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Fisheries Long Term Monitoring Program

Syngnathids and their associated communities

Supplementary report to:
Syngnathids in the East Coast Trawl Fishery: a review and trawl survey

August 2006

Queensland Government
Department of Primary Industries and Fisheries

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Contents

Acronyms

BRD	Bycatch Reduction Device
CRW	Catch Rate - Weight
CRN	Catch Rate - Numbers
MDS	Multidimensional Scaling
PRIMER	Plymouth Routines in Multivariate Ecological Research
SIMPER	Similarity of Percentages
TED	Turtle Exclusion Device

Introduction

This document presents the data collected to address the fourth objective of the initial report (Dodt 2005), to "investigate the relationship between syngnathid distribution and abundance, and assemblages and habitat characteristics".

Methods

Dodt (2005) details the survey design, field sampling protocols and laboratory procedures for collection and processing of the syngnathid samples from the trawl survey. The location of the survey shots and the stratified grids sampled during the survey are shown in Figure 1. From each trawl shot a 10 kg sub-sample of the catch was collected from the middle net to evaluate community composition[1]. The latitude and longitude, depth and strata information for each shot was recorded. Large individuals (including sharks, rays, sponges and habitat characters (i.e. rubble)) caught in the middle net that could not be accurately sub-sampled, due to their size, were identified to the lowest taxonomic level achievable, number of individuals and their weight were recorded on board the vessel and released. These individuals are referred to as "monsters" in this report. Syngnathids were removed from the catch prior to collecting the sub-sample. The details of syngnathid processing are in the initial report (Dodt 2005).

In order to calculate catch rates of the species and habitat characters in each sub-sample the following information was collected from each trawl:

- total weight of catch in the middle net (full net weight - empty net weight)
- wet weight of the sub-sample (sum of weights of all the contents as processed in the laboratory)
- total weight of each species (including habitat characters) in the sub-sample
- number of individuals of each species in the sub-sample.

The sub-sample from each trawl shot was sorted to lowest taxonomic level. Species[2] were identified according to protocols outlined in the Department of Primary Industries and Fisheries species register (Roy *et al.* 2005).

The lengths of up to 20 randomly selected individuals were recorded for each species in each sub-sample. Only maximum and minimum sizes are presented in this report.

[1] *Community Composition* refers to all catch (including rubble or sediment, yet excluding syngnathids for this survey) trawled by nets without excluder devices such as TEDs and BRDs.
2 In order to be consistent with terminology throughout this section, we use the term species (plural form) even when referring to groupings at the higher taxonomic level

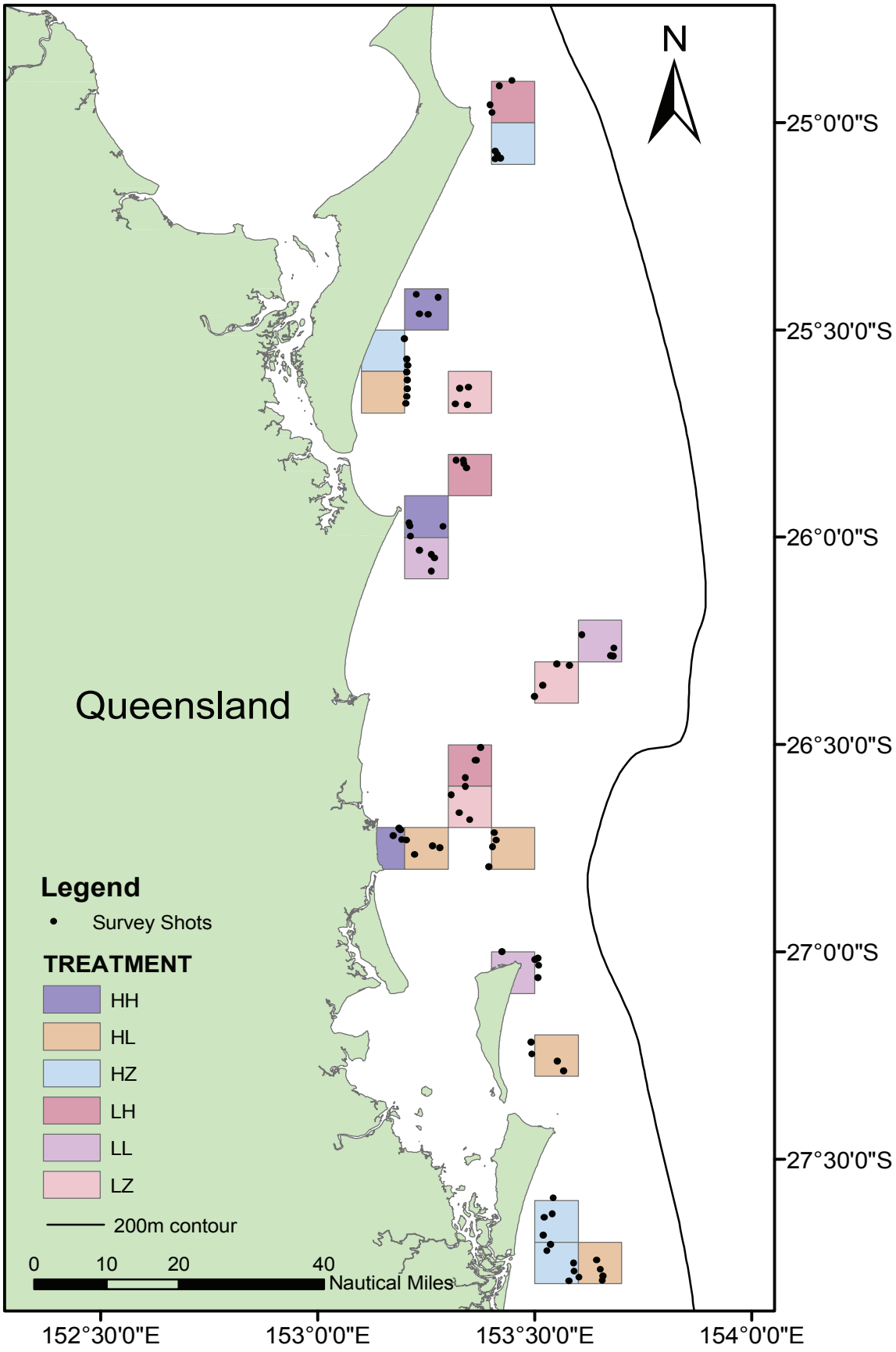

Figure 1. The location of the survey shots (mid-point of trawl) and the stratified grids sampled for the syngnathid survey (April - May 2005). HH = high trawl effort, high syngnathid CPUE, HL = high trawl effort, low syngnathid CPUE, HZ = high trawl effort, zero syngnathid CPUE, LH = low trawl effort, high syngnathid CPUE, LL = low trawl effort, low syngnathid CPUE, LZ = low trawl effort, zero syngnathid CPUE (CFISH February 2005).

Data Analysis

Although syngnathids were collected from all three nets during the survey, only the syngnathids that were present in the middle net were used in the analysis. This made the syngnathid collection comparable to the samples of the community composition which were only collected from the middle net. Unlike the middle net the port and starboard nets had excluder devices fitted and the use of the syngnathids from these nets may have biased the results for this objective of the study.

The catch rate of each species and habitat character was determined for each trawl shot using the equations:

For each "monster" and syngnathid species removed from the middle net catch prior to sub-sampling:

$$CRW_{si} = X_{si} \div D \qquad \text{OR} \qquad CRN_{si} = X_{si} \div D$$

For all species and habitat character within the sub-sample:

$$CRW_{si} = (X_{si} \times \frac{TW_i}{SSW_i}) \div D \quad \text{OR} \qquad CRN_{si} = (X_{si} \times \frac{TW_i}{SSW_i}) \div D$$

where

CRW is the catch rate as grams per nautical mile (g n.mile^{-1}) of each species or habitat character *s* in trawl *i*

CRN is the catch rate as numbers per nautical mile (numbers n.mile^{-1}) of each species or habitat character *s* in trawl *i*

X is the total weight (for CRW) or number of individuals (for CRN) collected from the sub-sample for species or habitat character *s* in trawl *i*

TW is the total weight of the catch from the middle net in trawl *i*

SSW is the sub-sample weight in trawl *i*

D is the distance of trawl *i*

The frequency of occurrence was calculated for each species and habitat characters, those that occurred in less than 5% of the trawls were omitted from further analysis in order to reduce the stress of the analysis of large data sets. Stress increases not only with reducing dimensionality but also with increasing quantity of data and is essentially a measure of the "goodness of fit" of the data in the MDS plot (Clarke and Warwick 2001).

