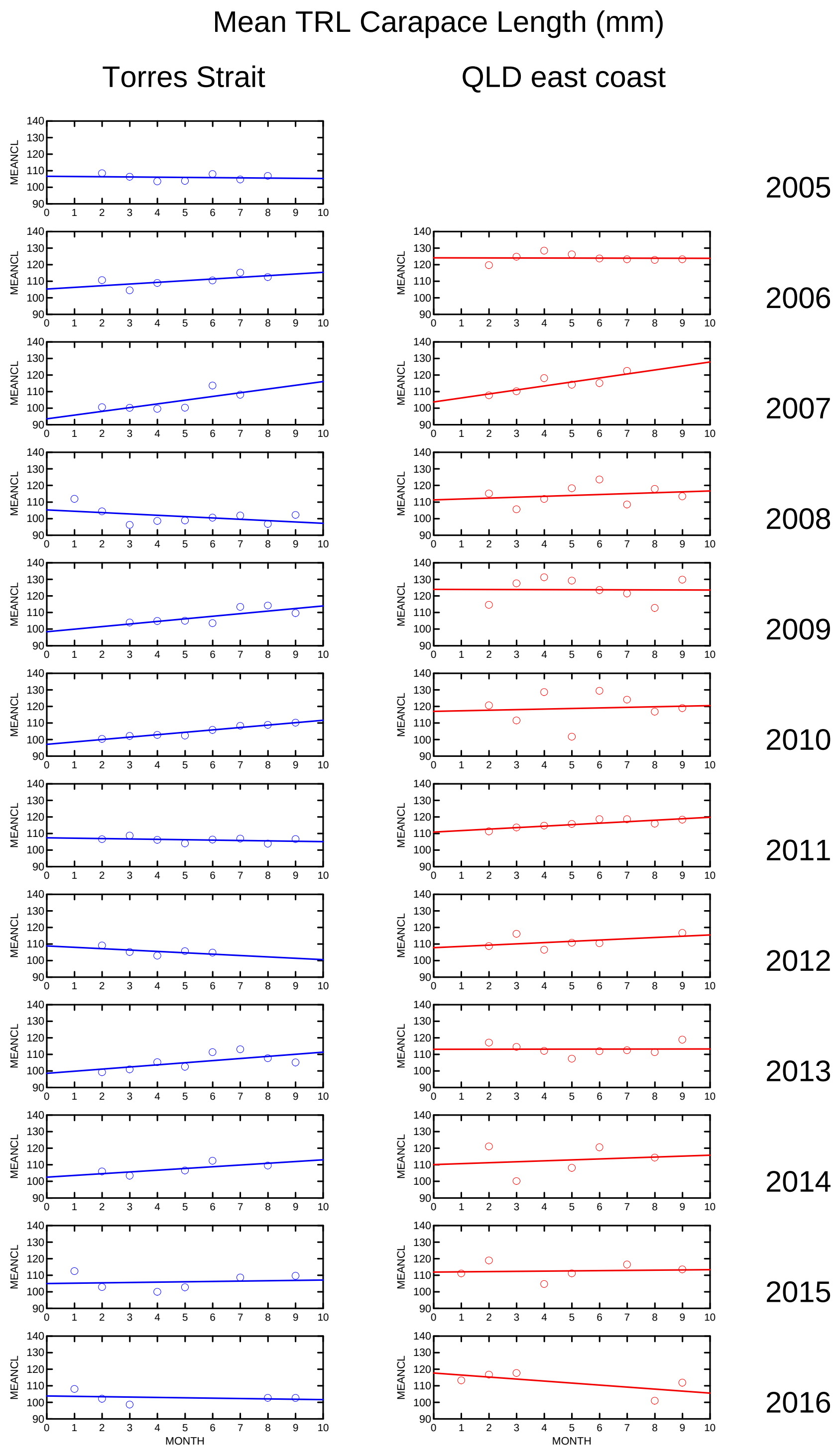

Figure 1 Mean size (carapace length mm) of lobsters *Panulirus ornatus* from commercial catches taken each month in Torres Strait (blue) and on the QLD east coast (red) between 2005 and 2016.

