

The NSW Commercial Fisheries Port Monitoring Program

Data summary report for 2017/18

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Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing (May 2020). However, because of advances in knowledge, users are reminded of the need to ensure that information upon which they rely is up to date and to check currency of the information with the appropriate officer of the Department of Primary Industries or the user's independent adviser.

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Introduction

NSW DPI-Fisheries relies upon fishery dependent sources of information to assess the status of exploited fish stocks. These assessments are done to fulfil Departmental obligations as part of the national Status of Australian Fish Stocks (SAFS) reports, as well as underpinning management decisions and determination of quota allocations. Monitoring of commercial fisheries is the primary source of data for Departmental stock assessments and includes catch and effort data as reported in mandatory logbooks, as well as information on the fish sizes, ages and species compositions in landed catches. Port monitoring of the landed catch has been an important component of fisheries assessments for more than 70 years, and the time series of data generated provide considerable insight into the dynamics of the stocks and the fisheries that exploit them, far beyond what is achievable through simple logbook catch and effort data. For example, age and size composition samples are used to calculate indicators such as mean age, mortality rates or the fraction of fish smaller than a threshold length. These indicators are used, along with indicators of relative abundance such as catch rates, to make inferences about current levels of fishing pressure and relative biomass – the two requirements for the SAFS exploitation status assessments. Monitoring the size and age composition of the commercial catch is also a cost-effective option to insure against the deficiencies of commercial catch per unit effort data.

In recognition of the importance of ongoing monitoring of the sizes and ages of species within commercial landings, the Department has allocated significant resources to the NSW Commercial Fisheries Port Monitoring Program), as well as funding from the Commercial Fishing Trust to employ casual staff at regional Fishermen's co-operatives and the Sydney Fish Markets. This model has proven to be extremely cost-effective.

The Port Monitoring Program is completed within the 'Sustainable Fish Harvest Program' as detailed in the 'Fisheries NSW Strategic Research Plan 2014-2018'. It has been determined as an ongoing project in that plan. The project is nested beneath the 'Commercial Fisheries Monitoring' research theme but is the major data source for several listed Key Areas including 'Collection and integration of biological and fishery-based information', 'Assessment of quota managed species', and 'Stock structure and status determinations'.

The Port Monitoring Program exists not just for stock assessment but is often the sole source of information on fisheries performance for managers. The Port Monitoring Program contributes to:

- Stock status assessments in terms of changes to size and age compositions in landings
- Validation of the commercial logbook records
- Information on species compositions in species complexes (e.g. the trawl whittings, bugs, 'Unspecified' catch categories)
- Baseline data on biology (e.g. morphometric relationships such as length/weight and fork length/total length, reproductive biology, age and growth, diet etc.)
- Assessment of recovery programs (e.g. mulloway bycatch allowances)
- Analyses of the impacts of management changes (e.g. changes to minimum legal lengths)
- Stakeholder engagement – DPI staff at co-operatives liaise with commercial fishers and co-op staff and are at the front line of communications
- Various externally funded projects with commitments to provide data on commercial landings

- Unplanned events – e.g. the 2015/16 Perfluorooctane sulfonate (PFOS) contamination sampling, prawn white-spot monitoring
- Assisting the commercial fishing industry to maintain a social licence to operate through transparency in operations and co-operation with government

This data summary report is designed to be reviewed by the Fisheries Resource Assessment scientists responsible for stock assessment, as well as fisheries managers and industry if required. Review of the performance of the program is essential to maintain confidence in the data collected and provides opportunity for the designated scientific leads for each species to refine the sampling protocols if needed. The report also proves transparency around expenditure from the Commercial Trust.

This version of the data report has had the reported commercial catch data by month and sampling strata removed from the Tables for reasons of confidentiality.

Methods

The NSW commercial fisheries port monitoring program utilizes a spatially and temporally stratified sampling design in order to generate representative estimates of the landed commercial catch. The base units of sampling are generally monthly and commercial fishing reporting zone; however, these may vary depending on advice from the species' leads. Sampling protocols are established for each species to optimize the likelihood that representative samples of the landed catch are obtained from a port (fishing reporting zone) on each day sampled. The number of days sampled each month and area may differ between species and are based upon advice from each species' lead within the Resource Assessment Unit, as well as the dynamics of the fishery and the capacity of the program.

The relative importance of landings from each month and fishing zone are dependent upon the reported commercial landings provided by fishers via the commercial fishing logbooks. These data are used to reweight and combine the sampled length frequency data in each base unit of sampling (e.g. month and fishing zone combination) in order to provide estimates that are representative of the entire fishing fleet in NSW. The Department has developed extremely efficient computing applications (e.g., PISCES software) to automate these processes. The project has also moved largely to electronic data collection. Custom-made electronic measuring boards have made data available in real time and removed the need for paper-based records and the associated data-entry expense and potential data-entry errors.

The program utilizes mainly casual staff at regional fishermen's co-operatives to collect the data, as well as at the Sydney Fish Markets. Casual employees have previously been stationed at Fishermen's co-operatives at: Ballina, Iluka/Maclean, Coffs Harbour, Wallis Lake, Newcastle, Nelson Bay, Bermagui and Eden; however, for 2017/18 staff were based at Iluka/Maclean, Coffs Harbour, Wallis Lake, Newcastle and Nelson Bay. DPI staff also monitor the Sydney Fish Markets to cover ports where casual staff are not located.

Process for selection of species to monitor

Species to be included in the port monitoring program are selected each year through a rigorous process involving all assessment scientists. The process utilizes the Species Priority List (SPL) for Resource Assessment (see Appendices) to rank species of relative importance, followed by the Data and Monitoring Plan (DMP) to rank species for which port monitoring has been identified as being important for assessment purposes. Within the DMP the requirements of a port monitoring program for each species needs under a base case scenario required to inform a reliable assessment are also identified and ranked. Potential requirements include data on biology, length composition and/or age composition. Following the identification and ranking of species requiring port monitoring the list is sent to all relevant assessment scientists who are designated 'leads' for each species for their recommendations. This is an important step in the process as the SPL was not designed specifically to be used for Port Monitoring, and under an environment limited by resources it may not be suitable to rely on the SPL as being totally prescriptive. Species leads may also be aware of other programs collecting similar data, therefore allowing the group to make more balanced and practical decisions on allocation of port monitoring resources to species.

Generally, between 10-15 species are monitored for length compositions each year, with the numbers dictated by sampling designs, sampling logistics and the resources available. In addition, a few (generally between 3 and 5) species are sampled for age composition. Port monitoring staff assess the feasibility of successfully sampling each identified species based on the temporal and spatial distribution of the fishery, the operations of the fleet and how they land catches, and the resourcing of the program. Once a final list of proposed species to monitor for lengths and ages has been compiled it is sent for endorsement by the relevant scientists within the FRA Unit.

Fish to be assessed for age are purchased directly from either the Fishermen's co-operative or the Sydney Fish Markets. In cases where it is considered cost-effective (e.g. the Wallis Lake co-operative and for high value species (e.g. large Snapper and Mulloway) elsewhere, the fish have their otoliths removed and are resold in order to recoup costs. The ageing process and all size and age-based analyses are done by the sister projects "Determination of age and growth estimates for priority species" and "Assessment and status reporting of non-quota commercially harvested species" that are overseen by the same personnel as the "NSW Commercial Fisheries Port Monitoring Program".

Details of the prioritisation and justification, sampling aims, reported landings and sampling data for 2017/18 are presented below for each species separately. It should be noted that the 2017/18 sampling period was truncated to be between December 2017 and June 2018 which effected the species selected due to landings patterns. A brief commentary on how well the sampling met the aims is also provided for each species.

Blue Mackerel

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	Eastern Australia	OHF	Sustainable	Catch, effort, CPUE, spawning biomass, ecosystem modelling

OHF Ocean Hauling Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **22**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **not required**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **not required**

Rank for ages – **not required**

Species lead commentary

A size and age-based assessment is used by the Commonwealth in support of a DEPM-based biomass estimate. Consequently, the base case scenario in the DMP is not appropriate for Blue Mackerel.

Aim of the Port Monitoring sampling for 2017/18

To collect size and age composition data that are representative of the commercial landed catch for NSW.

Sampling design

All sampling was done at the Sydney Fish Markets. Blue Mackerel sampling is based on monthly and ocean zone strata for data expansion using reported commercial landings for each month and ocean zone. These expansions are done using the PISCES software.

For each location (Ulladulla and Wollongong fleets), all catches from the Ocean Hauling Fishery that were on the floor on the day of sampling were sampled. Blue Mackerel were measured from the tip of the nose to fork length (nearest cm rounding down).

Two samples of 20 fish, from each location, were also purchased each month for ageing. Fish were selected from each grade in the approximate ratio of each grade in the total catch by weight.

Sampling graded catches

Almost all Blue Mackerel catches are graded as extra-large; however, where there were more than one grade, all grades were sampled. Approximately 10 times the number of size classes per grade are measured (as tallied by the electronic measuring board software). These sub-samples are weighed and the total weight of each grade recorded and the sample scaled up accordingly, using the PISCES software.

Results

Table 1. Reported landings heat map of Blue Mackerel by month and area during 2017/18.

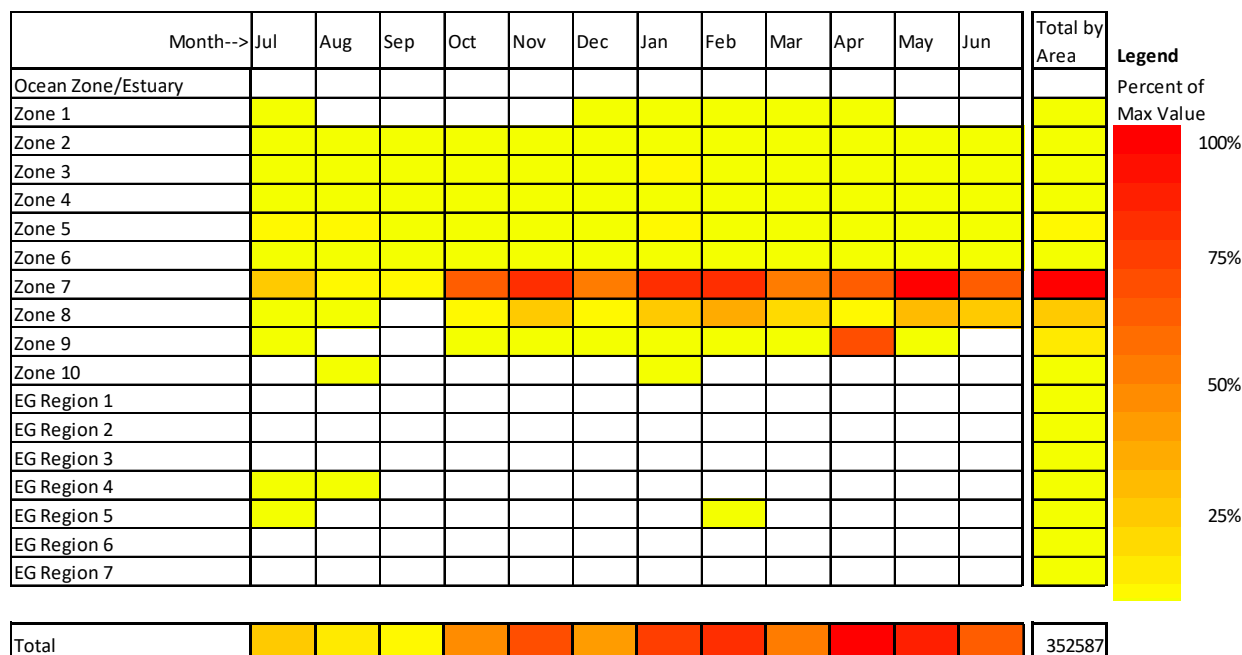


Table 2. The number of days sampled for Blue Mackerel by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

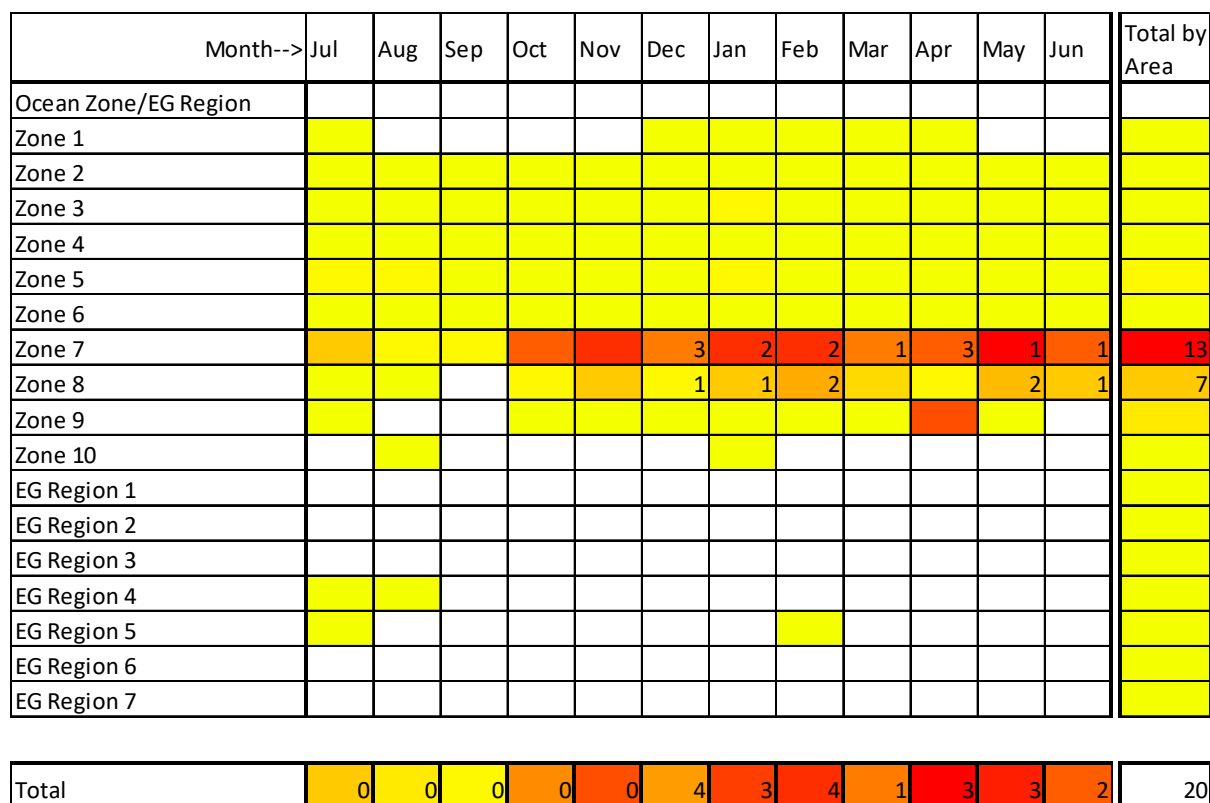


Table 3. The number of catches sampled for Blue Mackerel by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7						5	4	2	2	4	3	2	22
Zone 8						1	2	3			2	1	9
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	6	6	5	2	4	5	3	31