The catch rate of individual species and habitat characters from each trawl was used in multivariate analysis using *PRIMER* (Plymouth Routines in Multivariate Ecological Research) by Clarke and Warwick (2001). The catch rate data were square root transformed to produce similarity matrices using the Bray-Curtis index of similarity. The similarity matrices were analysed using multidimensional scaling (MDS) to investigate patterns in the species (including habitat characters) composition of each trawl sample by

visually representing the relative “closeness’ of the composition between each sample (Clarke and Warwick 2001).

A Similarity of Percentages (SIMPER) analysis was performed on observed clusters shown on the MDS plots. The SIMPER identifies species (including habitat characters) principally responsible for the observed clusters (Clarke and Warwick 2001).

The combined catch rates for the syngnathid species (CRW and CRN) of each trawl were visually superimposed over each trawl sample on the MDS, as a technique of noting consistent differences in the syngnathid abundance between each of the observed clusters. However, after eliminating the species that occurred in less than 5% of trawls, the only syngnathid species remaining was *Solegnathus hardwickii* and *Solegnathus dunckeri* and as such only their catch rates were combined and superimposed over each trawl sample. It is important to note that the survey was designed to sample all syngnathid species from the middle net by removing them prior to sub-sampling, in order to provide more accurate catch rates of these rarely caught species. Although the majority of syngnathids were removed from the middle net, some were also collected in the sub-samples. Therefore, the catch rate of each syngnathid species was determined by the summation of the two separate catch rates, calculated using the equations above.

A draftsmen plot was performed for the *Solegnathus* spp. (pipehorses) and the community composition to provide an indicator of mutual correlation between all pairs of variables (Clarke and Warwick 2001). The 50 most frequently occurring species (including habitat characters) were analysed to provide information on those with which *Solegnathus* spp. are positively and negatively correlated.

Results

A total of 433 species and habitat characters were identified from the sub-samples and individuals removed prior to sub-sampling (monsters and syngnathids) from the 85 trawls (Appendix 1). This included fifty-seven syngnathids comprising four species (*Hippocampus tristis*, *Solegnathus dunckeri, Solegnathus hardwickii, Trachyrhamphus bioarctatus*) and eight 'monsters'. *Nemipterus theodorei* (Theodore's threadfin bream) and *Lepidotrigla argus* (gunard) were the two species most frequently encountered (75 and 71% of trawls respectively) (Table 1). However, *Sillago robusta* (stout whiting) had the highest overall mean catch rate according to weight (Table 1).

Table 1. The 25 most common species (including rubble) collected within the sub-samples of 85 trawls from the syngnathid survey (Dodt 2005).

Species Name	Frequency (%)	Average Catch Rate (g/n.mile)	Total Number Collected	Total Weight Collected (g)	Minimum Recorded Length (mm)	Maximum Recorded Length (mm)
Nemipterus theodorei	75	4391.18	2770	98544.96	14	210
Lepidotrigla argus	71	3908.72	6248	100368.72	27	195
Ambiserrula jugosa	69	1226.01	859	26952.81	26	292
Saurida undosquamis	60	2483.61	445	55507.60	74	479
Sepia plangon	57	1831.63	1030	26088.80	19	116
Paramonacanthus otisensis	56	428.38	449	7469.34	30	143
Engyprosopon grandisquama	55	802.83	1503	16648.62	50	150
Penaeus plebejus	54	533.55	498	11794.65	15	57
Rubble	54	1645.05	–	42692.93	–	–
Tetrosomus concatenatus	51	771.48	1410	13926.45	10	149
Dactyloptena papilio	47	239.92	339	4052.47	29	125
Portunus rubromarginatus	45	344.10	274	4553.07	12	60
Sillago robusta	45	5448.59	2053	85416.50	35	193
Trachypenaeus curvirostris	45	108.96	877	1988.53	4	28
Portunus sanguinolentus	44	2263.27	391	29895.86	19	143
Uroteuthis (Photololigo) cf chinensis	43	401.44	93	4802.58	38	292
Parapercis nebulosa	40	605.57	111	6515.57	60	211
Platycephalus longispinis	38	823.04	466	13051.13	52	221
Upeneus asymmetricus	37	1441.59	549	20242.20	39	178
Calliurichthys scaber	35	309.58	157	3065.41	44	205
Ibacus chacei	34	694.32	119	8708.50	12	75
Torquigener altipinnis	33	226.17	306	3241.94	26	110
Apogon nigripinnis	32	101.54	104	1137.73	25	81
Portunus argentatus	32	103.97	318	1119.08	11	34
Amusium balloti	31	2697.22	653	20590.70	32	118

There were three main clusters observed when the species and rubble composition was plotted by catch rates (CRW) (Figure 2). The first cluster includes trawls two and three, the second cluster is trawls 44 and 43 and all the remaining trawls are within the third cluster.

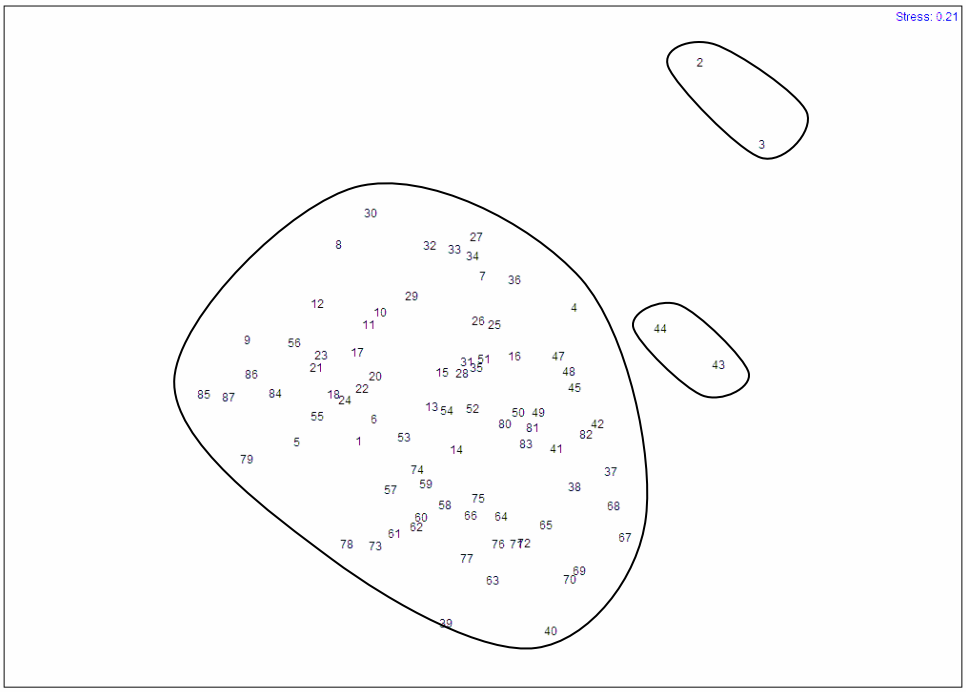

Figure 2. Multidimensional scaling of species (including habitat characters) composition (based on weight catch rates) presenting the observed clusters of trawls from the Dodt (2005) syngnathid survey (April and May 2005).

Syngnathid abundance (CRW) per trawl overlayed on the MDS (Figure 3) illustrates that the trawls in the 44 and 43 cluster were the trawls of highest observed syngnathid abundance. Trawls 2 and 3 are also separated from the main cluster, but as they have zero syngnathid abundance have not been analysed further.