3.3 Torres Strait lobster size distributions

The size distributions of commercially caught ornate rock lobsters (*Panulirus ornatus*) taken in Torres Strait were remarkably consistent between years (Figure 2), with median values around 105 mm CL in each year. The introduction of the 115 mm tail length (~90 mm CL) size limit in 2003 virtually excludes age 1+ lobsters from commercial catches. As a result catches are comprised almost solely of age 2+ lobsters, with minor contributions of 3+ lobsters forming the right-hand tails of the size distributions.

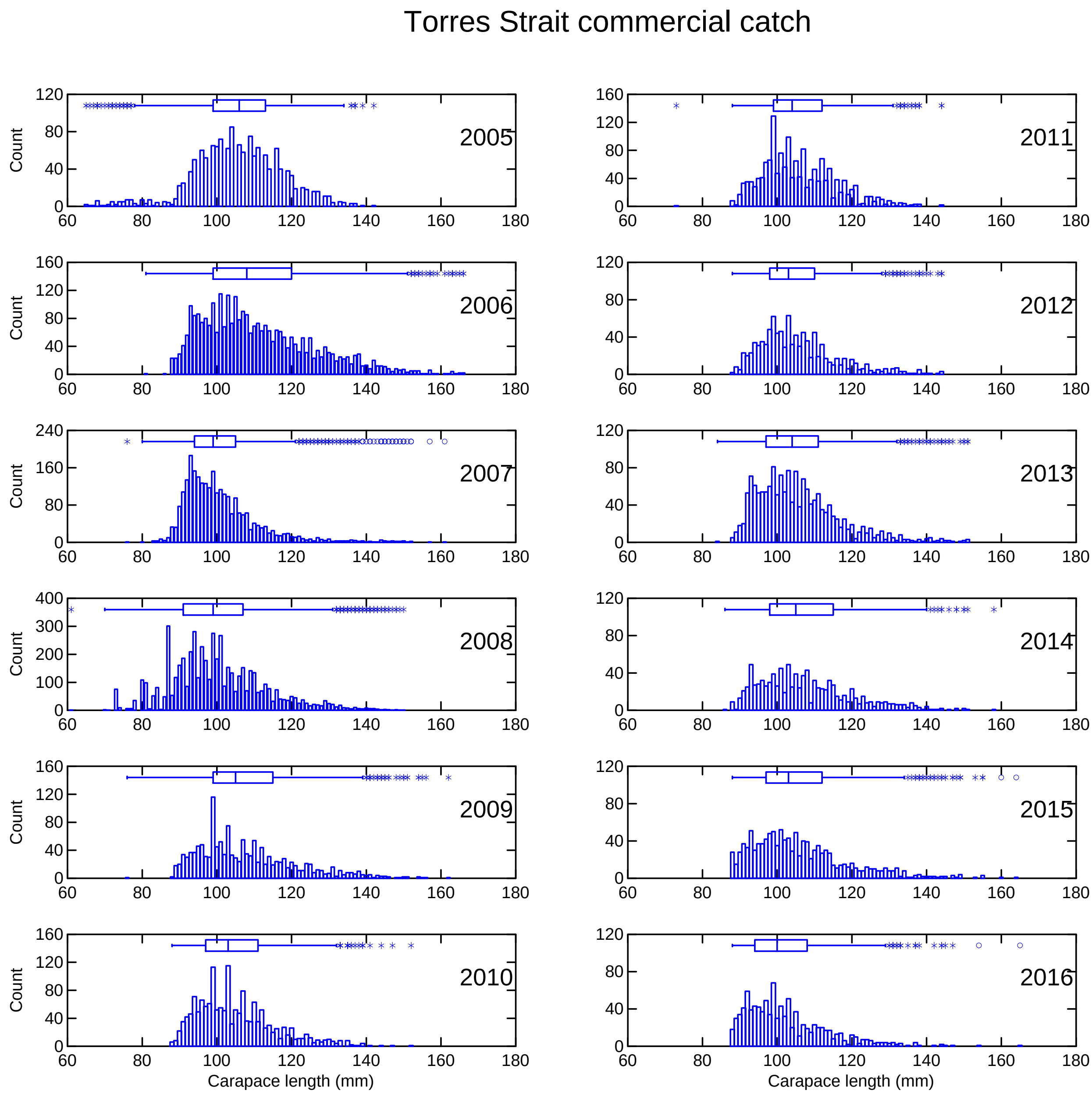

Figure 2 Size frequency distributions of ornate rock lobsters (*Panulirus ornatus*) taken in commercial catches in Torres Strait between 2005 and 2016. Box plots show median values and confidence limits for the data.

As expected the combined monthly size distributions of commercially caught lobsters were also remarkably consistent (Figure 3) and there was no apparent progression in size/age throughout the year, for either sex. The age 3+ components of the size distributions were dominated by male lobsters. These males represent the non-migratory portion of each year's breeding population.