Table 4. The number of fish sampled for Blue Mackerel by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7						416	291	115	102	273	273	156	1626
Zone 8						112	95	193			128	101	629
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	528	386	308	102	273	401	257	2255

Table 5. The number of fish sampled for ageing Blue Mackerel by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7						20	0	20	20	20	0	20	100
Zone 8						20	20	20			20	21	101
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	40	20	40	20	20	20	41	201

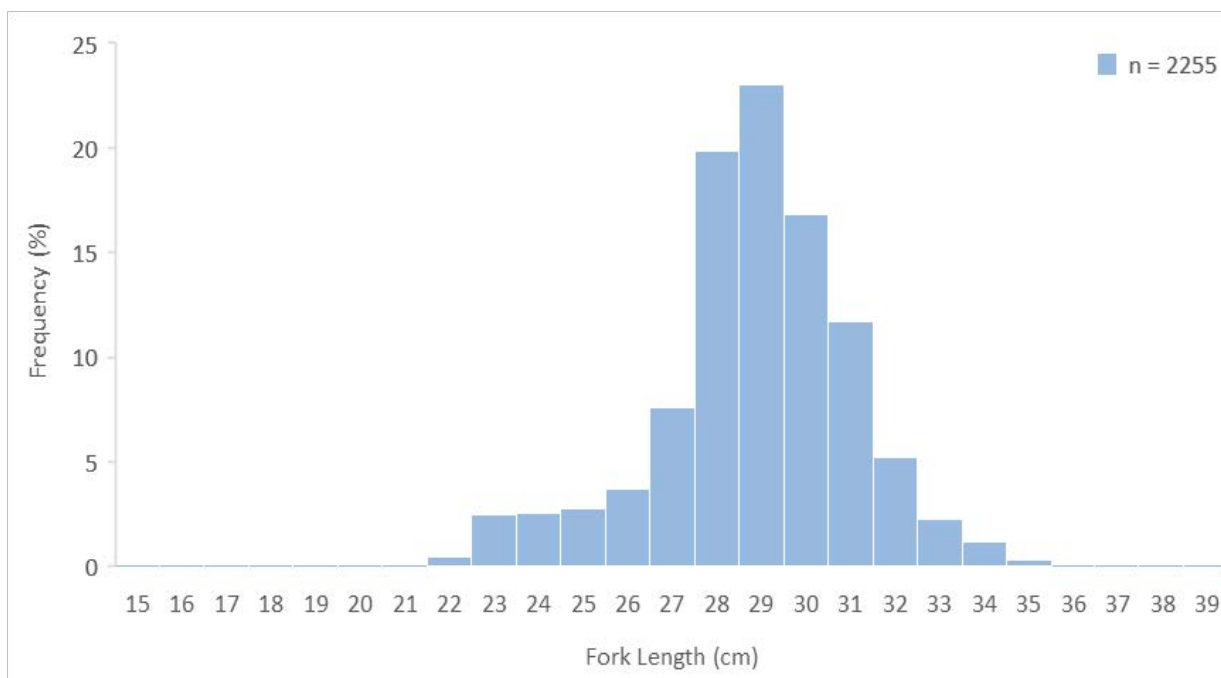


Figure 1. Length composition of Blue Mackerel landed by the commercial fishery for 2017/18. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

Although, there were a couple of months of relatively high commercial catch not captured in our sampling window (see Table 1), the 5-month delay in the 2017/18 Port Monitoring program did not adversely affect sampling of the Blue Mackerel fishery. The distribution of sampling, for the most part, approximated the fishery landings.

Blue Swimmer Crab

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	South Eastern Australia	EGF, EPTF, OTF	Sustainable	Catch, effort, CPUE, size composition

EGF Estuary General Fishery (NSW)

EPTF Estuary Prawn Trawl Fishery (NSW)

OTF Ocean Trawl Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **30**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **18**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **18**

Rank for ages – **not required**

Species lead commentary

Size-limit changes and quota managed. Length frequency data needed to quantify changes in targeting behaviour (i.e. large crabs).

Aim of the Port Monitoring sampling for 2017/18

To collect size composition data that are representative of the commercial landed catch from the Wallis Lake area.

Sampling design

Five estuaries account for 95% of the commercial catch, with Wallis Lake being the most important (EG Region 4). All sampling was done at Wallis Lake Fishermen's co-operative.

As Estuary Prawn Trawl and Ocean Fish Trawl catches are incidental, sampling was focused on the Estuary General Fishery. Blue Swimmer Crab were measured as carapace length (CL) to the nearest whole mm, rounding down, and when possible all crabs on the floor on the day of sampling were measured unless the catch exceeded 50 individuals in which case sub-sampling was done. A separate length frequency was recorded for each sex, maturity and quality grade (A, B or C).

Sampling is based on month and estuary region strata for data expansion using reported commercial landings for each month and estuary region. These expansions are done using the PISCES software.

Sampling graded catches

Blue Swimmer Crab catches are graded according to their size and density. All grades are sampled and recorded separately.

Results

Table 1. Reported landings heat map of Blue Swimmer Crab by month and area during 2017/18.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area	Legend
Ocean Zone/Estuary														Percent of Max Value
Zone 1														100%
Zone 2														
Zone 3														
Zone 4														
Zone 5														
Zone 6														75%
Zone 7														
Zone 8														
Zone 9														
Zone 10														
EG Region 1														50%
EG Region 2														
EG Region 3														
EG Region 4														25%
EG Region 5														
EG Region 6														
EG Region 7														
Total													97606.1	

Table 2. The number of days sampled for Blue Swimmer Crab by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	1	3	3	2	3	2	2	16

Table 3. The number of catches sampled for Blue Swimmer Crab by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	1	6	4	3	7	4	3	28

Table 4. The number of Blue Swimmer Crabs sampled by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4						123	255	284	233	527	388	454	2264
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	123	255	284	233	527	388	454	2264

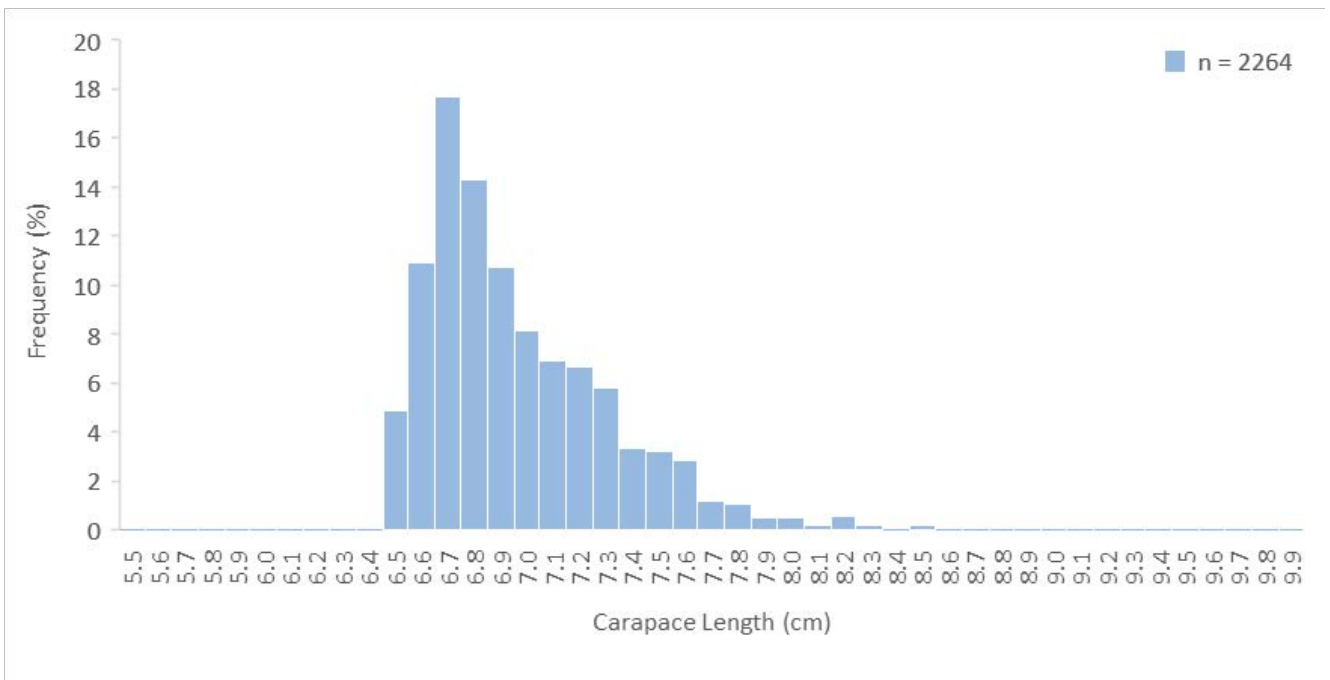


Figure 1. Length composition of Blue Swimmer Crab landed by the commercial fishery for 2017/18. Crabs were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES

Commentary

Although, there were a couple of months of relatively high commercial catch not captured in our sampling window (see Table 1), the 5-month delay in the 2017/18 Port Monitoring program did not adversely affect sampling of the Blue Swimmer Crab fishery. The distribution of sampling, for the most part, approximated the fishery landings.

Eastern School Whiting

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	South Eastern Australia	OTF	Sustainable	Spawning stock biomass

OTF Ocean Trawl Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **2**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **2**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **2**

Rank for ages – **2**

Species lead commentary

A size and age-based assessment. Port monitoring to include continued export box sampling of lengths at Iluka fishermen's co-op as well as supplemental lengths from the Fish Trawl Fishery in ocean zones 4-6. Ocean Prawn Trawl Observer Program also collecting length frequency data; Ocean Prawn Trawl closure project collecting length frequency data.

Aim of the Port Monitoring sampling for 2017/18

To collect size composition data that are representative of the commercial fish trawl fishery in ocean zones 4-6 and whiting for export from Iluka.

Sampling design

Export box sampling was done at Iluka Fishermen's co-op, where length frequencies were recorded along with the species split of Eastern School Whiting: Stout Whiting. Length Frequency data from the Fish Trawl Fishery for ocean zones 4-9 were collected through Newcastle Fishermen's co-op and the Sydney Fish Markets. For each location, all catches from the Fish Trawl Fishery that were on the floor on the day of sampling, were sampled. Eastern School Whiting were measured from the tip of the nose to fork length (nearest cm rounding down).

Eastern School Whiting sampling is based on month and ocean zone strata for data expansion using reported commercial landings for each month and ocean zone. These expansions are done using the PISCES software.

Sampling graded catches

Almost all Eastern School Whiting catches are graded, generally into XL, L, M, S or U. All grades are sampled. Approximately 10 times the number of size classes per grade are measured (as tallied by the electronic measuring board software). These sub-samples are weighed and the total weight of each grade recorded and the sample scaled up accordingly, using the PISCES software.

Results

Table 1. Reported landings heat map of Eastern School Whiting by month and area during 2017/18.

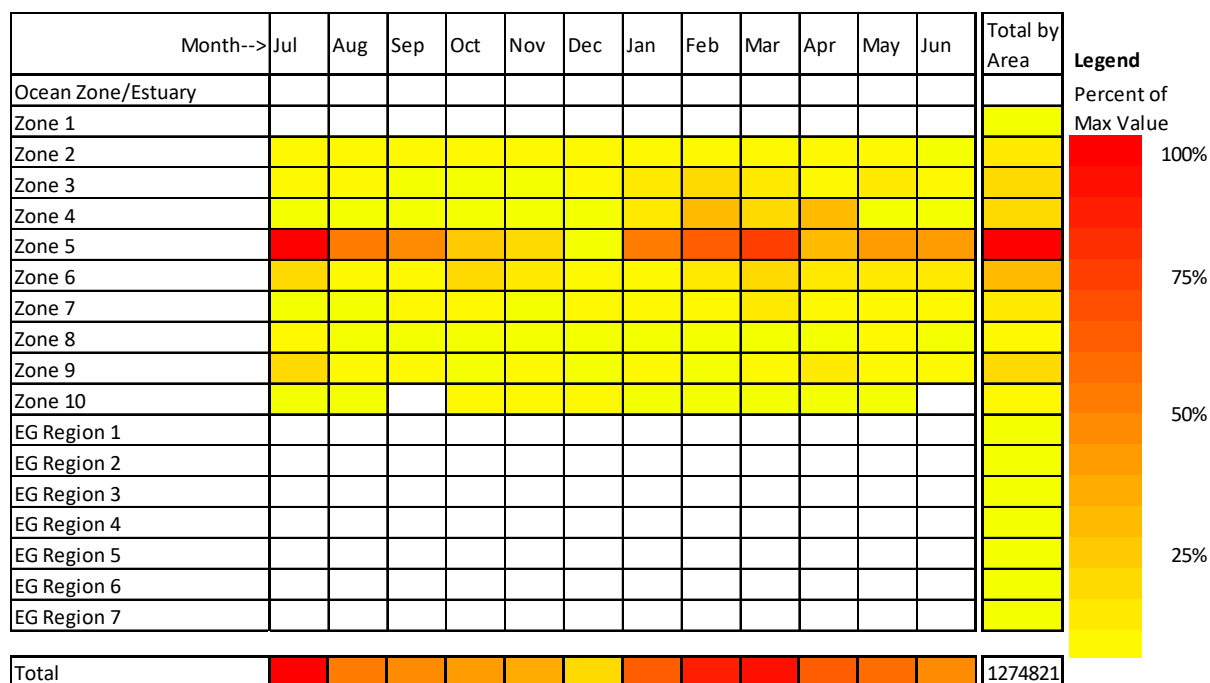


Table 2. The number of days sampled for Eastern School Whiting by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2						3		1	1	1	2		8
Zone 3													
Zone 4							4	1	1				6
Zone 5						1							1
Zone 6						1	1	1	1		1	1	6
Zone 7						2	1	3	1			2	9
Zone 8							2				2	1	5
Zone 9										2			2
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	7	8	6	4	3	5	4	37