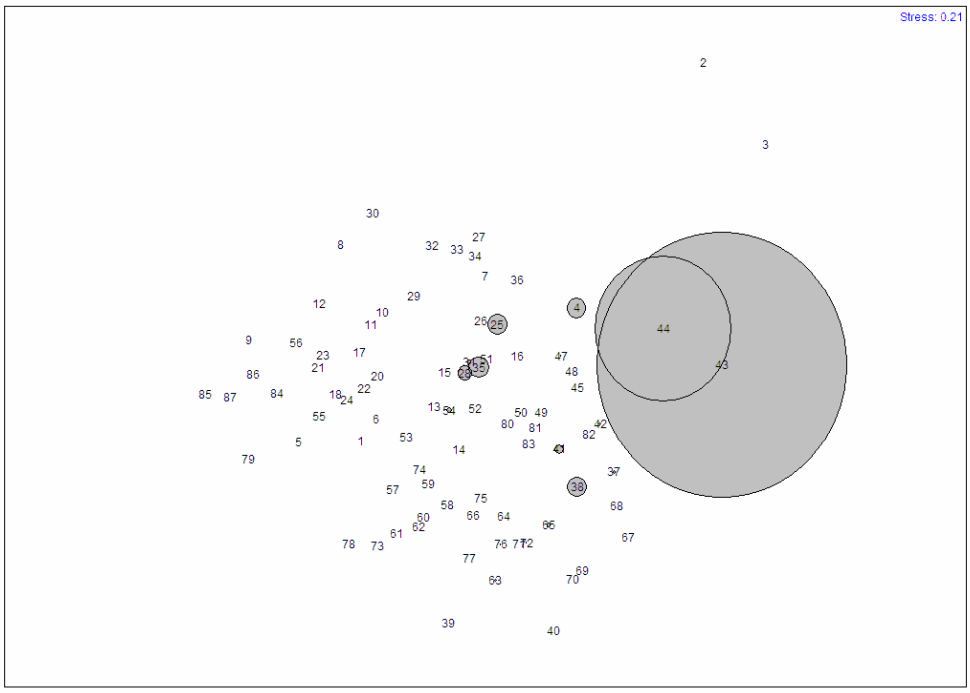

Figure 3. Multidimensional scaling of species (including habitat characters) composition (based on weight catch rates) with the syngnathid abundance (by weight) overlayed for each trawl of the Dodt (2005) syngnathid survey (April and May 2005).

A SIMPER analysis comparing the species (including habitat characters) composition of trawls 44 and 43 to all other trawls indicates *Nemipterus theodorei*, rubble, *Sepia plangon* (striking cuttlefish) and *Choerodon venustus* (venus tuskfish), account for approximately 70% of the similarity between the two trawls (Table 2). The draftsmen plot's correlation coefficients indicate that the first two species and rubble are also correlated with *Solegnathus* species.

Table 2. A Similarity of Percentages (SIMPER) analysis to show the species (including habitat characters) that account for the most similarity between trawls 44 and 43 based on weight catch rates (CRW). The correlation coefficient shows those that are most correlated to *Solegnathus* spp.

Species	Average Abundance (g/n.mile)	Average Similarity	Contribution %	Cumulative Contribution %	Correlation Coefficient
Nemipterus theodorei	24793.39	14.63	36.26	36.26	0.504
Rubble	6704.08	4.74	11.74	48.00	0.227
Sepia plangon	4322.92	4.72	11.71	59.71	0.194
Choerodon venustus	3698.81	3.96	9.82	69.52	–
Neosebastes insicipinnis	9591.59	3.95	9.80	79.32	–
Lepidotrigla argus	5369.35	2.43	6.03	85.35	- 0.089
Parupeneus spilurus	1695.52	1.24	3.08	88.43	–
Glaucosoma scapulare	8976.87	1.03	2.56	90.99	–

The SIMPER indicates that *Nemipterus theodorei*, *Neosebastes insicipinnis* (black spotted gurnard perch), rubble and *Glaucosoma scapulare* (pearl perch) account for approximately 40% of the dissimilarity between the trawls 44 and 43, and the remaining trawls (Table 3). Where the dissimilarity divided by standard deviation of the SIMPER is above 1.50 they are a good discriminating species (or habitat character) of the dissimilarity between the groups (Clarke and Warwick 2001). These species include, *Nemipterus theodorei*, *Neosebastes insicipinnis*, rubble, *Sepia plangon*, *Choerodon venustus*, *Upeneichtys lineatus*, *Paraupeneus spilurus* and *Solegnathus* spp..

Table 3. The between group dissimilarity, comparing the group with high syngnathid abundance, which includes shot 44 and 43 and the group with low or no syngnathid abundance which includes all other trawls.

Species	Average Abundance (g/n.mile)		Average Dissimilarity	Dissimilarity/ Standard Deviation	Contribution %	Cumulative Contribution %
	Group with low or zero syngnathids	Group with high syngnathids				
Nemipterus theodorei	3453.73	24793.39	17.49	2.58	20.46	20.46
Neosebastes insicipinnis	73.46	9591.59	7.35	2.26	8.60	29.06
rubble	717.36	6704.08	6.90	1.54	8.07	37.13
Glaucosoma scapulare	7.89	8976.87	6.27	1.20	7.34	44.47
Saurida grandisquamis	262.10	3215.77	3.95	0.99	4.62	49.09
Lepidotrigla argus	3284.52	5369.35	3.71	1.46	4.34	53.44
Tetrosomus concatenatus	352.42	5324.77	3.63	1.23	4.25	57.68
Sepia plangon	842.83	4322.92	3.46	2.08	4.05	61.74
Choerodon venustus	11.75	3698.81	3.46	3.26	4.05	65.79
Sillago robusta	3027.00	0	2.60	0.62	3.04	68.83
Amusium balloti	985.38	1898.93	1.84	0.91	2.16	70.99
Upeneus filifer	147.01	2542.13	1.78	1.45	2.09	73.07
Saurida undosquamis	1807.55	1302.72	1.74	0.73	2.04	75.11
Upeneichthys lineatus	2.50	2096.38	1.61	2.23	1.89	77.00
Ibacus chacei	259.45	1295.79	1.52	1.01	1.78	78.78
Parupeneus spilurus	28.00	1695.52	1.43	5.63	1.67	80.46
Ratabulus diversidens	9.88	935.89	1.15	0.97	1.34	81.80
Cleidopus gloriamaris	30.34	875.88	1.07	0.97	1.25	83.05
Portunus sanguinolentus	1229.43	0	1.02	0.51	1.19	84.25
Ambiserrula jugosa	1038.33	245	0.85	0.70	1.00	85.24
Trachurus novaezelandiae	56.29	966.62	0.66	1.02	0.78	86.02
Sepia whitleyana	211.53	871.91	0.64	1.08	0.75	86.77
Upeneus asymmetricus	658.50	0	0.60	0.36	0.70	87.48
Lethrinus genivittatus	61.66	431.26	0.56	0.89	0.66	88.14
Pelates sexlineatus	884.83	0	0.55	0.12	0.64	88.78
Solegnathus spp.	3.65	503.45	0.52	1.74	0.60	89.38
Engyprosopon grandisquama	545.13	0	0.50	0.45	0.58	89.96
Portunus pelagicus	604.03	0	0.48	0.29	0.56	90.52

The observed clusters plotted by numerical catch rates (CRN) (Figure 4) differ from the clusters plotted by weight (CRW) (Figure 2). The separate cluster of trawls 44 and 43 in Figure 2 are within the main cluster of trawls in Figure 3.