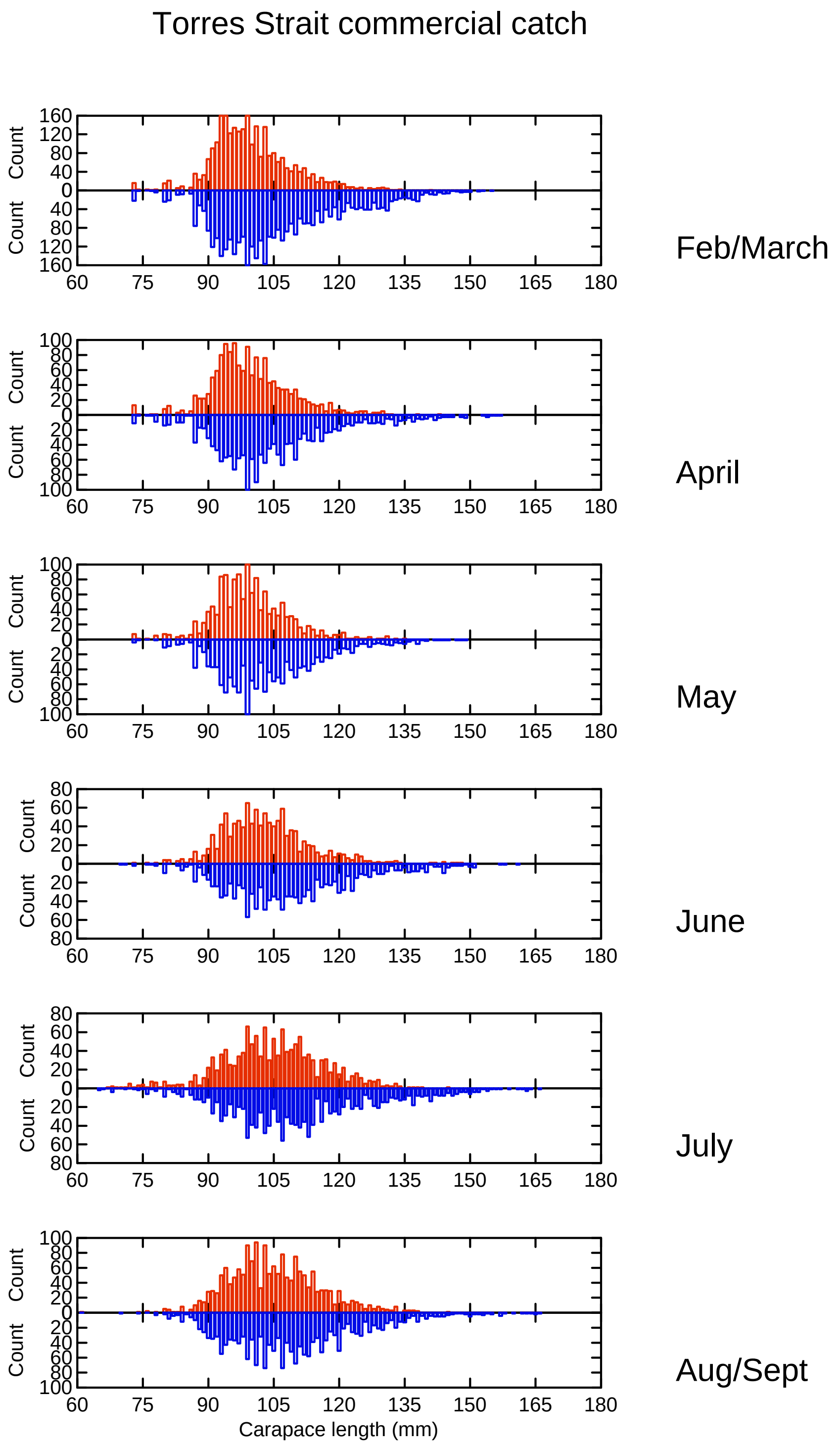

Figure 3 Size frequency distributions of ornate rock lobsters (*Panulirus ornatus*) taken in monthly commercial catches in Torres Strait for all years (2005- 2016) combined. Red bars indicate females, blue bars indicate males.