Table 3. The number of catches sampled for Eastern School Whiting by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2						3		1	1	1	2		8
Zone 3													
Zone 4							4	1	1				6
Zone 5						1							1
Zone 6						2	3	3	1		1	1	11
Zone 7						2	1	3	1			3	10
Zone 8							2				2	1	5
Zone 9										2			2
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	8	10	8	4	3	5	5	43

Table 4. The number of fish sampled for Eastern School Whiting by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2						187		3	94	92	21		397
Zone 3													
Zone 4							352	180	54				586
Zone 5						385							385
Zone 6						220	305	623	80		103	106	1437
Zone 7						245	151	398	273			309	1376
Zone 8							361				181	50	592
Zone 9										169			169
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	1037	1169	1204	501	261	305	465	4942

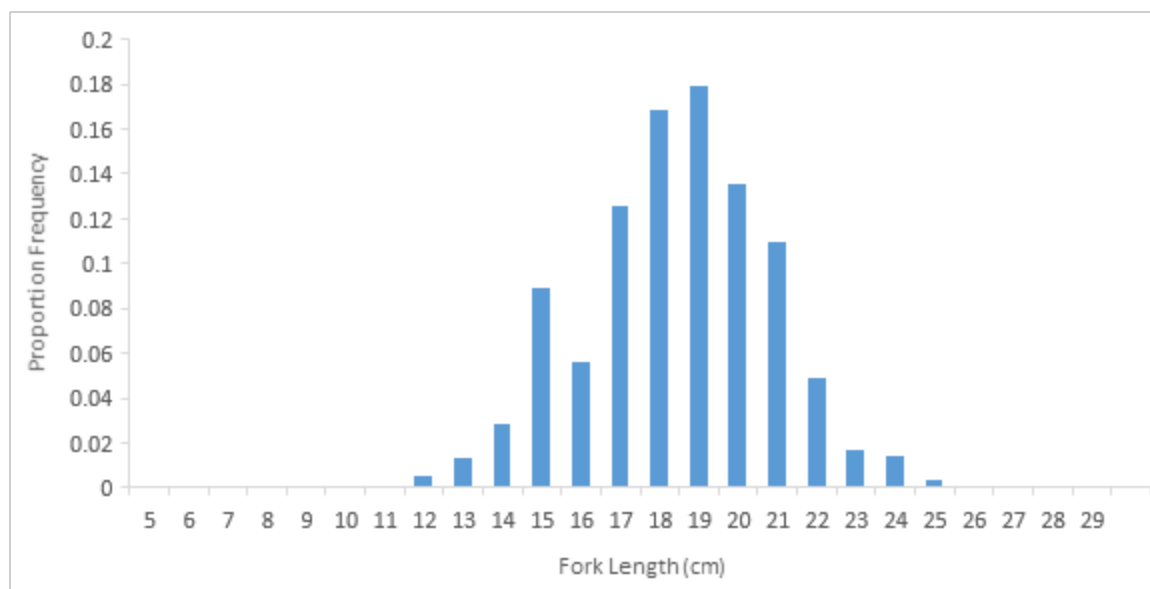


Figure 1. Length composition of Eastern School Whiting landed by the commercial fishery for 2017/18. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES. Data collected via the Ocean Prawn Trawl Observer Program and the Ocean Prawn Trawl closure project are not included.

Commentary

Although, there were a couple of months of relatively high commercial catch not captured in our sampling window (see Table 1), the 5-month delay in the 2017/18 Port Monitoring program did not adversely affect sampling of the Eastern School Whiting fishery. The distribution of sampling, for the most part, approximated the fishery landings; however, sampling from ocean zone 5 was limited.

Eastern Sea Garfish

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	Eastern Australia	EGF, OHF	Sustainable	Spawning stock biomass, fishing mortality rate, age composition, catch, effort

EGF Estuary General Fishery (NSW)

OHF Ocean Hauling Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **29**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **17**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **17**

Rank for ages – **11**

Species lead commentary

Previously the stock was overfished (2002.03 until 2012/13) and is still under pressure. TAC setting will likely require an age-based assessment based on recent analyses by Broadhurst et al.

Aim of the Port Monitoring sampling for 2017/18

Collect size and age composition data that are representative of the commercial landed catch for NSW.

Sampling design

Most sampling is done at the Sydney Fish Markets; however, some is done at regional Fishermen's Co-ops and instructions are sent to staff (See below). Sea Garfish sampling is based on the standard port monitoring design that is based on monthly and ocean zone strata for data expansion using reported commercial landings for each month and ocean zone. These expansions are done using the PISCES software.

Sea Garfish are measured from the lower jaw to fork length to the nearest cm rounding down.

Both the Ocean Hauling and Estuary General Fisheries are monitored.

Twenty fish per catch are generally purchased for ageing. Fish are selected from each grade in the approximate ratio of each grade in the total catch by weight.

Sampling graded catches

Almost all Sea Garfish catches are graded, generally into XL, L, M, S or U. All grades are sampled. Approximately 10 times the number of size classes per grade are measured (as tallied by the electronic measuring board software). These sub-samples are weighed, and the total weight of each grade recorded and the sample scaled up accordingly using the PISCES software.

Sea garfish (*Hyporhamphus australis*)

Sample days

- **Nelsons Bay only** - January 2017 to June 2018
- Opportunistically up to 4 days per month

Lengths required

- Sea garfish are almost always graded by size. Sample from **each grade 80-100 fish** (approx. 3-10kgs depending on size). Make sure you weigh the sub-sample taken from each grade. If whole catch is ungraded then only need to do one sample of 80-100 length measurements
- Measure catches as fork length (FL - from the tip of the top jaw to the fork in the tail – see figure below) to the nearest whole cm below true length.
- You will need to record the total catch weight, total weight of each size grade and the total weight of the fish measured from each size grade.
- Try and measure from as many different fishermen as time allows.

Otoliths required

- 20 otoliths per catch taken proportionately from each grade. Two samples per month= 40 otoliths total. Field code **NB-Ha 1**

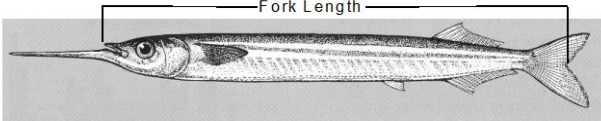


Figure 1. Sea Garfish sampling instructions for Nelson Bay.

Results:

Table 1. Reported landings heat map of Eastern Sea Garfish by month and area during 2017/18.

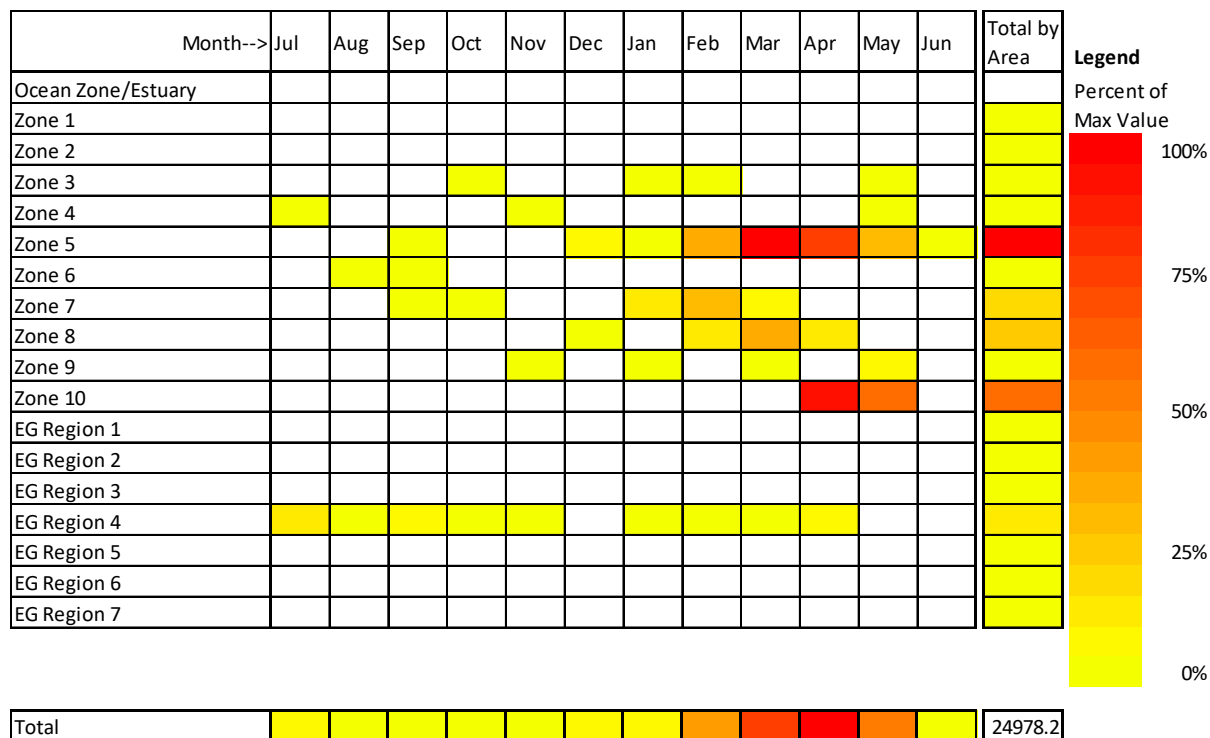


Table 2. The number of days sampled for Eastern Sea Garfish by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Days Sampled													
Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5								2	5	4	1		12
Zone 6													
Zone 7							1	3	1				5
Zone 8								1	1	2			4
Zone 9													
Zone 10											2		2
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4									1				1
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	0	1	6	8	6	3	0	24

Table 3. The number of catches sampled for Eastern Sea Garfish by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Catches Sampled													Total by Area
Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total													

Table 4. The number of fish sampled for Eastern Sea Garfish by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Number of fish Sampled														Total by Area
Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun		
Ocean Zone/Estuary														
Zone 1														
Zone 2														
Zone 3														
Zone 4														
Zone 5								400	1039	844	224		2507	
Zone 6														
Zone 7							220	871	82				1173	
Zone 8								99	220	294			613	
Zone 9														
Zone 10											186		186	
EG Region 1														
EG Region 2														
EG Region 3														
EG Region 4									191				191	
EG Region 5														
EG Region 6														
EG Region 7														
Total (area known)	0	0	0	0	0	0	220	1370	1532	1138	410	0	4670	

Table 5. The number of fish sampled for ageing Eastern Sea Garfish by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Number of Bios

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													

Total (area known)	0	0	0	0	0	0	31	102	101	80	41	0	355
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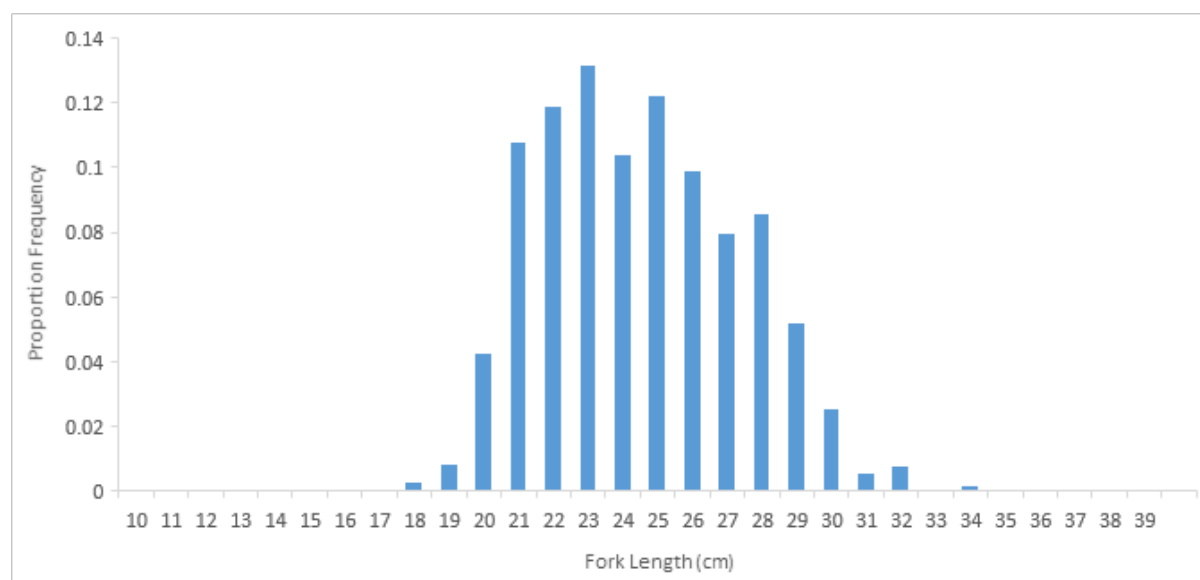


Figure 2. Length composition of Eastern Sea Garfish landed by the commercial fishery for 2017/18. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

The 5-month delay in the 2017/18 Port Monitoring program did not adversely affect sampling of the Sea Garfish fishery due to the seasonal nature of landings (see Table 1 above). The distribution of sampling approximated the fishery landings.