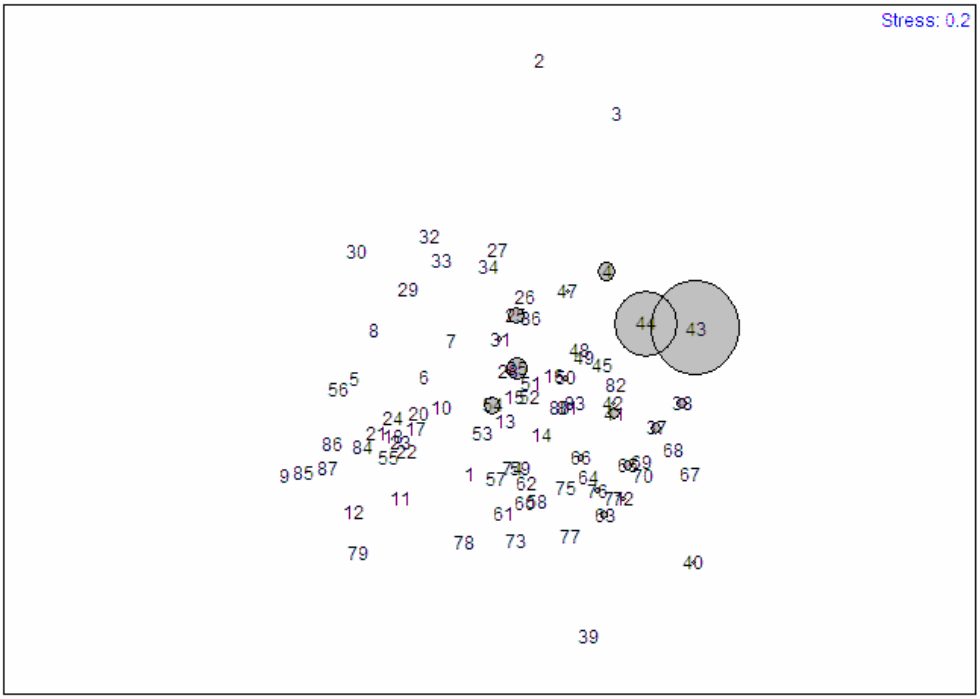

Figure 4. Multidimensional scaling of species (including habitat characters) composition (based on numbers catch rates) with the syngnathid abundance (by numbers) overlayed for each trawl of the Dodt (2005) syngnathid survey (April and May 2005).

A SIMPER analysis on the similarity between trawls 44 and 43 for CRN showed that *Nemipterus theodorei* and *Sepia plangon* account for approximately 50% of the similarity between the two trawls. The difference between the SIMPER analyses of species (including habitat characters) composition by weight catch rates (CRW) and numbers catch rates (CRN) is that habitat characters (e.g. rubble), for which no numbers were recorded, are eliminated from the CRN similarity comparison.

Table 4. A Similarity of Percentages (SIMPER) analysis to show the species that account for the most similarity between trawls 44 and 43 based on numbers catch rates (CRN).

Species	Average Abundance (numbers/n.mile)	Average Similarity	Contribution %	Cumulative Contribution %
N*emipterus theodorei*	394.61	11.27	31.57	31.57
Sepia plangon	131.37	6.44	18.04	49.62
Lepidotrigla argus	205.56	5.36	15.04	64.65
Neosebastes insicipinnis	72.96	2.15	6.01	70.67
Choerodon venustus	35.87	2.03	5.68	76.35
Amusium balloti	43.14	1.61	4.51	80.86
Upeneus filifer	75.08	1.07	3.01	83.87
Solegnathus spp.	14.50	0.79	2.21	86.08
Apogon capricornis	13.32	0.68	1.89	87.97
Upeneichthys lineatus	24.67	0.54	1.50	89.48
Parupeneus spilurus	14.38	0.54	1.50	90.98

Discussion

The MDS provides a simple picture of the relationship between each trawl by forming clusters of samples. A stress level is given to each MDS plot as a measure of the "goodness-of-fit" (Clarke and Warwick 2001). To reduce the stress level for a 2-dimensional MDS plot species and habitat characters that occurred in less than 5% of trawls were removed. This removed rarely caught species and habitat characters (and therefore prone to random and uninterpretable fluctuations) that may co-occur with *Solegnathus* spp., yet occur in such low numbers that their contribution to the clustering of samples would be extremely minimal.

The cluster of trawls (44 and 43) where high syngnathid abundance was present may include species and habitat characters important in defining syngnathid abundance and distribution. The species and habitat characters that caused the majority of the similarity between the trawls may provide information on a particular habitat type or composition that could in turn be relevant to syngnathid distribution and abundance. They are not however species and habitat characters that are definitely associated or co-occur with syngnathids. If any of these species and habitat characters are correlated with syngnathid abundance then it can be assumed that they are likely to be associated (Courtney *et al*. 2003).

The species that accounted for catch rate (CRW) similarities within trawls 44 and 43 that correlated with syngnathids include *Nemipterus theodorei,* which is a benthic species that occurs on sand or mud bottoms (Carpenter and Niem 2001a), *Sepia plangon,* which is found from shallow intertidal zones to depths of 80 m (Carpenter and Niem 1998) and rubble (a general habitat characteristic). The correlation with rubble would suggest that syngnathids are associated with rocky areas that have a higher level of benthic structure. It is also interesting to note that species such as *Neosebastes insicipinnis*, *Choerodon venustus*, *Upeneichtys lineatus* and *Paraupeneus spilurus* are shown as contributing to the separation of trawls 44 and 43 from the remainder of the trawls and that these species are commonly representative of sponge-algal mixed reef and rocky reef areas (Carpenter and Niem 1999, 2001a and 2001b; Kuiter 1996). The species and rubble composition of trawls 44 and 43 suggest that syngnathids occur in rocky, structured benthic areas. These areas are not typically targeted by trawlers, which is further supported by the result from the initial report which suggested that syngnathids were more commonly found in low effort trawl areas (Dodt 2005).

Catch rate units were shown to cause variation in the cluster formation on the MDS plots. The use of weight for determining the catch rates in this type of survey is supported as it includes habitat character components of the catch that could otherwise not be counted. The results demonstrated that catch rates based on numbers removed many species and rubble from the composition and therefore from the analysis. This is caused when pieces are not able to be identified as belonging to one particular individual. The species that commonly break apart in the sub-samples include marine plants and invertebrates, which can be important to indicate habitat type and structure of the trawls that form particular groupings in the MDS.

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Appendix 1

List of all species (including habitat characters) collected from the middle net of 85 trawls in the 2005 syngnathid survey.

Species Name	CAAB Code	Species Register Code	Frequency of Species	Average Catch Rate (g/n.mile)	Total Number Collected	Total Weight Collected (g)	Minimum Recorded Length (mm)	Maximum Recorded Length (mm)
Bivalves								
Amusium balloti	23 270001		31	2697.22	653	20590.7	32	118
Amusium pleuronectes	23 270003		2	107.96	4	58.2	51	64
Annachlamys flabellata	23 270004		8	91.72	22	227.8	28	54
Pecten fumatus	23 270007		2	349.64	2	101.8	65	67
Bryozoans								
Bryozoan sp B		1105	1	225.1	-	86.6	-	-
Bryozoan sp C		1106	1	72	-	27.7	-	-
Bryozoan sp D		1107	1	30.41	-	11.7	-	-
Bugs								
Ibacus chacei	28 821019		34	694.32	119	8708.5	12	75
Thenus indicus	28 821007		1	218.71	1	33.8	37	37
Thenus orientalis	28 821008		9	2203.75	13	3512.4	34	97
Thenus sp		732	1	162.49	1	60.1	44	44
Crabs								
Arcania elongata	28 876061		2	3.8	2	4.8	17	19
Arcania foliolata		443	1	1.43	1	1.3	13	13
Ashtoret granulosa	28 877001		1	92.16	1	50.1	48	48
Bathypilumnus nigrispinifer	28 926039		1	297.05	1	85.1	42	42
Calappa lophos	28 875005		4	491	4	1145.8	99	119
Calappa philargius	28 875001		3	421.31	3	415.7	67	113
Calappa sp B		1124	1	13.63	1	7.2	29	29
Charybdis bimaculata	28 911018		1	7.98	1	6.5	32	32
Charybdis miles	28 911019		1	22.09	1	9.6	34	34
Charybdis natator	28 911002		1	36.52	1	16.8	42	42
Charybdis truncata	28 911015		10	1025.69	533	3861.9	18	56
Corystidae sp A		1121	1	6.73	1	8.7	21	21
Cyclodorippidae sp A		1019	1	47.31	1	5.79	19	19
Dardanus arrosor	28 827001		7	11.59	10	31.4	10	60
Dardanus crassimanus	28 827054		4	3.33	6	7.19	5	14
Dardanus hessii	28 827011		1	5.61	2	1	9	12
Dardanus sp A		811	2	66.16	2	35.1	21	32
Dardanus sp B		1128	2	6.12	2	6.2	5	18
Dorippe quadridens	28 870001		1	7.58	2	4.5	14	15
Eduarctus martensii	28 821022		1	8.62	2	3.6	12	13
Entomonyx depressus		438	7	13.97	15	44.8	7	28
Ephippias endeavouri	28 880072		1	14.48	2	8.6	18	19
Gaetice sp A		1029	2	7.27	3	5.9	10	41
Horny Devil Crab		1072	1	2.93	1	1.1	15	15
Hyastenus campbelli	28 880030		6	104.12	15	88.9	10	27
Hyastenus diacanthus	28 880031		1	8.92	2	8.1	17	17
Lyreidus tridentatus	28 865002		1	0.95	1	0.5	8	8
Matuta planipes	28 877005		2	130.85	8	141.3	15	45
Phalangipus australiensis	28 880038		2	5.6	2	6	17	17
Podophthalmus vigil	28 911014		1	43.51	1	19.5	54	54
Portunus argentatus	28 911032		32	103.97	318	1119.08	11	34
Portunus granulatus	28 911028		4	16.44	8	29.1	19	33
Portunus haanii	28 911033		1	33.22	1	4.5	31	31
Portunus orbitosinus	28 911063		2	104.28	27	96.9	15	29
Portunus pelagicus	28 911005		27	1812.1	70	12835	44	147