3.4 QLD east coast lobster size distributions

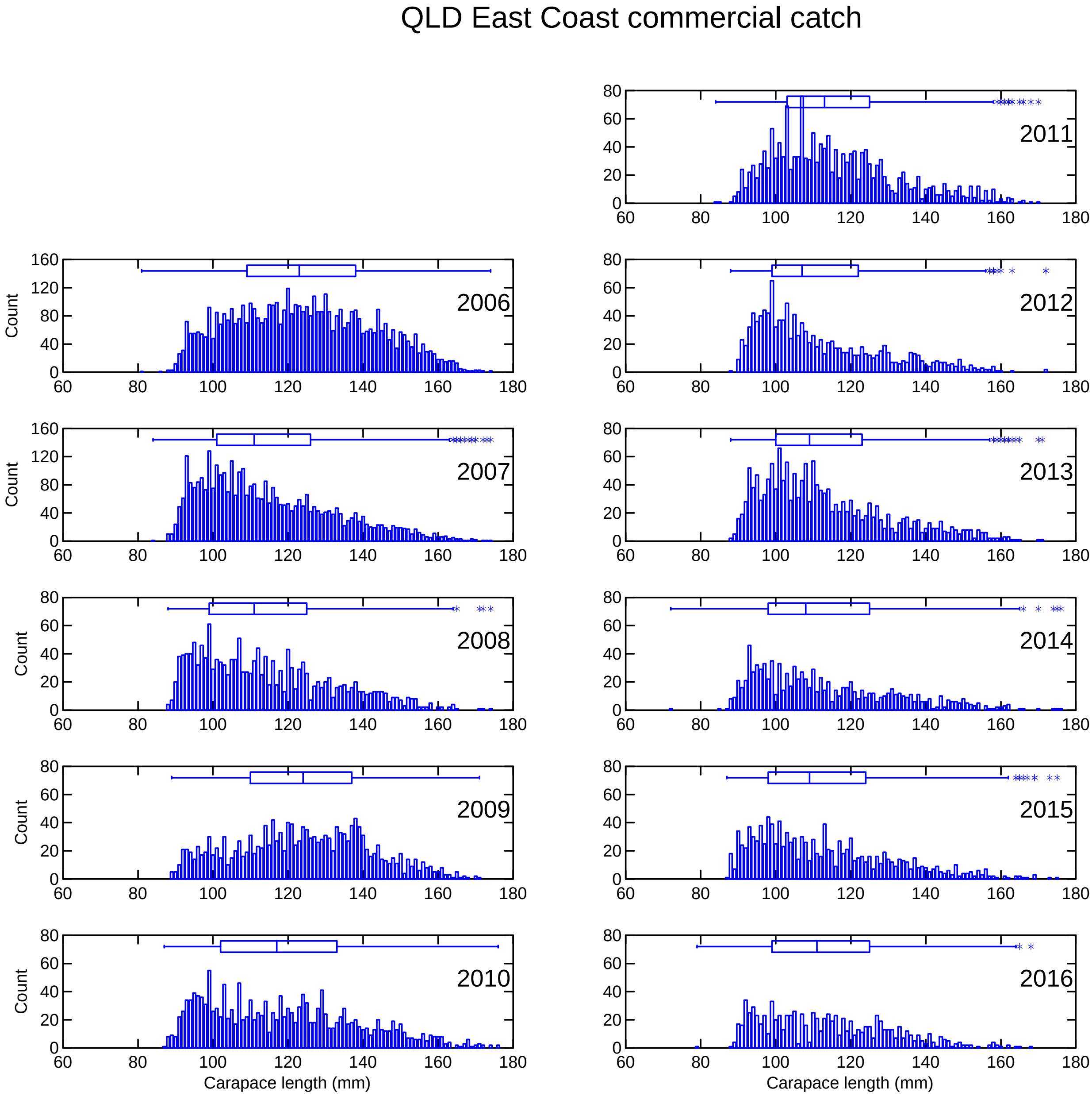

Figure 4 Size frequency distributions of ornate rock lobsters (*Panulirus ornatus*) taken in commercial catches on the QLD east coast between 2006 and 2016.