Giant Mud Crab

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	Estuary General Fishery	EGF	Undefined	Catch

EGF Estuary General Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **6**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **4**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **4**

Rank for ages – **not required**

Species lead commentary

Quota managed from December. Length frequency data required to investigate/determine if QMS results in changes in harvesting strategies (sizes and sexes). It would be good if port monitoring data sheet could be modified to include quality grade (A, B, C etc.).

Aim of the Port Monitoring sampling for 2017/18

To collect size composition data that are representative of the commercial landed catch from the Clarence River, Coffs Harbour, Wallis Lake and Newcastle areas.

Sampling design

Length frequency data from the Estuary General Fishery were collected through the Clarence River Fishermen's Co-op, Coffs Harbour Fishermen's Co-op, Wallis Lake Fishermen's Co-op and Newcastle Fishermen's Co-op. Giant Mud Crab were measured as carapace length (CL) to the nearest mm, rounding down, and all crabs on the floor on the day of sampling were measured unless the catch exceeded 50 individuals in which case sub-sampling was done. A separate length frequency was recorded for each sex and maturity. The breakdown of quality grade (A, B or C) by weight was also recorded for each catch sampled.

Sampling is based on month and estuary region strata for data expansion using reported commercial landings for each month and estuary region. These expansions are done using the PISCES software.

Sampling graded catches

Giant Mud Crab catches are graded according to their size and density. All grades are sampled.

Results

Table 1. Reported landings heat map of Giant Mud Crab by month and area during 2017/18.

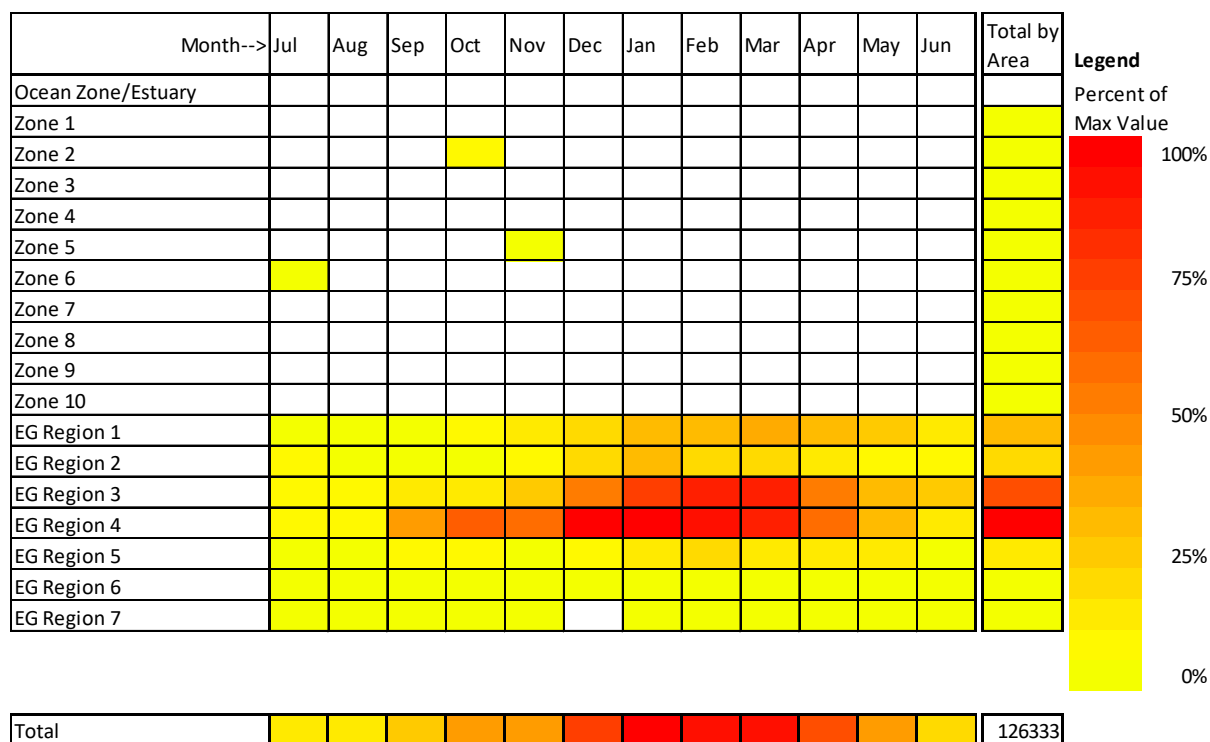


Table 2. The number of days sampled for Giant Mud Crab by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2						3	3	3	4	2	2	1	18
EG Region 3						7	4	6	4	6	8	1	36
EG Region 4						3	8	4		1	4		20
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	13	15	13	8	9	14	2	74

Table 3. The number of catches sampled for Giant Mud Crab by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2						7	6	6	8	5	2	1	35
EG Region 3						11	8	11	9	11	9	1	60
EG Region 4						6	16	4		1	4		31
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	24	30	21	17	17	15	2	126

Table 4. The number of Giant Mud Crabs sampled by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2						322	488	417	375	242	121	107	2072
EG Region 3						669	655	531	441	628	467	24	3415
EG Region 4						175	421	71		80	107		854
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	1166	1564	1019	816	950	695	131	6341

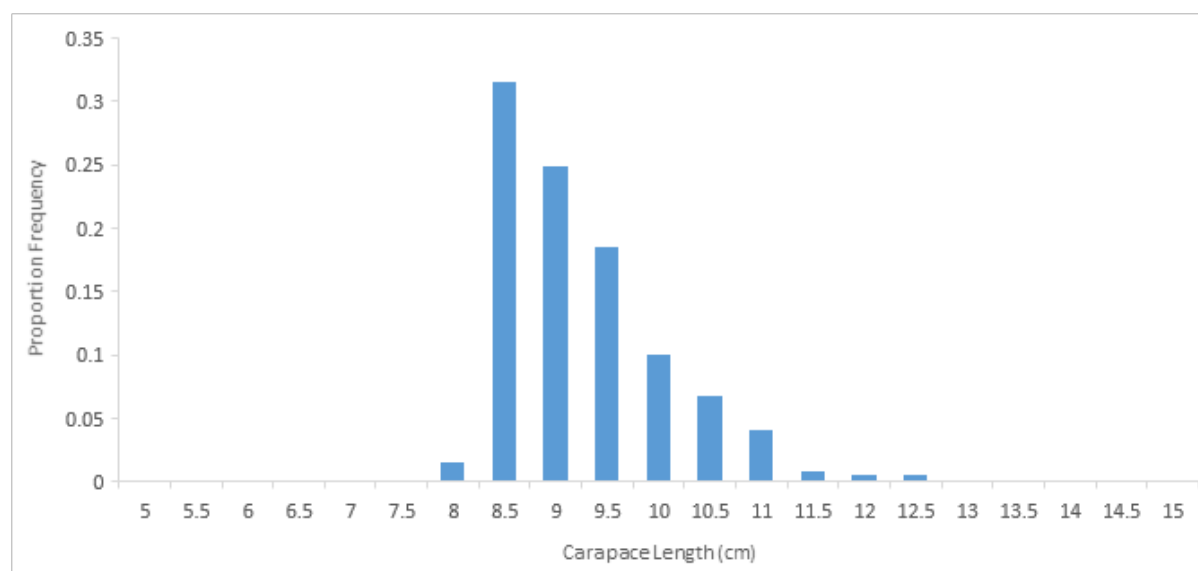


Figure 1. Length composition of Giant Mud Crab landed by the commercial fishery for 2017/18. Crabs were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES

Commentary

Although there were a couple of months in Estuary General Region 4 of relatively high commercial catch not captured in our sampling window (see Table 1), the 5-month delay in the 2017/18 Port Monitoring program did not adversely affect sampling of the Giant Mud Crab fishery. The distribution of sampling, for the most part, approximated the fishery landings.

Some fishers have started to make getting samples quite difficult as they don't always want the DPI staff handling their catch.

Grey Morwong

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	Eastern Australia	OTF, OTLF	Depleted	Catch, Catch rates, size structure, age structure, fishing mortality

OTF Ocean Trawl Fishery (NSW)

OTLF Ocean Trap and Line Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **11**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **8**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **8**

Rank for ages – **5**

Species lead commentary

Annual lengths required for assessment. Comparison with Charter boat observer program. Last aged 2015/16 with no improvement in stock and given longevity of species, perhaps not necessary to age again in 2017/18. New casual staff member based at Bermagui/Eden co-ops to get length frequency data for south coast. Propose just do Ocean Trap and Line Fishery as state Fish Trawl catch is < 1t.

Aim of the Port Monitoring sampling for 2017/18

To collect size composition data that are representative of the commercial landed catch for NSW.

Sampling design

Length Frequency data from the Ocean Trap and Line Fishery were collected for all ocean zones through Iluka/Maclean Fishermen's Co-op, Coffs Harbour Fishermen's Co-op, Wallis Lake Fishermen's Co-op, Newcastle/Nelson Bay Fishermen's Co-ops and the Sydney Fish Markets. For each location, all catches from the Ocean Trap and Line Fishery that were on the floor on the day of sampling, were sampled. Grey Morwong were measured from the tip of the nose to fork length (nearest cm rounding down).

Grey Morwong sampling is based on month and ocean zone strata for data expansion using reported commercial landings for each month and ocean zone. These expansions are done using the PISCES software.

Sampling graded catches

Almost all Grey Morwong catches are graded, generally into XL, L, M, S or U. All grades are sampled and because catches are relatively small, all fish in each catch are usually measured.

Results

Table 1. Reported landings heat map of Grey Morwong by month and area during 2017/18.

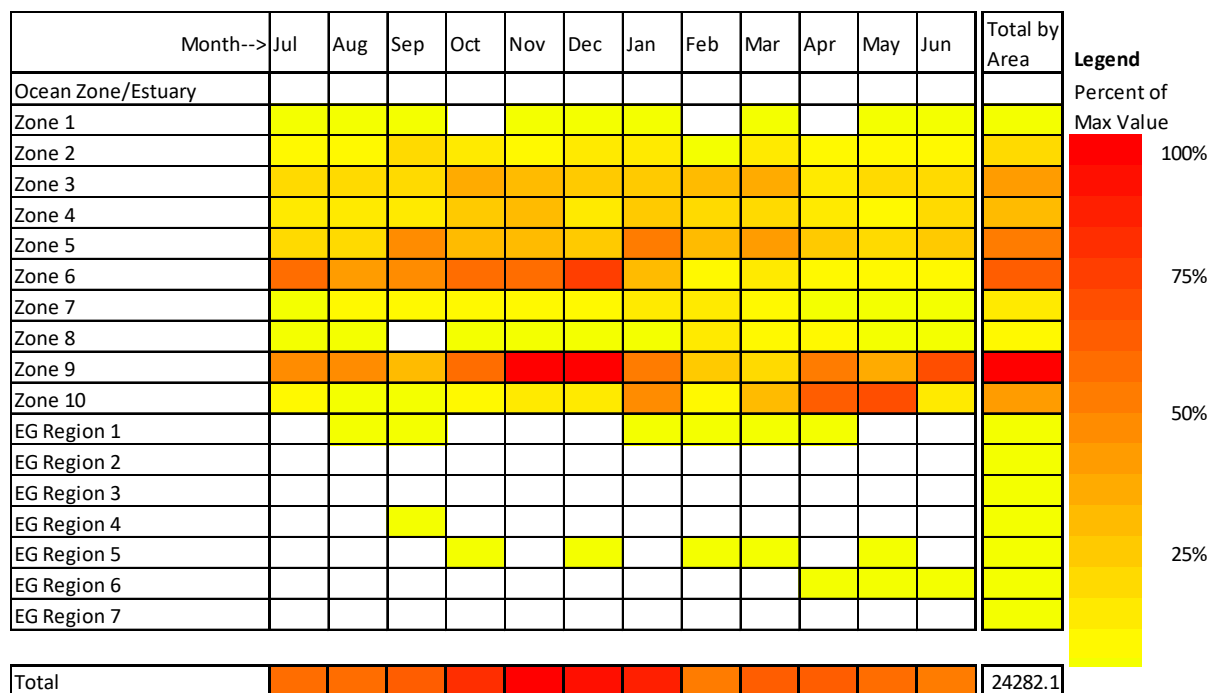


Table 2. The number of days sampled for Grey Morwong by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2							1		2				3
Zone 3	1					7	3	6	8	3	10		38
Zone 4													
Zone 5		1				3	4	3	5		1		17
Zone 6						2	3	1					6
Zone 7													
Zone 8													
Zone 9						1				3	1		5
Zone 10										1	1		2
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4						1							1
EG Region 5													
EG Region 6													
EG Region 7													
Total	1	1	0	0	0	14	11	10	15	7	13	0	72

Table 3. The number of catches sampled for Grey Morwong by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2							1		2				3
Zone 3	1					9	5	7	10	3	12		47
Zone 4													
Zone 5		1				3	4	3	6		1		18
Zone 6						2	5	1					8
Zone 7													
Zone 8													
Zone 9						2				3	1		6
Zone 10										1	1		2
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4						1							1
EG Region 5													
EG Region 6													
EG Region 7													
Total	1	1	0	0	0	17	15	11	18	7	15	0	85

Table 4. The number of fish sampled for Grey Morwong by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2							33		49				82
Zone 3	17					260	103	344	417	29	159		1329
Zone 4													
Zone 5		25				87	159	125	386		24		806
Zone 6						177	221	28					426
Zone 7													
Zone 8													
Zone 9						134				81	103		318
Zone 10										10	14		24
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4						13							13
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	17	25	0	0	0	671	516	497	852	120	300	0	2998

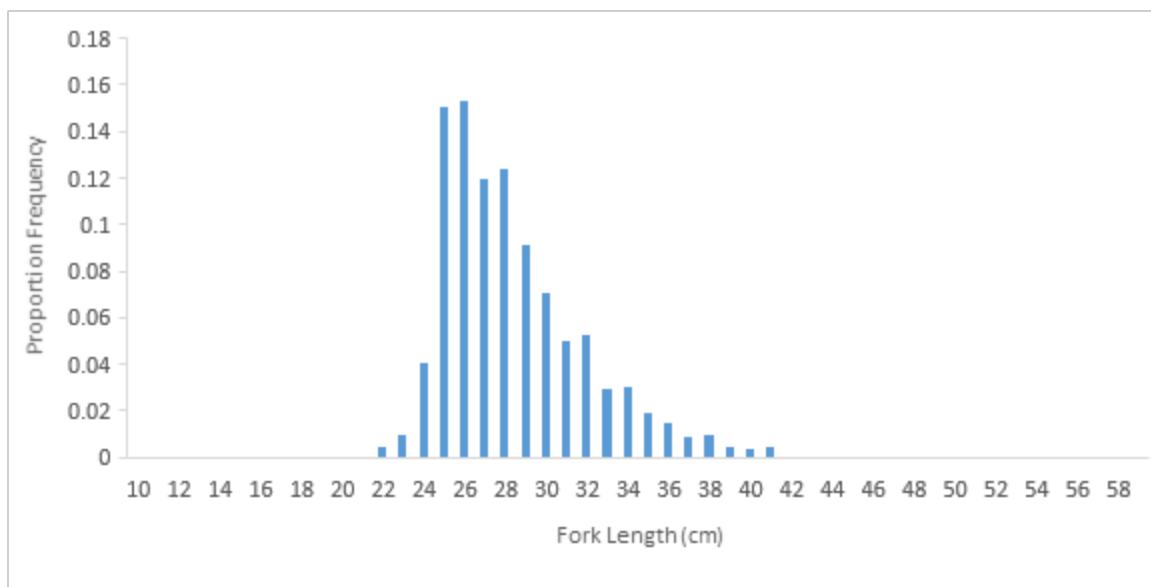


Figure 1. Length composition of Grey Morwong landed by the commercial fishery for 2017/18. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

Several months of relatively high commercial catch was not captured in our sampling window (see Table 1). The absence of a casual to sample from the Eden/Bermagui area made sampling more difficult.