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Portunus pubescens	28 911067		1	131.82	1	9.5	39	39
Portunus rubromarginatus	28 911026		45	344.1	274	4553.07	12	60
Portunus sanguinolentus	28 911006		44	2263.27	391	29895.86	19	143
Thalamita sima	28 911022		2	14.29	2	11.3	23	23
Crinoids								
Crinoid sp E		608	1	758.59	1	135	35	35
Crinoid sp M		742	2	2870.82	27	203.21	5	11
Crinoid sp S		913	1	25.28	3	10.46	10	11
Crinoid sp V		967	1	19.5	1	10.3	6	6
Crinoid sp W		1005	1	20.01	2	8.28	9	12
Crinoid sp X		1018	1	195.59	3	23.94	7	7
Cuttlefish								
Metasepia pfefferi	23 607015		8	101.13	10	354.5	16	72
Sepia elliptica	23 607003		3	433.22	7	300.3	25	107
Sepia limata	23 607024		4	199.14	7	247.47	35	101
Sepia opipara	23 607006		1	585.67	2	233.5	102	108
Sepia plangon	23 607012		57	1831.63	1030	26088.8	19	116
Sepia whitleyana	23 607011		25	942.82	101	6016.92	31	141
Echinoderms								
Clypeasteridae sp A		617	17	80.86	63	528.3	10	125
Clypeasteridae sp B		646	1	20.2	5	18.1	19	59
Clypeasteridae sp C		729	1	32.42	1	6.6	46	46
Fish								
Abalistes stellaris	37 465011		1	7.3	1	2.9	36	36
Ablabys taenianotus	37 287031		1	74.86	1	28.8	95	95
Aesopia cornuta	37 462001		1	90.23	1	37.7	151	151
Alepes apercna	37 337010		1	262.58	2	158.5	149	157
Aluterus monoceros	37 465022		1	14644.23	1	448.6	314	314
Ambiserrula jugosa	37 296041		69	1226.01	859	26952.81	26	292
Anoplocapros inermis	37 466002		1	2641.46	1	256.6	170	170
Antennarius striatus	37 210009		19	108.74	40	935.3	32	101
Antigonia rhomboidea	37 267006		1	4.58	1	2.1	25	25
Apistus carinatus	37 287011		21	397.8	297	3003.5	40	127
Aploactis aspera	37 290005		5	148.74	6	60.6	62	100
Apogon capricornis	37 327125		6	174.76	25	246.36	48	80
Apogon ellioti	37 327013		12	113.91	16	445.05	70	117
Apogon fasciatus	37 327008		19	117.66	47	391.14	39	83
Apogon limenus	37 327066		2	75.26	3	12.07	35	58
Apogon nigripinnis	37 327009		32	101.54	104	1137.73	25	81
Apogon poecilopterus	37 327026		1	74.31	5	25.6	41	60
Apogon semilineatus	37 327004		1	20.97	1	8.9	74	74
Apogon septemstriatus	37 327012		3	7.01	3	8.8	31	58
Aptychotrema rostrata	37 027009		12	779.25	19	3994.6	121	587
Arnoglossus fisoni	37 460043		10	2617.41	368	9782	66	134
Arnoglossus waitei	37 460045		18	155.16	129	778.15	52	124
Aseraggodes melanostictus	37 462016		5	61.81	5	100.5	96	125
Asterorhombus bleekeri	37 460050		3	274.51	33	514	65	144
Aulopus curtirostris	37 117003		2	1944.18	2	485.6	86	306
Aulotrachichthys sp		224	1	62.73	2	23.2	67	76
Bathycallionymus moretonensis	37 427038		4	30.19	10	60.4	52	146
Batrachomoeus dubius	37 205008		10	117.32	16	389.49	61	126
Batrachomoeus trispinosus	37 205003		4	272.49	12	276.1	67	102
Bothus myriaster	37 460042		1	144.14	1	51.9	160	160
Brachaluteres taylori	37 465049		4	20.23	5	35.43	23	45
Calliurichthys grossi	37 427007		1	32.49	1	12.5	115	115
Calliurichthys scaber	37 427050		38	401.72	161	3187.01	44	209
Calotomus spinidens	37 386006		1	1410.15	2	101.63	110	115