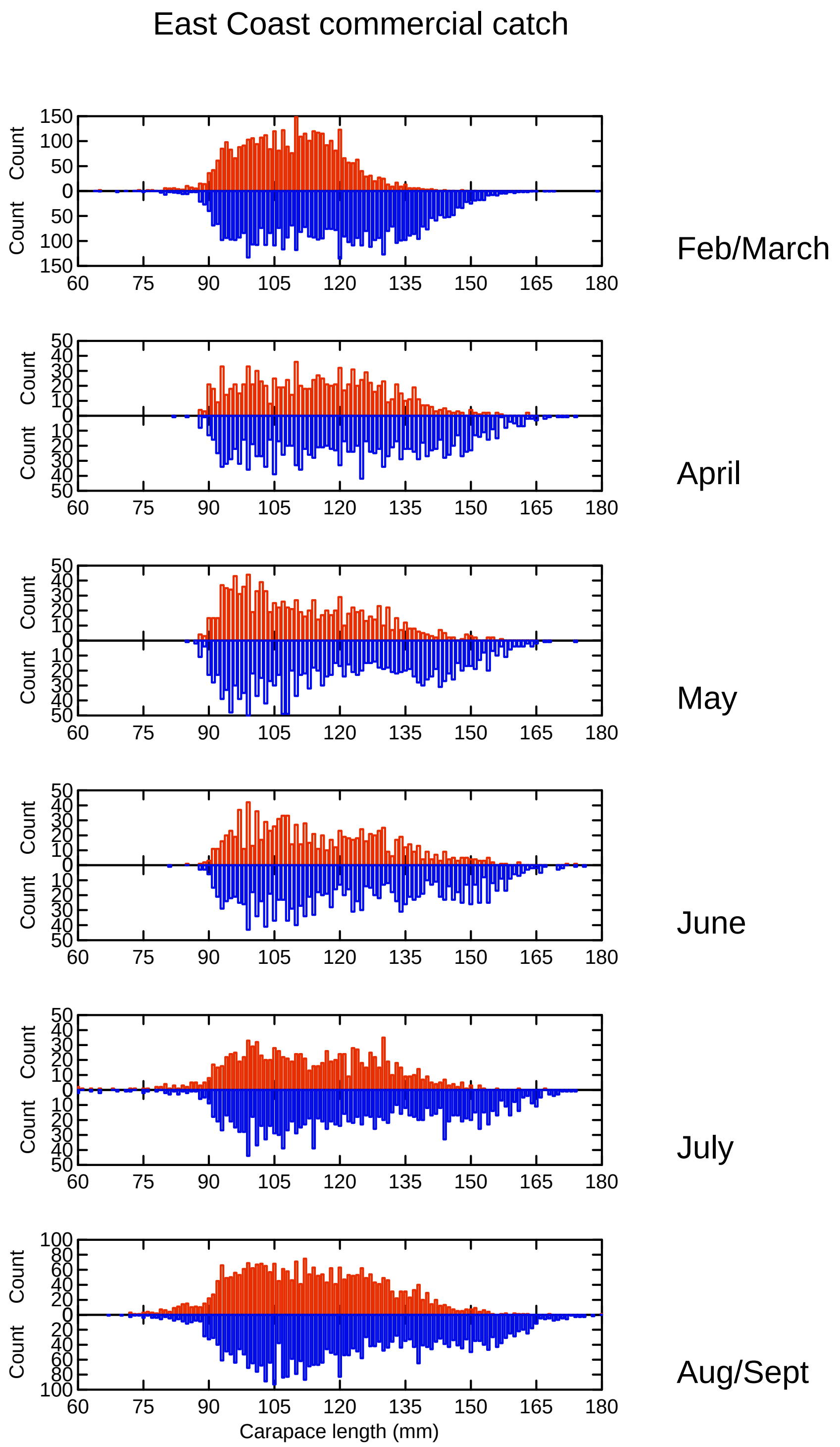

Figure 5 Size frequency distributions of ornate rock lobsters (*Panulirus ornatus*) taken in monthly commercial catches on QLD east coast for all years (2006-2016) combined. Red bars indicate females, blue bars indicate males.

3.5 Comparative seasonal trends

The long-term seasonal trends in mean sizes of ornate rock lobsters (*Panulirus ornatus*) taken in commercial catches on the QLD east coast and in Torres Strait differ markedly (Figure 6). However, this difference is primarily due to the different age compositions of these populations; QLD east coast comprising more than 4 year-classes (Figure 4) cf. Torres Strait comprised almost entirely of only one year-class (Figure 2).