Mulloway

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	New South Wales	EGF, OHF, OTF, OTLF	Depleted	Catch, CPUE, length/age composition, yield-per-recruit, mortality rates, spawning potential ratio

EGF Estuary General Fishery (NSW)

OHF Ocean Hauling Fishery (NSW)

OTF Ocean Trawl Fishery (NSW)

OTLF Ocean Trap and Line Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **17**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **9**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **9**

Rank for ages – **6**

Species lead commentary

'Overfished' species, therefore age-based assessment model required for monitoring. Need at least length data (particularly for estuary mesh net fishery) and ages collected by Research Angler Program frame donations can be applied to lengths via ALKs for age-based assessment.

Aim of the Port Monitoring sampling for 2017/18

To collect size composition data that are representative of the commercial landed catch for NSW.

Sampling design

Length Frequency data were collected through Iluka/Maclean Fishermen's Co-op, Coffs Harbour Fishermen's Co-op, Wallis Lake Fishermen's Co-op, Newcastle/Nelson Bay Fishermen's Co-op and the Sydney Fish Markets. Sampling primarily focused on the Clarence River, Manning River, Wallis Lake, Hawkesbury River and Shoalhaven River, as well as any ocean catches in these areas. Opportunistic sampling of the Ocean Haul fishery was also done. For each location, all catches from either the Estuary General Fishery or Ocean Trap and Line Fishery that were on the floor on the day of sampling were sampled. Mulloway were measured from the tip of the nose to total length (nearest cm rounding down).

Mulloway sampling is based on month, estuary region and ocean zone strata for data expansion using reported commercial landings for each month and ocean zone. These expansions are done using the PISCES software.

Sampling graded catches

All Mulloway catches are graded, generally into XL, L, M, S or U. All grades are sampled and because catches are relatively small, all fish in each catch are usually measured.

Results

Table 1. Reported landings heat map of Mulloway by month and area during 2017/18.

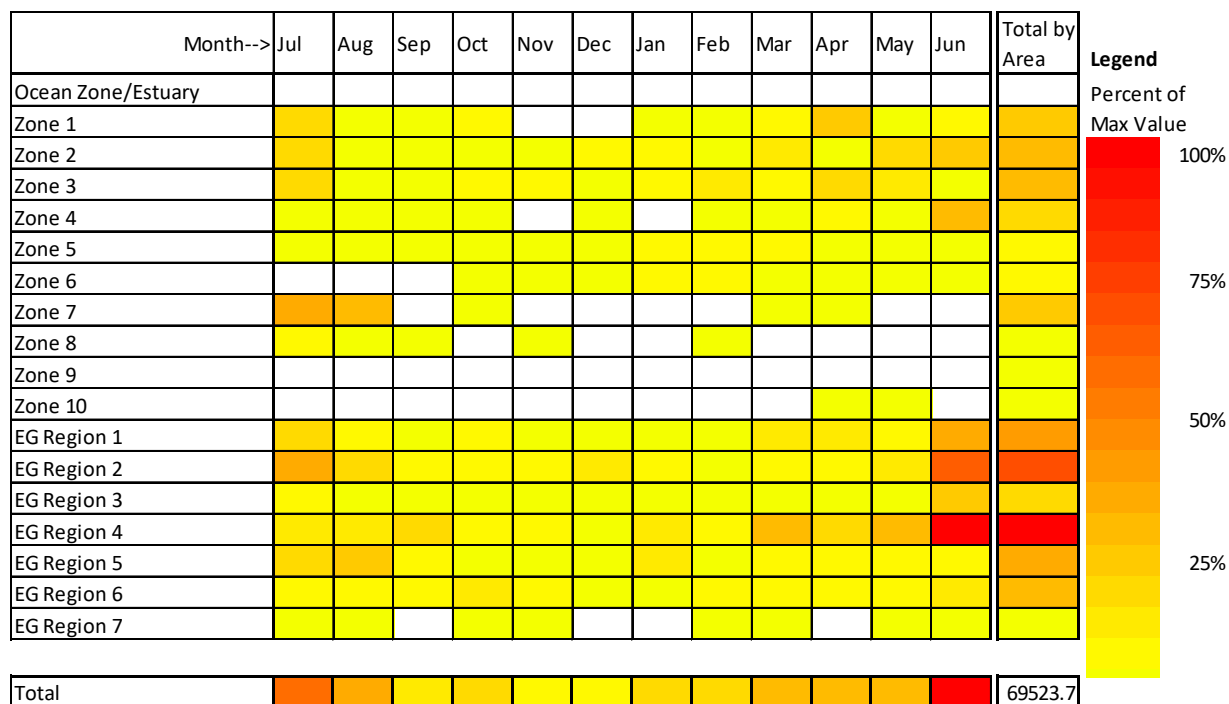


Table 2. The number of days sampled for Mulloway by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2							1		1		2		4
Zone 3							1	2	1	2	1		7
Zone 4													
Zone 5								1	1	1			3
Zone 6								1	1	2	1		5
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2							3	3	2	3	2	5	21
EG Region 3										1		1	2
EG Region 4							2	2	6	3	2	8	23
EG Region 5											1	2	3
EG Region 6							2		1	4	1		8
EG Region 7													
Total	0	0	0	0	0	0	6	6	9	17	12	14	76

Table 3. The number of catches sampled for Mulloway by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2						1			1		2		4
Zone 3							2	2	1	2	1		8
Zone 4													
Zone 5								1	1	1			3
Zone 6								2	1	2	3		8
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2						3	3	2	4	2	10	10	34
EG Region 3										1		1	2
EG Region 4							2	2	6	3	3	10	26
EG Region 5											1	2	3
EG Region 6						2		1	4	1			8
EG Region 7													
Total	0	0	0	0	0	6	7	10	18	12	20	23	96

Table 4. The number of fish sampled for Mulloway by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2						2			3		9		14
Zone 3							10	15	1	4	20		50
Zone 4													
Zone 5								1	1	3			5
Zone 6								10	4	5	11		30
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2						5	3	21	28	43	68	116	284
EG Region 3										5		4	9
EG Region 4							10	34	27	15	6	150	242
EG Region 5											9	20	29
EG Region 6						37		19	26	10			92
EG Region 7													
Total (area known)	0	0	0	0	0	44	23	100	90	85	123	290	755

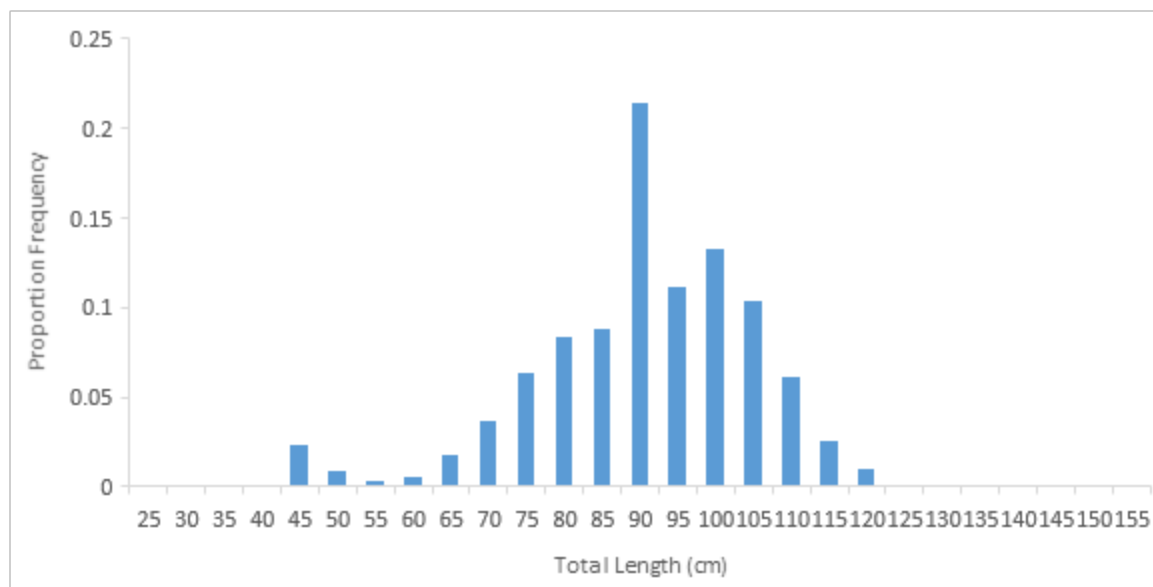


Figure 1. Length composition of Mulloway landed by the commercial fishery for 2017/18. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

Because of the 5-month delay in starting the Port Monitoring in 2017/18, ~ 50% of landings were missed, including the overnight mesh setting period. Sizes landed are generally substantially larger during the January to June period than those during July to December. This means any analysis of sub-70cm fish may be confounded. Strata with the highest reported landings were sampled.

Red Sea Urchin

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	New South Wales	NSW Sea Urchin and Turban Shell	Undefined	Catch, Effort, CPUE

Prioritization and justification

Species Priority Ranking for 2017/18: **23**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **13**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **13**

Rank for ages – **not required**

Species lead commentary

Red Sea Urchins are a quota managed species in NSW, with current management concerns related to sustainability with a proposal by industry to introduce a minimum legal length (MLL) of 120 mm. There are no current data (outside of catch returns) to inform assessment or any issue with respect to MLL.

Aim of the Port Monitoring sampling for 2017/18

To sample at Sydney Fish Market and Newcastle Fishermen's co-ops for sizes from January to June 2018 as a pilot/feasibility study to assist in the development of a future sampling program.

Sampling design

Opportunistic length frequency data to be collected from Newcastle Fishermen's co-op and the Sydney Fish Markets. Red Sea Urchins to be measured as test diameter to the nearest 0.1 cm rounding down.

Sampling graded catches

Red Sea Urchin catches are generally ungraded; however, if grading occurs then all grades are sampled.

Results

Table 1. Reported landings heat map of Red Sea Urchin by month and area during 2017/18.

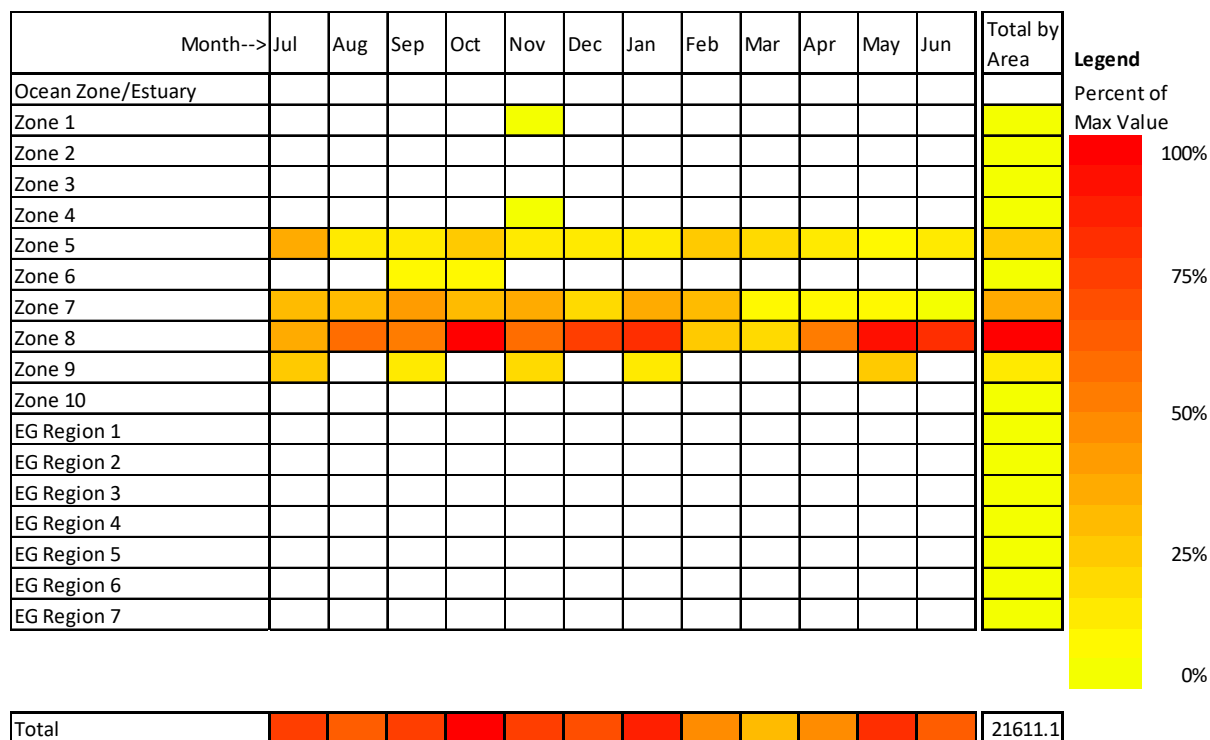


Table 2. The number of days sampled for Red Sea Urchin by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5											1		1
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	0	0	0	0	0	1	0	1