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Cantheschenia grandisquamis	37 465052		1	3321.98	1	406.6	274	274
Canthigaster callisterna	37 467038		2	76.77	3	58.1	63	73
Canthigaster rivulata	37 467018		1	393.79	3	151.5	78	115
Carangoides equula	37 337013		1	57.05	1	73.7	128	128
Carangoides gymnostethus	37 337022		1	84.56	1	28.4	92	92
Chaetodon guentheri	37 365039		3	1815.13	5	226.1	72	110
Cheilodactylus vestitus	37 377008		1	283.56	1	102.1	170	170
Cheilopogon pinnatibarbatus	37 233008		1	56.12	1	72.5	166	166
Chiloscyllium punctatum	37 013008		2	2527.26	2	1847.4	365	610
Choerodon frenatus	37 384074		19	181.14	44	967.58	47	129
Choerodon venustus	37 384042		5	3378.54	17	1458.5	91	195
Cleidopus gloriamaris	37 259001		4	1052.34	7	1253.71	107	153
Cod (unidentified)	37 311908		1	25396.83	1	16000	-	-
Crossorhombus azureus	37 460019		15	287.21	61	1074.7	80	151
Cymbacephalus nematophthalmus	37 296023		2	424.04	2	409	244	261
Cynoglossus bilineatus	37 463013		1	2830.26	3	86.7	156	162
Cynoglossus eximus			1	50.63	1	14.7	126	126
Cynoglossus kopsii	37 463006		1	68.47	1	27.3	147	147
Cynoglossus maculipinnis	37 463003		8	165.06	22	601	45	162
Cynoglossus sp A		594	5	102.2	6	185	80	163
Cynoglossus sp D		1038	1	87.44	1	46.3	212	212
Cynoglossus sp.4		81	31	228.33	68	1965.3	123	176
Dactyloptena orientalis	37 308004		4	28.02	4	47.5	74	85
Dactyloptena papilio	37 308001		47	239.92	339	4052.47	29	125
Dasyatis kuhlii	37 035004		3	3894.56	3	2131.7	253	356
Decapterus macrosoma	37 337017		1	35.74	1	17	120	120
Decapterus russelli	37 337023		1	650.61	1	115.9	201	201
Dendrochirus brachypterus	37 287010		4	41.89	6	74.5	48	96
Diagramma pictum	37 350003		4	2240.81	4	2095.6	90	122
Diodon holocanthus	37 469005		5	9366.41	15	2610.9	49	189
Engyprosopon grandisquamum	37 460012		55	802.83	1503	16648.62	50	150
Engyprosopon maldivensis	37 460013		11	514.92	65	1275.7	66	150
Engyprosopon sp A		1002	4	984.98	72	1487.27	80	150
Epinephelus octofasciatus	37 311152		2	32.24	2	28.2	68	68
Erosa erosa	37 287022		27	91.9	59	761.92	20	136
Euleptorhamphus viridis	37 234015		1	139.56	3	127.6	310	390
Euristhmus lepturus	37 192004		3	427.64	3	174.9	180	247
Euristhmus nudiceps	37 192003		2	173.28	6	255.3	172	271
Eurypegasus draconis	37 309001		1	1.91	1	0.8	35	35
Fistularia petimba	37 278002		2	174.69	2	46.8	230	421
Foetorepus calauropomus	37 427001		8	132.67	33	403.9	64	139
Gerres subfasciatus	37 349005		1	344.24	1	39.8	110	110
Glaucosoma scapulare	37 320003		11	1690.24	44	2035.4	32	156
Gnathophis grahami	37 067028		21	168.32	35	1634.14	205	500
Gonorynchus greyi	37 141001		4	121.22	4	335.5	212	262
Grammatobothus pennatus	37 460016		9	133.27	24	466.4	70	168
Grammatobothus polyophthalmus	37 460010		27	167.12	49	1588.97	73	205
Gymnocranius audleyi	37 351018		1	205.35	1	14.8	70	70
Hemigaleus microstoma	37 018020		1	1279.13	1	359.3	472	472
Heniochus diphreutes	37 365005		3	54.06	4	49.66	47	70
Herklotsichthys lippa	37 085008		2	220.25	3	188.64	140	148
Hippocampus tristis	37 282117		2	23.36	2	16.9	150	157

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Ichthyscopus sannio	37 400022		2	263.87	2	171.1	118	121
Inimicus caledonicus	37 287055		7	455.2	19	927.9	75	167
Lactoria cornuta	37 466004		1	304.5	1	247.9	181	181
Lactoria diaphana	37 466007		2	107.96	2	83.9	40	114
Lactoria fornasini	37 466018		1	51.73	1	19.9	66	66
Lagocephalus spadiceus	37 467017		3	531	7	1240.7	167	215
Leiognathus moretoniensis	37 341012		6	15.25	17	41	37	64
Lepidotrigla argus	37 288032		71	3908.72	6248	100368.72	27	195
Lepidotrigla cf *japonica*		220	23	1752.73	271	11561.85	81	181
Lepidotrigla sp A		1135	1	479.89	3	82.6	95	102
Lepidotrigla umbrosa	37 288029		4	1509.36	94	2067.2	82	110
Lethrinus genivittatus	37 351002		7	26577.28	152	10061.29	86	177
Lethrinus obsoletus	37 351019		2	246.02	3	164.7	110	125
Lophiomus setigerus	37 208001		5	7.86	5	22.1	42	55
Lophonectes gallus	37 460001		3	128.69	22	331.8	94	139
Lutjanus sebae	37 346004		2	1247.02	3	249.8	67	180
Maxillicosta whitleyi	37 287045		21	735.61	1886	7647.4	32	60
Microcanthus strigatus	37 361005		1	411.76	1	40	94	94
Minous trachycephalus	37 287024		8	126.84	24	369.8	35	92
Minous versicolor	37 287021		10	140.8	28	478.2	47	98
Nelusetta ayraudi	37 465006		1	2330.94	1	285.3	255	255
Nemipterus aurifilum	37 347025		4	1059.3	122	4494.8	95	141
Nemipterus hexodon	37 347014		1	20.03	1	6.9	68	68
Nemipterus theodorei	37 347036		75	4391.18	2770	98544.96	14	210
Neosebastes cf entaxis		605	2	18.53	3	19.7	51	55
Neosebastes insicipinnis	37 287019		6	4188.92	35	4977	105	210
Neosebastes johnsoni		1197	1	7.94	1	4.3	47	47
Opistognathus eximius	37 388004		1	103.51	1	41.27	120	120
Optivus sp. 1	37 255007		21	107.43	74	856.5	45	150
Oxycheilinus bimaculatus	37 384063		2	310.78	2	29.6	66	85
Pagrus auratus	37 353001		1	94.55	1	41.1	106	106
Parachaetodon ocellatus	37 365003		1	1961.92	1	60.1	96	96
Paramonacanthus filicauda	37 465024		5	869.27	54	1653.7	20	134
Paramonacanthus lowei	37 465085		15	176.83	79	1111.1	34	131
Paramonacanthus otisensis	37 465065		56	428.38	449	7469.34	30	143
Parapercis nebulosa	37 390005		40	605.57	111	6515.57	60	211
Paraplagusia bilineata	37 463001		2	510.44	2	124.3	211	226
Paraplagusia unicolor		240	15	2268.8	155	7445.58	120	237
Parapriacanthus ransonneti	37 357004		2	140.56	13	106.7	60	72
Parexocoetus mento	37 233003		1	33.23	1	13.1	96	96
Parrot Fish (unidentified)	37 386000		1	1020.41	1	1000	0	0
Parupeneus barberinoides	37 355021		1	559.18	2	40.3	86	95
Parupeneus spilurus	37 355015		7	8215.17	34	2702.3	81	182
Pegasus volitans	37 309002		5	60.87	31	133.6	84	125
Pelates quadrilineatus	37 321001		2	235.73	9	250.5	87	118
Pelates sexlineatus	37 321005		4	17917.74	265	10620.2	27	151
Pentapodus nagasakiensis	37 347012		3	355.76	3	91.19	96	126
Pentapodus paradiseus	37 347028		1	37.42	1	17.8	90	90
Petroscirtes lupus	37 408073		1	44.77	1	11	92	92
Petroscirtes sp	37 408000		1	258.63	5	99.5	75	96
Platycephalus arenarius	37 296021		5	482.73	17	988.4	130	304
Platycephalus caeruleopunctatus	37 296007		1	410.13	1	216.6	291	291
Platycephalus indicus	37 296033		2	905.9	7	524.5	146	305