The pattern observed in Torres Strait shows a drop from January to February, remaining consistent through until May, then increasing in June and remaining consistent for the remainder of the fishing season. The pattern on the QLD east coast was less defined, although as for the Torres Strait catches there was a significant increase in mean CL from May to June.

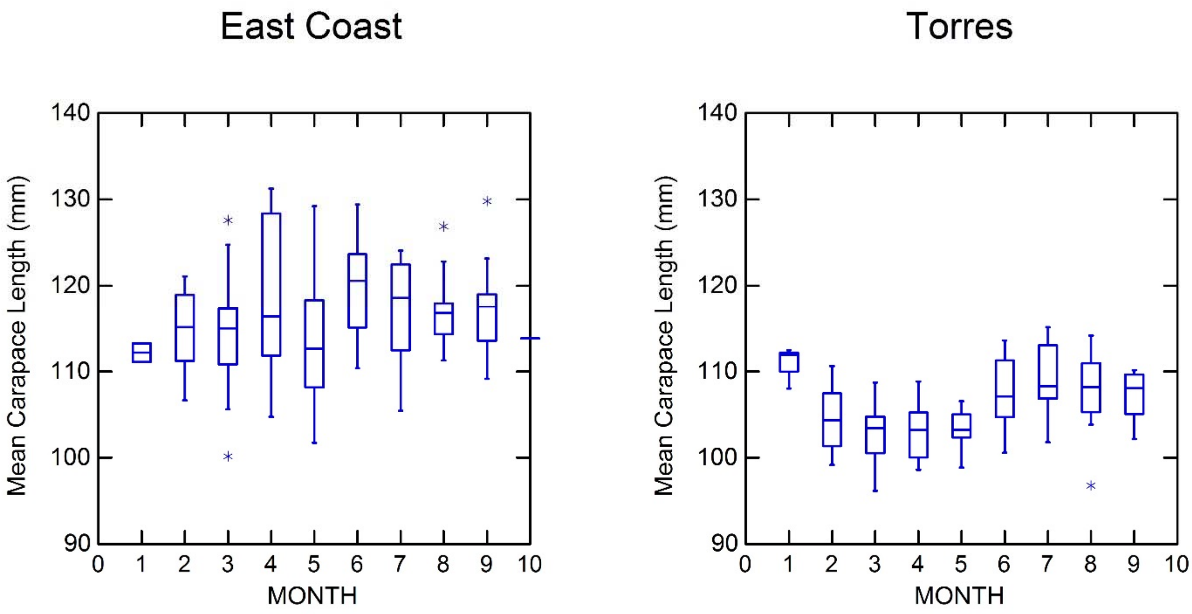

Figure 6 Boxplots of monthly mean sizes of ornate rock lobsters (*Panulirus ornatus*) taken in commercial catches on QLD east coast and Torres Strait for all years (2001-2016).