Table 3. The number of catches sampled for Red Sea Urchin by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5											1		
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	0	0	0	0	0	1	0	1

Table 4. The number of fish sampled for Red Sea Urchin by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5											48		
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	0	0	0	0	0	48	0	48

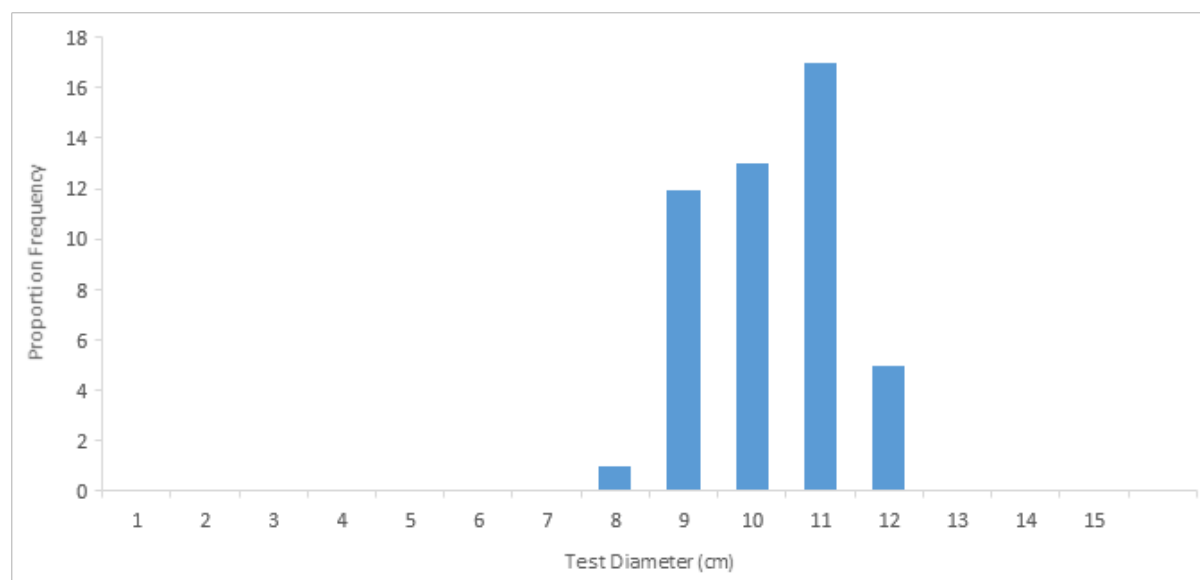


Figure 1. Length composition of Red Sea Urchin sampled through the Port Monitoring program during 2017/18.

Commentary

Only 1 catch of Red Sea Urchin was measured at the Sydney Fish Markets and none at Newcastle co-op. Very few catches of Red Sea Urchin were observed on the Sydney Fish Market floor during the sampling period, and some of those were in fact Purple Sea Urchin. A review of the appropriateness of the NSW Port Monitoring Program for gaining representative samples of Red Sea Urchins is recommended, including a detailed analysis of where landings are sent for sale.

Seasonal landings meant that ~ 65% of landings were missed due to the 5-month delay in port monitoring approval for 2017/18. The bulk of fishery is from zones 7 and 8.

School Prawn

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	New South Wales	EGF, EPTF, OTF	Sustainable	Catch, CPUE, environmental models

EGF Estuary General Fishery (NSW)

EPTF Estuary Prawn Trawl Fishery (NSW)

OTF Ocean Trawl Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **21**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **12**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **12**

Rank for ages – **not required**

Species lead commentary

Looking for baseline length frequency data.

Aim of the Port Monitoring sampling for 2017/18

To collect size composition data that are representative of the commercial landed catch for NSW.

Sampling design

Length Frequency data from Estuary General Fishery, Estuarine Prawn Trawl Fishery and Ocean Trawl Fishery were collected through Clarence River Fishermen's Co-op, Wallis Lake Fishermen's Co-op, Newcastle Fishermen's Co-op and the Sydney Fish Markets. Sampling primarily focused on the Clarence River, Wallis Lake and Hawkesbury River. For each location at least 3 catches per day of sampling were sampled. School Prawns were sexed and measured for carapace length: a straight line from the base of the eye socket to the centre of the posterior margin of the carapace (i.e. the back of the carapace) as shown in Figure 1. Carapace length is measured in millimeters (mm).

School Prawn sampling is based on month, estuary region and ocean zone strata for data expansion using reported commercial landings for each month and ocean zone. These expansions are done using the PISCES software.

Sampling graded catches

All School Prawn catches are graded, generally into XL, L or U. All grades are sampled; at least 50 prawns from each grade.

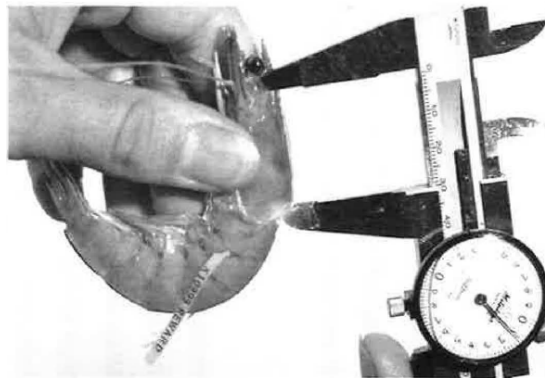


Figure 1. Carapace length of a prawn being measured using calipers. Note the locations of the caliper jaws at the back of the eye socket and back of the carapace.

Results

Table 1. Reported landings heat map of School Prawn by month and area during 2017/18.

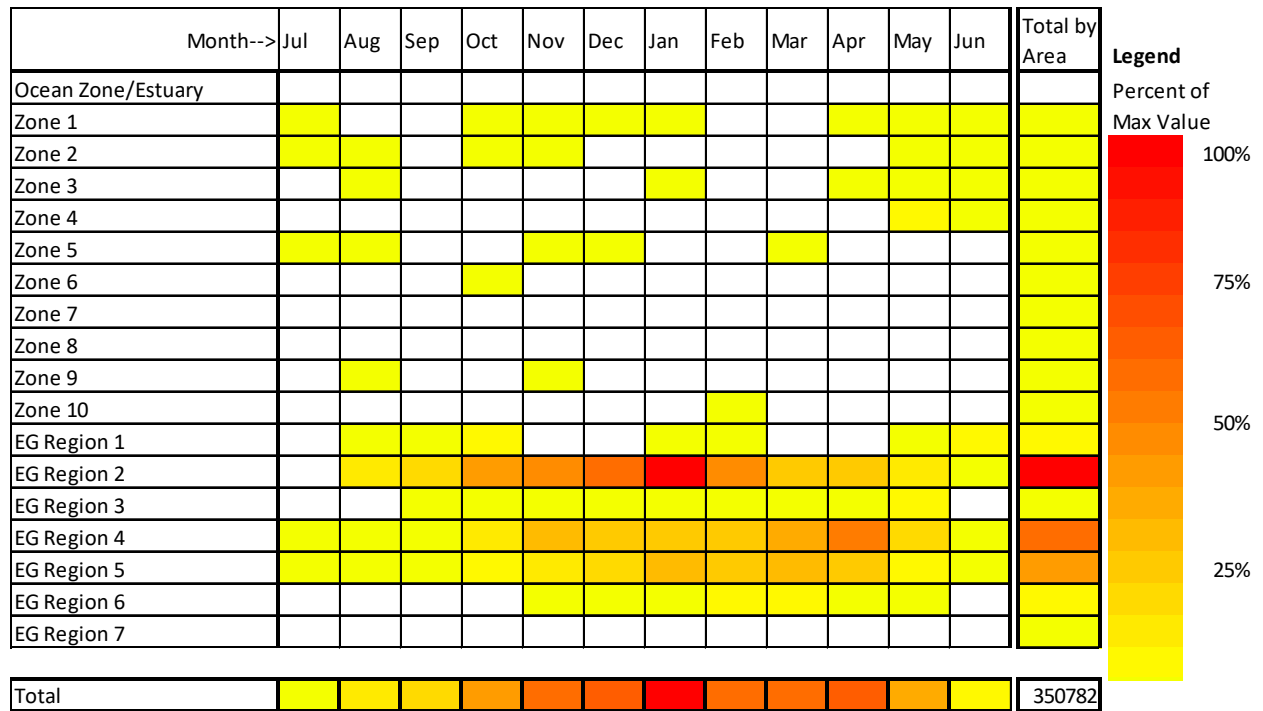


Table 2. The number of days sampled for School Prawn by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1									1				1
EG Region 2						3	4	4	4	3	5		23
EG Region 3													
EG Region 4							4	1	1	2	4		12
EG Region 5						2	1	3	2	1		2	11
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	5	9	8	8	6	9	2	47

Table 3. The number of catches sampled for School Prawn by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1									1				1
EG Region 2						9	9	9	7	6	7		47
EG Region 3													
EG Region 4							5	1	1	2	4		13
EG Region 5						3	2	3	2	1		3	14
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	12	16	13	11	9	11	3	75

Table 4. The number of fish sampled for School Prawn by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1									149				149
EG Region 2						1539	1472	1535	1168	1002	1078		7794
EG Region 3													
EG Region 4							721	119	39	220	558		1657
EG Region 5						272	107	209	216	56		342	1202
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	1811	2300	1863	1572	1278	1636	342	10802

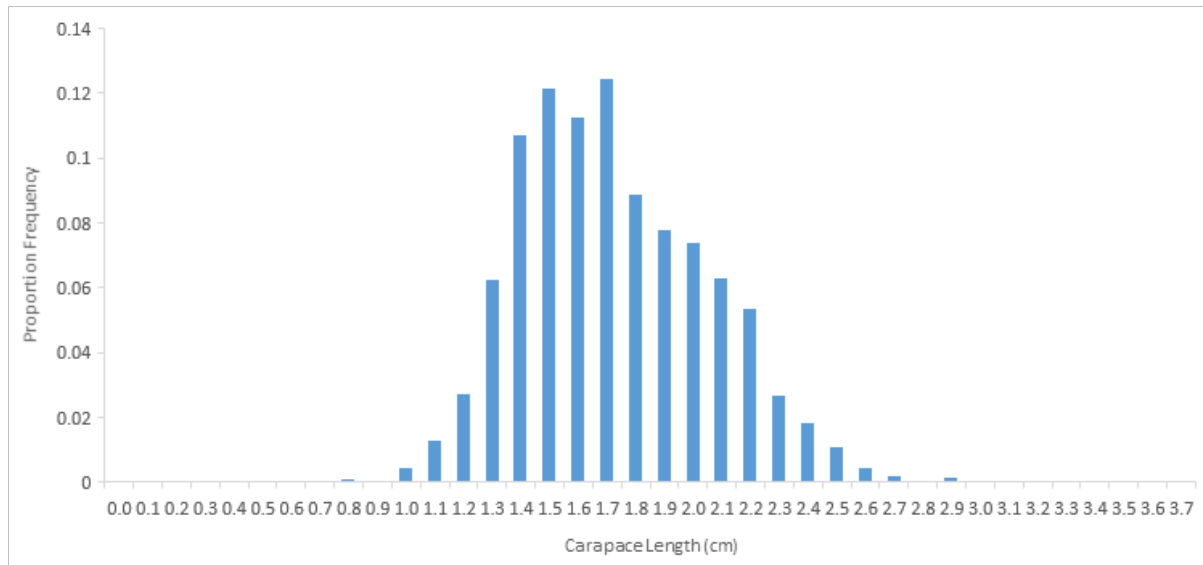


Figure 1. Length composition of School Prawn landed by the commercial fishery for 2017/18. Prawns were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

The 5-month delay in the 2017/18 Port Monitoring program did not adversely affect sampling of the School Prawn Fishery due to the seasonal nature of landings (see Table 1). The distribution of sampling approximated the fishery landings.

Additional School Prawn samples from the Richmond River, Clarence River, Hunter River and Hawksbury River were also collected throughout the year to assist the biosecurity and food safety division in their ongoing monitoring of White Spot Disease (WSD).

Sea Mullet

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	Eastern Australia	EGF, OHF	Sustainable	Catch, CPUE, length and age frequencies

EGF Estuary General Fishery (NSW)

OHF Ocean Hauling Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **19**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **11**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **11**

Rank for ages – **8**

Species lead commentary

Long-term size and age-based assessment used. Ocean Haul Fishery spawning run monitoring only. A seasonal spawning run means that despite the delayed approval by 5 months for Port Monitoring in 2017/18, the spawning run can still be sampled.