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Platycephalus longispinis	37 296036		38	823.04	466	13051.13	52	221
Plotosus lineatus	37 192002		2	1558.7	6	171.3	121	220
Pomadasys maculatus	37 350002		1	47.74	1	18.79	86	86
Pomatomus saltatrix	37 334002		1	630.36	3	328.2	155	207
Priacanthus macracanthus	37 326001		5	310.88	6	690.2	96	216
Pristigenys niphonia	37 326006		2	18.88	4	23	30	55
Pristotis jerdoni	37 372001		16	897.44	183	3300.07	35	105
Psettina gigantea	37 460033		2	169.25	14	172.1	72	114
Psettina iijimae	37 460017		4	36.83	5	42.4	89	100
Pseudanthias sp A		1013	1	28.68	1	3.51	50	50
Pseudomonacanthus peroni	37 465020		2	1639.88	3	288.6	136	160
Pseudopataecus taenianotus	37 290015		1	136.2	1	52.4	125	125
Pseudorhombus argus	37 460038		15	482.49	45	3434.6	73	265
Pseudorhombus arsius	37 460009		8	287.35	11	897.2	140	291
Pseudorhombus diplospilus	37 460015		1	60.18	1	23	134	134
Pseudorhombus dupliciocellatus	37 460004		7	414.96	10	1150.9	120	301
Pseudorhombus elevatus	37 460008		1	67.59	1	40.8	152	152
Pseudorhombus jenynsii	37 460002		25	378.29	58	2924.19	25	252
Pseudorhombus spinosus	37 460011		2	35.66	2	28.3	98	131
Pseudorhombus tenuirastrum	37 460031		9	214.36	33	1068.48	7	210
Pterois volitans	37 287040		4	760.15	4	477.93	57	197
Ratabulus diversidens	37 296011		4	668.04	9	577.28	52	230
Repomucenus calcaratus	37 427015		12	324.83	54	1436.6	60	160
Repomucenus limiceps	37 427012		28	747.53	387	8167.27	47	166
Repomucenus russelli	37 427022		6	228.07	47	957.2	58	151
Rhynchobatus djiddensis	37 026001		2	27322.04	2	10 703	495	495
Rogadius patriciae	37 296008		2	155.9	3	146.6	81	244
Samaris cristatus	37 461006		8	194.65	25	703.32	79	234
Samaris macrolepis	37 461027		1	57.08	1	52.1	201	201
Saurida filamentosa	37 118006		1	355.32	3	324.3	166	239
Saurida grandisquamis	37 118016		11	2514.7	79	6627.32	92	424
Saurida nebulosa	37 118027		1	721.39	6	516.9	124	157
Saurida undosquamis	37 118001		60	2483.61	445	55507.6	74	479
Seriolina nigrofasciata	37 337014		1	336.59	1	59.9	112	112
Shark 1 (unidentified)	37 990003		1	3000	1	3000	-	-
Shark 2 (unidentified)	37 990003		1	2040.82	1	2000	-	-
Siganus canaliculatus	37 438004		1	14187.21	15	434.6	90	113
Siganus fuscescens	37 438001		2	950.38	25	164.7	85	137
Sillago robusta	37 330005		45	5448.59	2053	85416.5	35	193
Sirembo metachroma	37 228038		2	29.87	2	57.6	108	172
Solegnathus dunckeri	37 282098		16	71.6	49	1137.7	95	385
Solegnathus hardwickii	37 282099		5	31.4	5	157	304	396
Soleichthys oculofasciatus		909	3	81.24	3	87.6	127	140
Sorsogona tuberculata	37 296030		7	126.17	19	293.84	55	130
Stolephorus indicus	37 086006		2	6.69	2	5.7	65	74
Strabozebrias cancellatus	37 462006		1	24.89	1	22.3	127	127
Suggrundus macracanthus	37 296012		1	100.43	2	34.6	55	151
Synchiropus rameus	37 427009		17	190.39	57	1091.04	50	144
Synclidopus macleayanus	37 462018		1	55.92	1	26.6	127	127
Synodus indicus	37 118009		1	39	1	15.5	110	110
Synodus similis	37 118007		9	482.2	11	1227.4	75	389
Tetrosomus concatenatus		365	51	771.48	1410	13926.45	10	149

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Tetrosomus gibbosus	37 466006		5	611.61	112	1387.2	15	132
Torquigener altipinnis	37 467056		33	226.17	306	3241.94	26	110
Torquigener pallimaculatus	37 467009		11	230.15	26	800.1	43	150
Torquigener whitleyi	37 467028		6	296.73	26	368.2	35	95
Trachinocephalus myops	37 118002		31	880.1	165	8754.41	62	220
Trachurus declivis	37 337002		2	130.94	2	104.9	144	149
Trachurus novaezelandiae	37 337003		11	590.26	20	1326.5	62	192
Trachyrhamphus bicoarctatus	37 282006		1	5.6	1	5.6	327	327
Trygonoptera testacea	37 038006		12	864.26	31	4525.5	96	382
Upeneichthys lineatus	37 355001		5	879.02	8	570.76	109	164
Upeneus asymmetricus	37 355010		37	1441.59	549	20242.2	39	178
Upeneus filifer	37 355033		29	585.93	220	3902.16	36	134
Upeneus luzonius	37 355009		1	838.07	1	60.4	136	136
Upeneus sundaicus	37 355013		1	38.64	1	15.99	90	90
Upeneus tragula	37 355014		1	608.68	1	74.5	147	147
Uranoscopus cognatus	37 400008		4	172.37	5	201.1	31	159
Uranoscopus terraereginae	37 400023		8	189.74	17	561.1	47	157
Xyrichtys jacksonensis	37 384012		1	158.3	1	65.5	142	142
Zebrias craticula	37 462003		5	108.17	7	229.2	122	155
Zebrias quagga	37 462004		1	32.83	1	19.5	119	119
Zebrias scalaris	37 462010		2	144.68	3	135.6	141	173
Gastropods								
Anadara crebricostata	23 226035		1	94.55	3	41.1	36	40
Ancillista velesiana		559	3	262.43	3	158.5	84	85
Astele speciosum	24 047020		1	27.58	1	17.91	40	40
Chicoreus sp A		1132	2	2.69	2	2.24	21	22
Collumbellidae sp A		1195	1	1060.53	32	329.5	46	54
Conus sp A		1126	1	18.75	1	9.9	38	38
Conus sp B		1134	1	83.66	1	14.4	49	49
Cymatium sp A		1131	3	37.88	5	49.29	50	55
Cymbiola magnifica	24 207062		1	196.13	1	280.6	88	88
Distorsio reticulata	24 174001		2	17.25	2	9.92	31	60
Ficus subintermedia	24 172001		3	23.13	4	46.3	46	58
Fusinius undulatus		813	3	20	4	36.88	68	103
Gemmula kieneri	24 220101		3	28.05	8	32.61	41	47
Glycymeris holisericus	23 231009		1	1033.53	1	100.4	146	146
Glycymeris sp	23 231000		3	47.57	3	55.7	33	40
Nassarius conoidalis	24 202017		2	16.47	4	12.6	22	25
Natica stellata	24 165021		1	53.58	1	21.4	38	38
Phalium areola	24 171018		2	12.93	3	19.73	35	48
Phalium bandatum	24 171003		3	66.52	3	86.7	30	80
Philine angasi	24 322002		15	41.63	77	273.86	8	73
Phos sp A		923	1	23.2	1	5.7	36	36
Ranella australasia	24 176002		1	98.6	3	55.9	50	61
Rapana rapiformis	24 200183		1	11.12	1	4.2	29	29
Semicassis sp A		1042	7	42.63	14	174.34	28	61
Strombus vittatus	24 125001		1	495.73	15	145.3	44	53
Tapes sp A		1145	1	157.62	1	46.2	63	63
Tonna chinensis	24 177007		1	147.01	1	62.4	97	97
Tonna variegata	24 177001		3	278.27	6	275.56	57	102
Tudivasum armigera	24 201013		1	51.92	1	24.7	60	60
Xenophora cf soloroides	24145001		3	16.74	17	29.56	13	31
Xenophora indica	24 145002		4	16.51	7	40.8	18	66
Xenophora peroniana	24 145008		1	4.87	1	1.8	18	18
Gorgonians								
Gorgonian sp A		1114	1	324.3	-	190.2	-	-