3.6 Temporal and spatial trends in lobster sex ratios

Between 2005 and 2016 the Torres Strait commercial catch was comprised of 45% female lobsters, while the QLD east coast commercial catch was comprised of 40% female lobsters. This result was not anticipated and was contrary to the difference in life strategies for the two sub-populations. In Torres Strait almost all female lobsters emigrate to breed as 2+ year olds in August/September while a small proportion of male lobsters remain (Skewes et al. 1994). On the QLD east coast breeding lobsters return to the fishing grounds after breeding, as evidenced by the larger size of lobsters in the commercial catches (Figure 1). There is some evidence of an increasing proportion of females in the Torres Strait catches (eg. 2005, 2008, 2010) that might be expected as the resident males are depleted during the year. There is also some evidence that the sex ratio in the QLD east coast catches remains more consistent throughout most years. However, the reason for the greater proportion of female lobsters in Torres Strait catches is difficult to explain.

It is possible that divers on the QLD east coast might actively exclude some large male lobsters as the higher grades are worth less in terms of $/kg. However, the increased lobster weight would account for the lower rate and it seems unlikely that any legal sized lobster would be excluded from the catch. Nevertheless this possibility requires further discussion with active fishers as such fisher selectivity has the potential to bias estimates of size and age distribution.

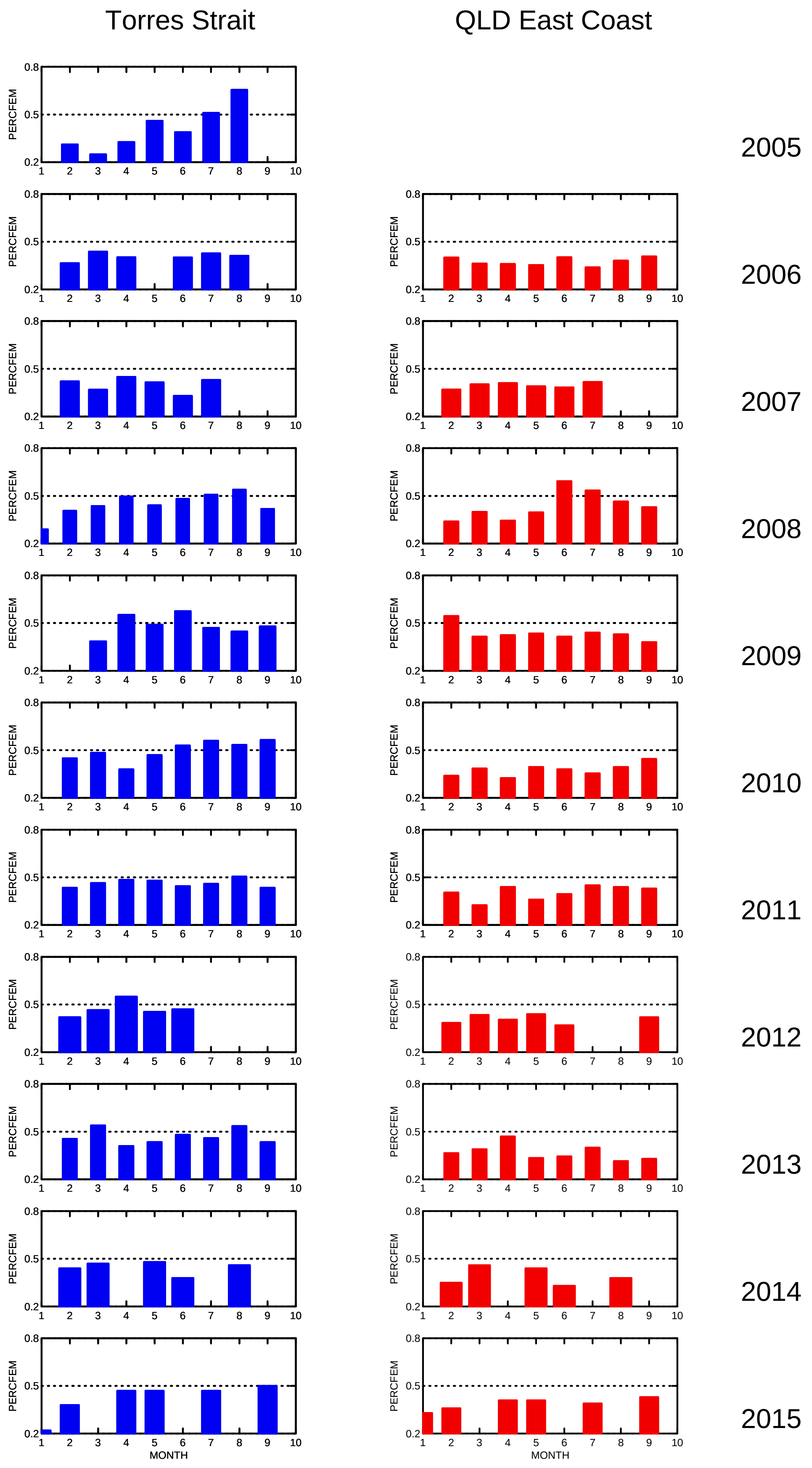

Figure 7 Percent females from monthly commercial catches of ornate rock lobsters (*Panulirus ornatus*) taken in Torres Strait (blue bars) and on the QLD east coast (red bars) between 2005 and 2015.

4 Discussion and Conclusions

The monthly collection of size data from commercial TRL catches taken in Torres Strait and on the Queensland east coast provided important information to allow assessment of growth and settlement timing for the population as well as temporal changes in sex ratio. Given the forecasted changes in climate and the likely impacts on environmental conditions for both larval and adult lobsters, the size distribution data provides a valuable benchmark for future monitoring and impact assessments. Further, these data provide a benchmark for assessment of any future changes in size selectivity due to changes in fishery management. For example the increased size limit and extended seasonal closure implemented in 2003 resulted in a significant reduction of age 1+ lobsters in commercial catches.