Table 2. The number of days sampled for Sea Mullet by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													2
Zone 1											2		2
Zone 2													
Zone 3											4		4
Zone 4											5		5
Zone 5											7		7
Zone 6											3		3
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	0	0	0	0	0	21	0	21

Table 3. The number of catches sampled for Sea Mullet by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1											3		3
Zone 2													
Zone 3											4		4
Zone 4											7		7
Zone 5											8		8
Zone 6											3		3
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	0	0	0	0	0	25	0	25

Table 4. The number of fish sampled for Sea Mullet by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1											466		466
Zone 2													
Zone 3											592		592
Zone 4											1219		1219
Zone 5											1366		1366
Zone 6											426		426
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	0	0	0	0	0	4069	0	4069

Table 5. The number of fish sampled for ageing Sea Mullet by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1											56		56
Zone 2													
Zone 3											90		90
Zone 4											240		240
Zone 5											270		270
Zone 6											90		90
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	60	0	0	0	0	0	0	0	0	746	0	806

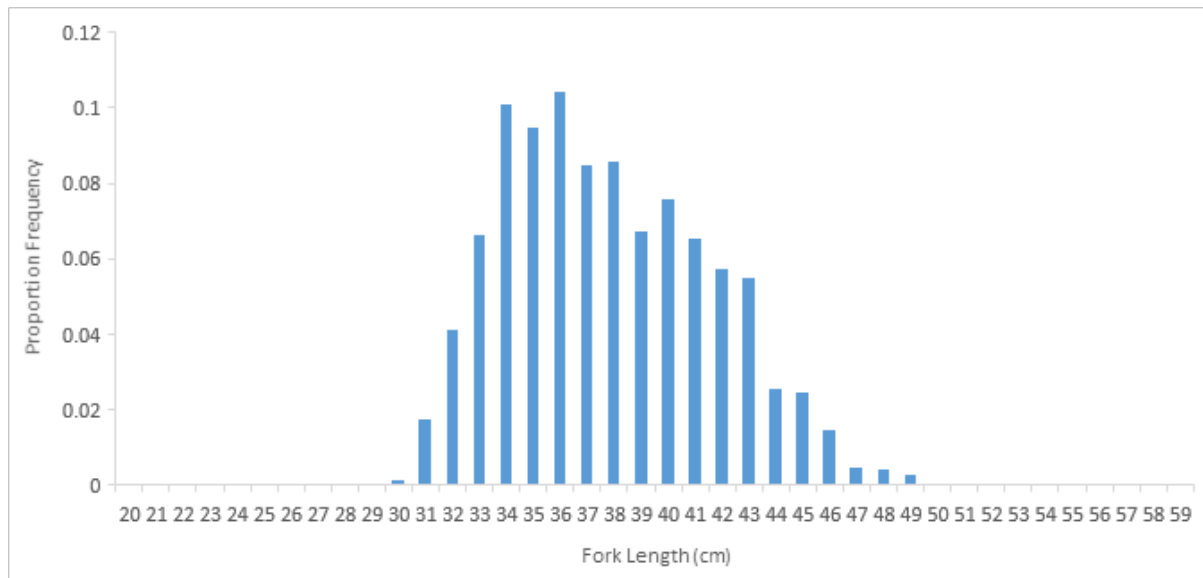


Figure 1. Length composition of Sea Mullet landed by the commercial fishery for 2017/18. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

Sea Mullet landings are highly subject to weather patterns from year to year during the spawning run; however, this year a reasonable spread of samples were taken from as far south as Patonga (Ocean Zone 6) up to Kingscliff beach (Ocean Zone 1).

Silver Trevally

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	New South Wales	EGF, OHF, OTF, OTLF	Depleting	Catch, CPUE, length and age structures

EGF Estuary General Fishery (NSW)

OHF Ocean Hauling Fishery (NSW)

OTF Ocean Trawl Fishery (NSW)

OTLF Ocean Trap and Line Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **4**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **3**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **3**

Rank for ages – **3**

Species lead commentary

New South Wales SAFS status is Transitional Depleting with a strong justification for this status based on truncation of length frequencies and historical declines in age structures. Without these data it is unlikely that the status will be able to be determined with confidence in the future.

Aim of the Port Monitoring sampling for 2017/18

To collect size composition data that are representative of the commercial landed catch for NSW. No otoliths were to be collected as considerable length and age data are yet to be analysed and the species lead will assess existing data before further collections for ageing.

Sampling design

Length Frequency data from the Ocean Trap and Line Fishery were collected for ocean zones 6-10 through the Sydney Fish Markets. When catches could be traced to state waters, the Fish Trawl Fishery was also sampled. Both the Ocean Trap and Line Fishery and the Fish Trawl Fishery were sampled opportunistically through Newcastle and Nelson Bay Fishermen's Co-ops. For each location, all catches that were on the floor on the day of sampling were sampled. Silver Trevally were measured from the tip of the nose to fork length (nearest cm rounding down).

Silver Trevally sampling is based on month and ocean zone strata for data expansion using reported commercial landings for each month and ocean zone. These expansions are done using the PISCES software.

Sampling graded catches

Almost all Silver Trevally catches are graded, generally into XL, L, M, S or U. All grades are sampled. Approximately 10 times the number of size classes per grade are measured (as tallied by the electronic measuring board software). These sub-samples are weighed, and the total weight of each grade recorded and the sample scaled up accordingly, using the PISCES software. Because catches are relatively small, all fish in each catch are often measured.

Results

Table 1. Reported landings heat map of Silver Trevally by month and area during 2017/18.

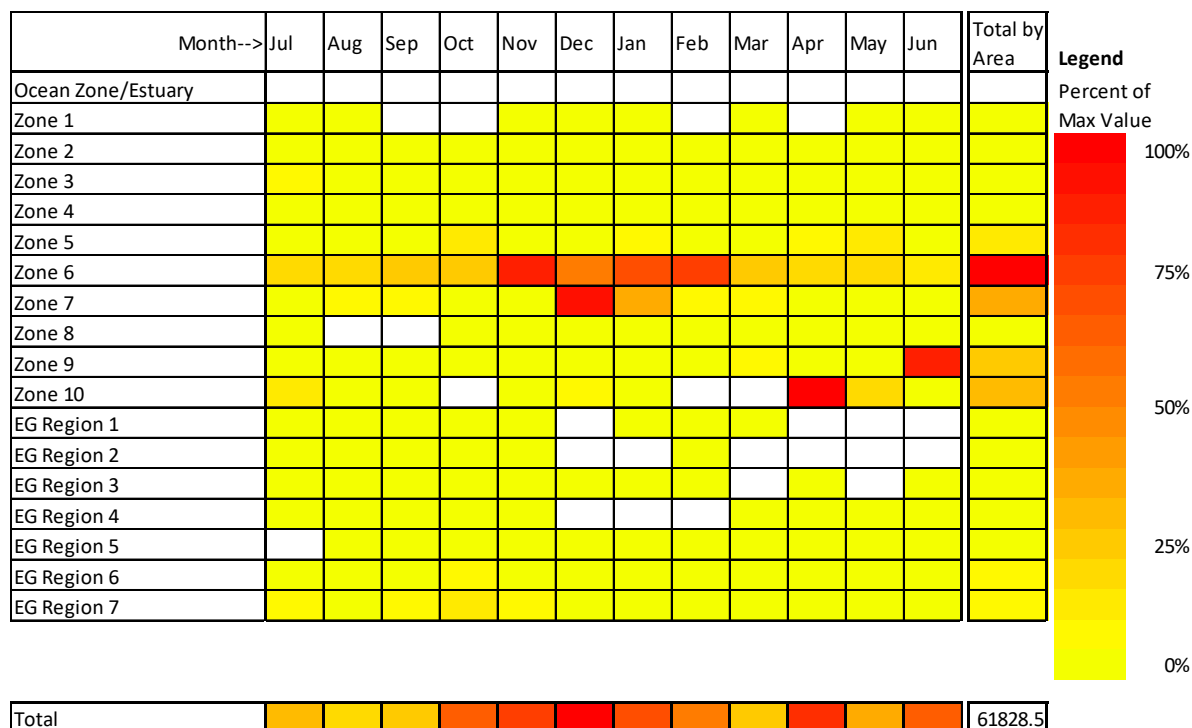


Table 2. The number of days sampled for Silver Trevally by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

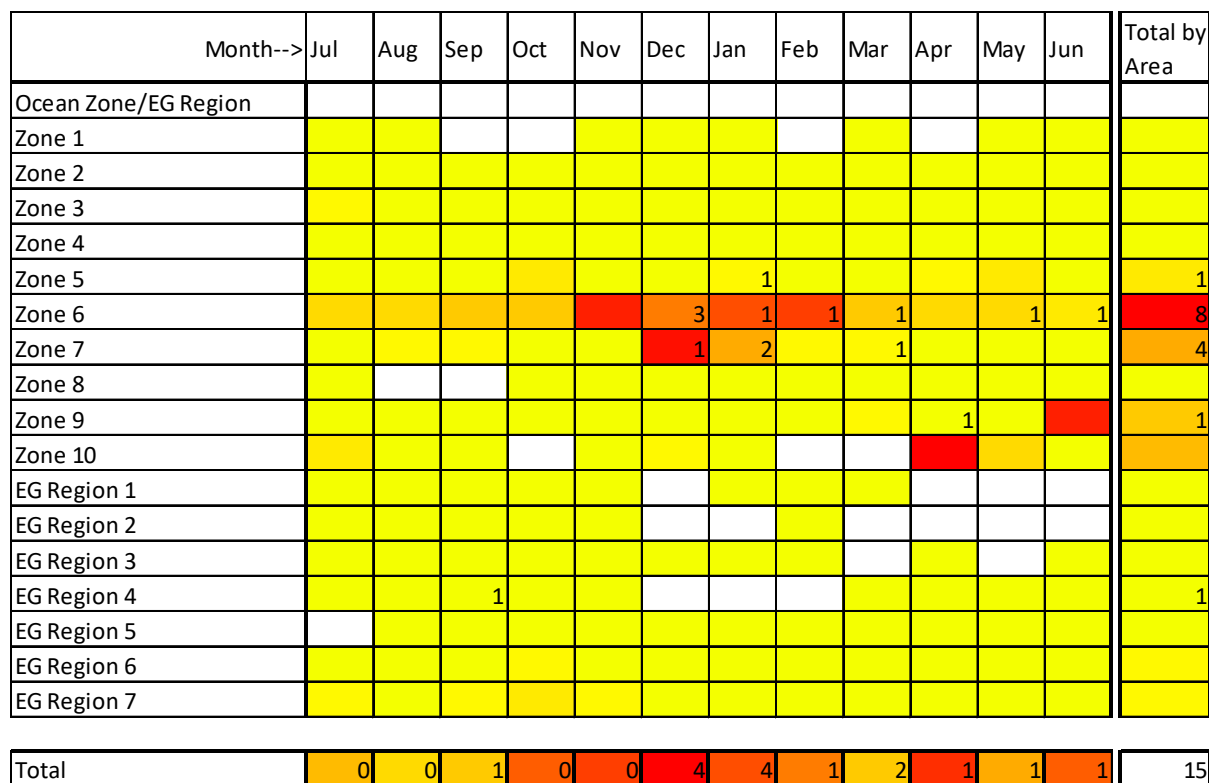


Table 3. The number of catches sampled for Silver Trevally by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5							1						1
Zone 6						5	3	3	2		1	4	18
Zone 7						1	3		1				5
Zone 8													
Zone 9										1			1
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4			1										1
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	1	0	0	6	7	3	3	1	1	4	26

Table 4. The number of fish sampled for Silver Trevally by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5							69						69
Zone 6						336	212	214	92		56	139	1049
Zone 7						60	380		76				516
Zone 8													
Zone 9										61			61
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4			9										9
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	9	0	0	396	661	214	168	61	56	139	1704

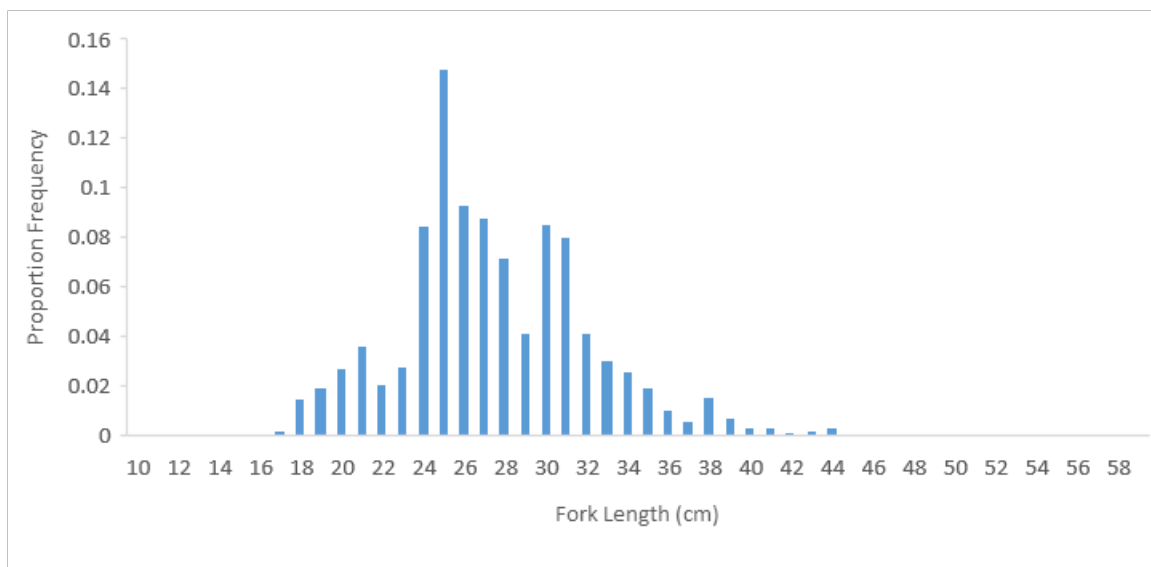


Figure 1. Length composition of Silver Trevally landed by the commercial fishery for 2017/18. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

The numbers of samples were considerably less than during previous years due to the 5 month delay in the 2017/18 Port Monitoring program. The distribution of sampling, for the most part, approximated the fishery landings.

The majority of the higher commercial catch in ocean zones 9 and 10 is from the Fish Trawl Fishery. This fishery has been difficult to sample through the Sydney Fish Markets as many of the fish trawlers fish in both state and commonwealth waters, so therefore the origins of the fish were sometimes hard to determine on any particular sampling night (for example the sub-24 cm FL fish in Fig. 1 may have been captured in the commonwealth fishery). The absence of a casual to sample from the Eden/Bermagui area made sampling more difficult.

Stout Whiting

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	Eastern Australia	OTF	Sustainable	Standardised CPUE, age composition

OTF Ocean Trawl Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **10**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **7**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **1**

Rank for lengths - **7**

Rank for ages – **4**

Species lead commentary

A size and age-based assessment. Port monitoring to include continued export box sampling of lengths and species composition at Iluka Fishermen's Co-op. Ocean Prawn Trawl Observer Program also collecting length frequency data; Ocean Prawn Trawl closure collecting length frequency data.