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Hydroids								
Hydroid sp D		807	1	69.24	2	10.7	96	250
Hydroid sp E		1015	2	157.78	2	41.1	304	304
Hydroid sp F		1017	1	1159.75	-	141.95	-	-
Hydroid sp G		1061	1	135.29	-	24.1	-	-
Lobsters								
Petrarctus demani		394	2	3.5	2	6.6	13	18
Scyllarus sp 2		596	1	27.74	1	11.6	25	25
Scyllarus sp A		788	3	17.56	6	28.8	10	20
Scyllarus sp B		783	2	3.16	2	3.3	14	15
Sicyonia cristata	28 715001		14	19.7	36	130.12	7	21
Mantis Shrimps								
Belosquilla laevis	28 051003		9	59.95	25	236.85	9	27
Carinosquilla carita	28 051013		2	56.49	2	14.6	15	27
Erugosquilla woodmasoni	28 051033		1	34.13	1	15.7	24	24
Harpiosquilla melanoura	28 051037		2	91.86	2	92.1	32	38
Kempina mikado	28 051040		1	51.28	3	26.7	18	21
Odontodactylus japonicus	28 038002		1	37.14	1	33.9	29	29
Octopus								
Amphioctopus cf *kagoshimensis*		1060	10	366.56	19	1336.9	30	68
Hapalochlaena lunulata	23 659012		1	17.95	1	6	59	59
Hapalochlaena maculosa	23 659013		1	162.5	1	61.1	54	54
Octopus australis	23 659001		14	195.92	20	1423.89	29	70
Octopus exannulatus	23 659024		5	135.7	6	221.5	26	51
Octopus kagoshimensis		504	7	320.93	8	592.06	27	85
Octopus marginatus		508	2	44.71	2	37.2	33	50
Octopus sp	23 650000		1	319.99	1	44.1	30	30
Octopus sp M		1065	15	215.33	28	1975.4	31	89
Octopus tetricus	23 659006		1	146	1	61	50	50
Ophiuroids								
Euryale asperum	25 170004		1	36.49	1	33.3	20	20
Ophiuroid - purple		723	3	2.74	3	5.3	11	17
Ophiuroid sp A		631	1	17.3	1	7.2	27	27
Ophiuroid sp B		626	1	22.58	4	12.8	18	21
Ophiuroid sp D		716	3	11.1	7	17.13	12	17
Ophiuroid sp E		717	2	5.19	2	4.8	12	17
Ophiuroid sp F		1052	6	8.97	13	24.6	9	18
Ophiuroid sp K		916	2	13.77	5	21.6	12	15
Ophiuroid sp O		1071	6	3.66	25	11.1	7	12
Ophiuroid sp P		1082	1	6.07	1	1.08	9	9
Ophiuroid sp R		1083	2	1558.01	3	577.8	30	52
Ophiuroid sp S		1117	4	3.65	5	8.2	11	119
Ophuroid sp Q		1203	1	3.64	1	2.7	85	85
Other								
Ascidian sp B		610	2	319.49	4	192.9	75	107
Ascidian sp F		812	1	439.78	1	54.4	54	54
Ceriantharia sp A		731	1	88.54	1	29.6	48	48
Ceriantharia sp B		720	1	152.23	1	86.3	84	84
Dendrodoris sp A		1207	1	32.72	1	16.6	70	70
Dendrodoris tuberculosa		550	11	117.36	18	482.7	45	115
Plumarella sp A		970	2	351.14	1	144.5	431	431
Rubble			54	1645.05	-	42692.93	-	-
Sphenopus marsupialus	11 287001		27	258.97	104	2972.04	22	82
Sponge (unidentified)	10 000000		1	5000	1	5000	-	-
Sponge sp G		1109	1	60.56	-	23.3	-	-
Sponge sp I		1214	1	2880.44	1	825.2	-	-

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Spongia sp D		978	1	255.11	1	45.4	-	-
Spongia sp E		1016	1	2888.56	-	353.55	-	-
Spongia sp H		1074	1	87.35	1	13.5	146	146
Prawns								
Caridean sp A		613	1	3.79	4	4.9	12	14
Melicertus plebejus	28 711052		1	965.62	19	447.9	30	40
Metapenaeopsis lamellata	28 711013		2	18.52	4	16	9	22
Metapenaeopsis mogiensis	28 711015		15	41.79	91	228.81	8	24
Metapenaeopsis palmensis	28 711017		15	93.72	210	555.8	7	33
Penaeus esculentus	28 711044		16	272.34	32	1493.66	25	67
Penaeus longistylus	28 711048		1	24.24	1	14.4	28	28
Penaeus plebejus	28 711052		54	533.55	498	11794.65	15	57
Prawn sp A		1206	1	53.58	11	27.9	10	15
Solenocera bifurcata	28 714022		3	16.12	6	27.5	16	22
Solenocera choprai	28 714012		2	4.06	2	7.4	17	20
Solenocera sp A		1119	3	3.34	4	7.4	12	21
Trachypenaeus anchoralis	28 711054		1	47.24	2	6.4	15	17
Trachypenaeus curvirostris	28 711055		45	108.96	877	1988.53	4	28
Trachypenaeus granulosus	28 711058		1	70.5	3	16.6	18	20
Sea Cucumber								
Holothuria (metriatyla) ocellata	25 416030		1	259.64	2	76.1	120	150
Holothuroid sp A		810	4	200.09	41	252.02	27	52
Holothuroid sp B		915	1	108.09	1	10.5	53	53
Pseudocolochirus axiologus	25 408031		2	631.33	2	723.7	113	117
Sea Pen								
Pennatulacea sp C		725	1	80.3	1	38.2	210	210
Sea Urchins								
Echinoid sp A		640	6	47.4	10	166.1	11	66
Echinoid sp B		675	1	93.43	1	120.7	125	125
Echinoid sp D		758	3	75.49	3	83.8	67	78
Echinoid sp E		795	1	86.92	1	24.9	52	52
Echinoid sp F		898	1	19.68	4	7.4	15	24
Echinoid sp G		911	5	81.61	27	195.2	11	52
Echinoid sp H		959	7	97.23	41	376.91	15	60
Echinoid sp J		1073	4	35.78	4	64.1	25	48
Echinoid sp K		1100	3	6206.85	4	726.9	64	93
Echinoid sp M		1146	1	4469	3	136.9	22	45
Prionocidaris sp		1049	31	172.96	100	2202.84	6	56
Spatangoida sp A		1127	1	15.15	3	8	28	31
Seaweeds								
Chlorophyta sp A		1147	1	11125.17	-	340.8	-	-
Chlorophyta sp B		1149	1	2791.09	-	85.5	-	-
Chlorophyta sp C		1153	1	1054.41	-	32.3	-	-
Dictyopteris sp		1056	5	183.55	-	329.6	-	-
Ecklonia radiata	54 080001		10	858.85	1	3148.5	-	-
Phaeophyta sp A		1108	1	11.18	-	4.3	-	-
Phaeophyta sp B		1113	1	39.9	-	13.4	-	-
Red Algae sp A		1058	10	1791.82	-	4981.9	-	-
Rhodophyta sp A		1103	3	2219.99	-	250.8	-	-
Rhodophyta sp B		1115	1	21.9	-	11.4	-	-
Rhodophyta sp C		1133	2	799.65	-	187.7	-	-
Rhodophyta sp D		1150	2	975.49	-	148.4	-	-
Rhodophyta sp E		1151	1	1031.56	-	31.6	-	-
Rhodophyta sp F		1152	1	2840.05	-	87	-	-
Rhodophyte sp		1198	1	3.1	-	2.3	-	-
Sargassum sp A		1148	2	1603.21	-	145	-	-

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Soft Coral								
Nepthea sp A		1154	1	2200.22	1	67.4	139	139
Squids								
Euprymna tasmanica	23 609001		1	41.56	2	16.6	27	100
Uroteuthis (Photololigo) cf chinensis	23 617008		43	401.44	93	4802.58	38	292
Sepiadariidae sp C		734	2	17.28	2	9.3	19	28
Sepioloidea lineolata	23 608001		17	55.75	32	416.5	18	40
Starfish								
Anthenea sp A		779	4	121.31	4	266.5	30	155
Asteroid sp B		625	5	4.7	5	14.2	19	52
Asteroid sp C		628	2	20.55	3	24.7	75	84
Asteroid sp D		726	4	83.53	10	149.9	15	178
Asteroid sp F		889	1	1405.37	1	330.9	268	268
Asteroid sp G		969	2	16.42	2	17.2	87	92
Asteroid sp I		1093	1	491.79	1	189.2	128	128
Asteroid sp J		1208	1	12.42	1	6.3	76	76
Astropecten sp A		597	1	45.68	1	9.3	96	96
Astropecten sp C		920	2	6.33	2	10.2	38	190
Astropecten sp D		921	3	35.43	8	64.06	18	124
Astropecten sp E		1122	2	142.81	2	138.15	175	197
Astropecten sp F		1125	1	14.77	1	7.8	81	81
Luidia maculata	25 105005		3	447.57	3	524.2	29	435
Pentaceraster sp A		808	2	477.88	2	218.7	129	163
Pentaceraster sp D		1037	1	2215.66	1	394.3	240	240
Stellaster equestris	25 122026		11	961.62	34	2580.2	19	185

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