The collection of size data for both the Torres Strait and QLD east coast populations at one processing facility has allowed cost-effective industry-based monitoring. The size monitoring program conducted at Badu Island between 1988 and 2001 was also cost-effective but included only central island catch data. Although a fishery-independent program, involving indiscriminate monthly sampling of lobsters, would likely provide more robust size distribution data the cost of such a program would be prohibitive. Further, fishers in the TRL fishery are unlikely to be size selective for most of the fishing season given only one year-class is fished and most are legal-sized early in the fishing season. This contrasts with selectivity of catches from baited traps that are affected by a range of external influences including conspecifics and predators.

The consistency in size distributions of both the Torres Strait and QLD east coast catches in most years over the study period strongly indicates both settlement timing and growth rates have also been consistent. It is possible that variable growth could dampen differences in size due to variable settlement timing but the long term consistency in size distribution suggests this is unlikely. In any case the advection processes that transfer larvae from the spawning grounds to the fishing grounds must have been generally consistent amongst years. The TRL fishery does not have an ongoing puerulus collection program to test this hypothesis but previous studies involving *insitu* observations of juvenile lobsters indicate a consistent peak settlement month of June (Dennis et al. 1997).

Glossary

AFMA	Australian Fisheries Management Authority
CSIRO	Commonwealth Scientific and Industrial Research Agency
CL	Carapace length
FRDC	Fisheries Research and Development Corporation
TW	Tail width
TRL	Tropical Rock Lobster
TSSAC	Torres Strait Scientific Advisory Committee
CPUE	Catch Per Unit Effort
TAC	Total Allowable Catch
TVH	Transferrable Vessel Holder (Licence)
TRL RAG	Tropical Rock Lobster Research Advisory Group
PNG	Papua New Guinea

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