Table 2. The number of days sampled for Stout Whiting by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2						3		1	1		2		7
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2								1					1
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	3	0	2	1	0	2	0	8

Table 3. The number of catches sampled for Stout Whiting by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2						3		1	1		2		7
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2								1					1
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	3	0	2	1	0	2	0	8

Table 4. The number of fish sampled for Stout Whiting by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2						81		143	49		371		644
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2								322					322
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	81	0	465	49	0	371	0	966

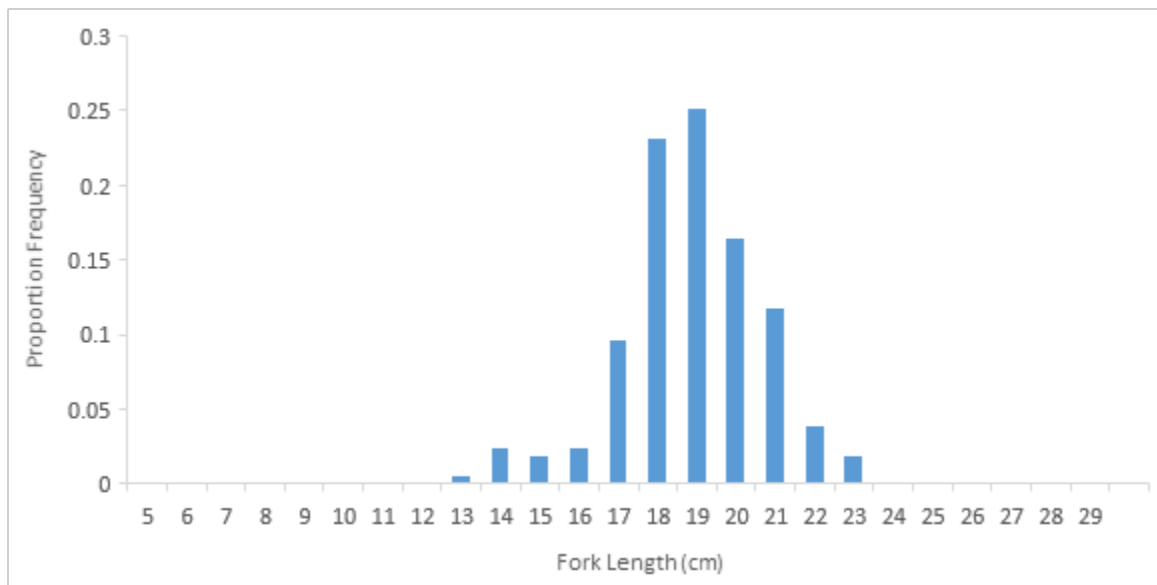


Figure 1. Length composition of Stout Whiting landed by the commercial fishery for 2017/18. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES. Data collected via the Ocean Prawn Trawl Observer Program and the Ocean Prawn Trawl closure project are not included.

Commentary

Several months of higher catches during the start of the year were missed due to the delay in starting the sampling. It is questionable whether sampling a limited number of catches from the Iluka co-op will provide a representative length distribution for the entire NSW fishery; although in this year the data will be combined with length frequency information from the prawn trawl observer program. A review of how best to sample this fishery in other years, given the variable fishing practices across the fleet, including on-board freezing of fish for export, may be required.

Yellowfin Bream

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	Eastern Australia	EGF, OHF, OTLF	Sustainable	Commercial catch and CPUE, length and age, mortality rate

EGF Estuary General Fishery (NSW)

OHF Ocean Hauling Fishery (NSW)

OTLF Ocean Trap and Line Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **27**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **16**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **16**

Rank for ages – **10**

Species lead commentary

Not assessed for sizes since 2010/11 or ages since 2009/10. Flagged as a priority in the 2016 Resource Assessment Workshop.

Aim of the Port Monitoring sampling for 2017/18

To collect size and age composition data that are representative of the commercial landed catch for NSW.

Sampling design

Length Frequency data from the Estuary General Fishery were collected through the Iluka/Maclean Fishermen's Co-op, Wallis Lake Fishermen's Co-op and the Sydney Fish Markets. Sampling primarily focused on the Clarence River, Wallis Lake, Tuggerah Lakes and Hawkesbury River. The occasional ocean catches in these areas were also sampled. For each location, all catches from the Estuary General Fishery that were on the floor on the day of sampling were sampled. Yellowfin Bream were measured from the tip of the nose to fork length (nearest cm rounding down).

Yellowfin Bream sampling is based on month, estuary region and ocean zone strata for data expansion using reported commercial landings for each month and ocean zone. These expansions are done using the PISCES software.

Two samples of 20 fish, from each location, were also purchased each month for ageing. Fish were selected from each grade in the approximate ratio of each grade in the total catch by weight.

Sampling graded catches

All Yellowfin Bream catches are graded, generally into XL, L, M, S or U. All grades are sampled. Approximately 10 times the number of size classes per grade are measured (as tallied by the electronic measuring board software). These sub-samples are weighed and the total weight of each grade recorded and the sample scaled up accordingly, using the PISCES software.

Results

Table 1. Reported landings heat map of Yellowfin Bream by month and area during 2017/18.

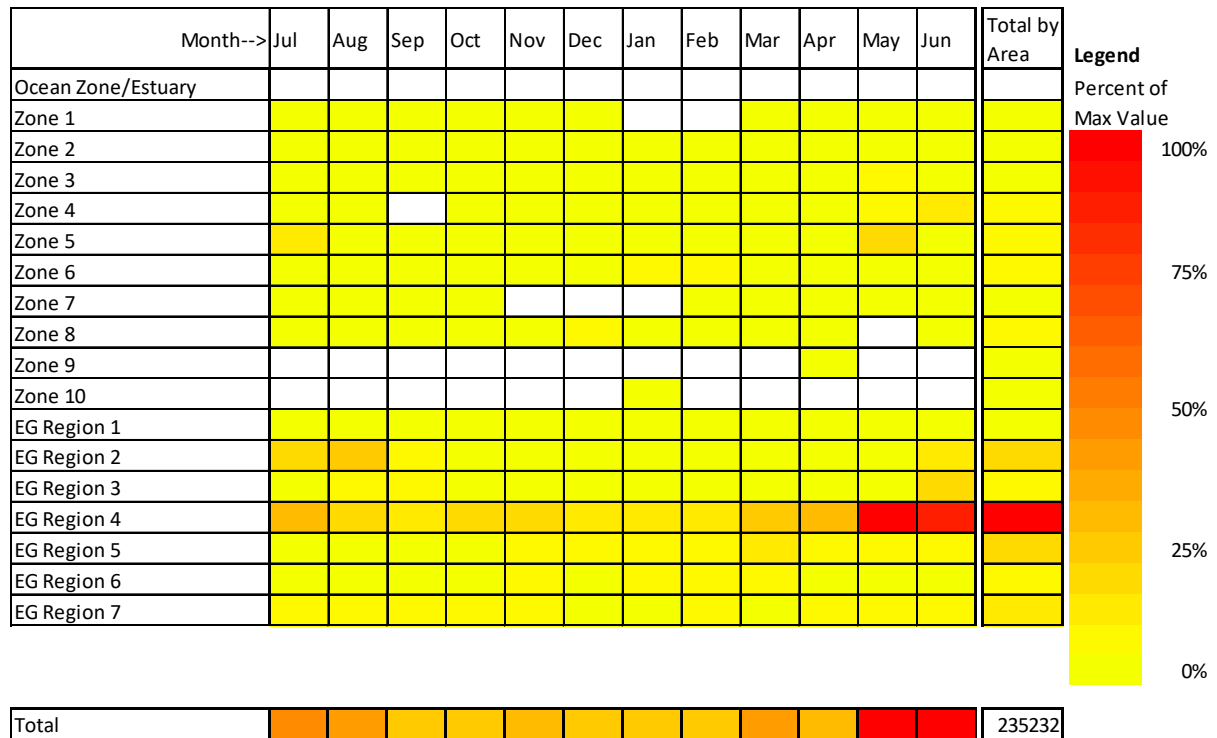


Table 2. The number of days sampled for Yellowfin Bream by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2										1			1
Zone 3													
Zone 4													
Zone 5							1			1			2
Zone 6							1	1	1	1			4
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2						4	3	4	5	4	5	3	28
EG Region 3													
EG Region 4						3	7	7	7	5	7	6	42
EG Region 5						1	4	2	3	3	2	2	17
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	8	16	14	16	15	14	11	94

Table 3. The number of catches sampled for Yellowfin Bream by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2										1			1
Zone 3													
Zone 4													
Zone 5							1			1			2
Zone 6							1	1	1	1			4
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2						11	8	7	14	13	14	11	78
EG Region 3													
EG Region 4						5	15	11	13	10	13	11	78
EG Region 5						2	5	4	6	6	3	3	29
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	18	30	23	34	32	30	25	192

Table 4. The number of fish sampled for Yellowfin Bream by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2										2			2
Zone 3													
Zone 4													
Zone 5							21			14			35
Zone 6							88	131	85	85			389
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2						551	58	33	189	254	87	504	1676
EG Region 3													
EG Region 4						171	440	277	762	536	860	754	3800
EG Region 5						127	254	322	517	375	273	282	2150
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	849	861	763	1553	1266	1220	1540	8052

Table 5. The number of fish sampled for ageing Yellowfin Bream by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2										0			
Zone 3													
Zone 4													
Zone 5							0			0			
Zone 6							0	0	0	20			20
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2						40	31	44	45	40	39	41	280
EG Region 3													
EG Region 4						30	61	78	60	59	60	60	408
EG Region 5						20	40	41	40	20	40	40	241
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	90	132	163	145	139	139	141	949

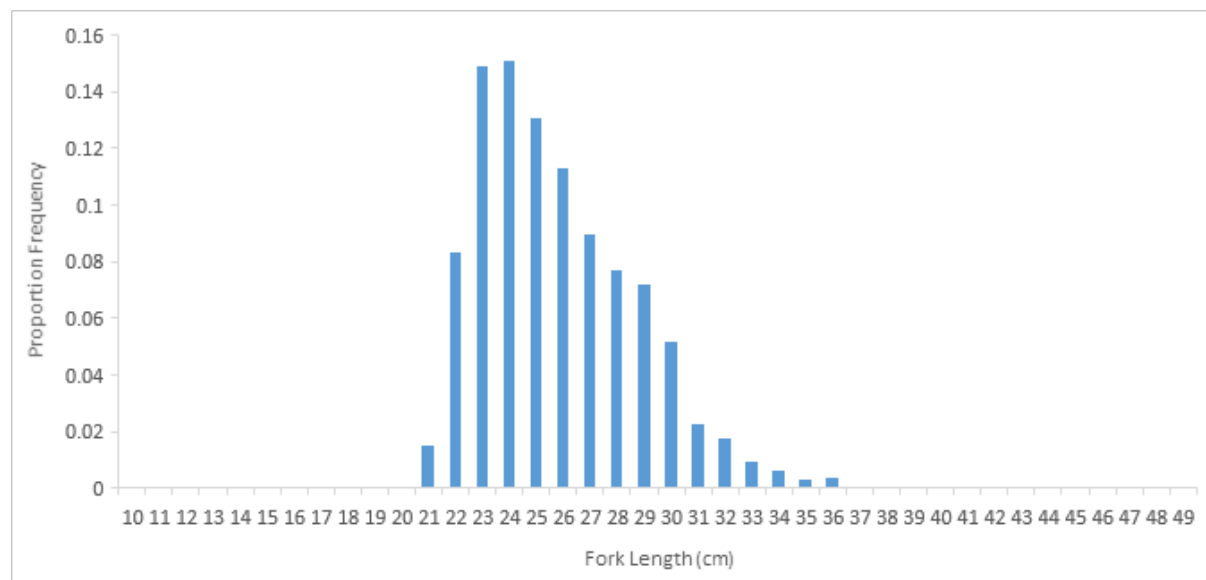


Figure 1. Length composition of Yellowfin Bream landed by the commercial fishery for 2017/18. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

The 5-month delay in the 2017/18 Port Monitoring program did not adversely affect sampling of the Yellowfin Bream fishery. The distribution of sampling, for the most part, approximated the fishery landings.

Yellowtail Scad

STOCK STATUS OVERVIEW

Stock status determination

Jurisdiction	Stock	Fisheries	Stock status	Indicators
New South Wales	Eastern Australia	OHF, OTF, OTLF	Sustainable	Historical catch and effort data, natural mortality, fishing mortality, fishing gear selectivity

OHF Ocean Hauling Fishery (NSW)

OTF Ocean Trawl Fishery (NSW)

OTLF Ocean Trap and Line Fishery (NSW)

Prioritization and justification

Species Priority Ranking for 2017/18: **18**

Data and Monitoring Plan for 2017/18

Ranking for Port Monitoring **10**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **10**

Rank for ages – **7**

Species lead commentary

A size and age-based assessment used.

Aim of the Port Monitoring sampling for 2017/18

To collect size and age composition data that are representative of the commercial landed catch for NSW.

Sampling design

All sampling was done at the Sydney Fish Markets. For each location (Ulladulla and Wollongong fleets), all catches that were on the floor on the day of sampling were sampled. Yellowtail Scad were measured from the tip of the nose to fork length (nearest cm rounding down).

Yellowtail Scad sampling is based on monthly and ocean zone strata for data expansion using reported commercial landings for each month and ocean zone. These expansions are done using the PISCES software.

Two samples of 20 fish, from each location, were also purchased each month for ageing. Fish were selected from each grade in the approximate ratio of each grade in the total catch by weight.

Sampling graded catches

Almost all Yellowtail Scad catches are graded as extra-large; however, where there were more than 1 grade, all grades were sampled. Approximately 10 times the number of size classes per grade are measured (as tallied by the electronic measuring board software). These sub-samples are weighed, and the total weight of each grade recorded, and the sample scaled up accordingly, using the PISCES software.

Results

Table 1. Reported landings heat map of Yellowtail Scad by month and area during 2017/18.

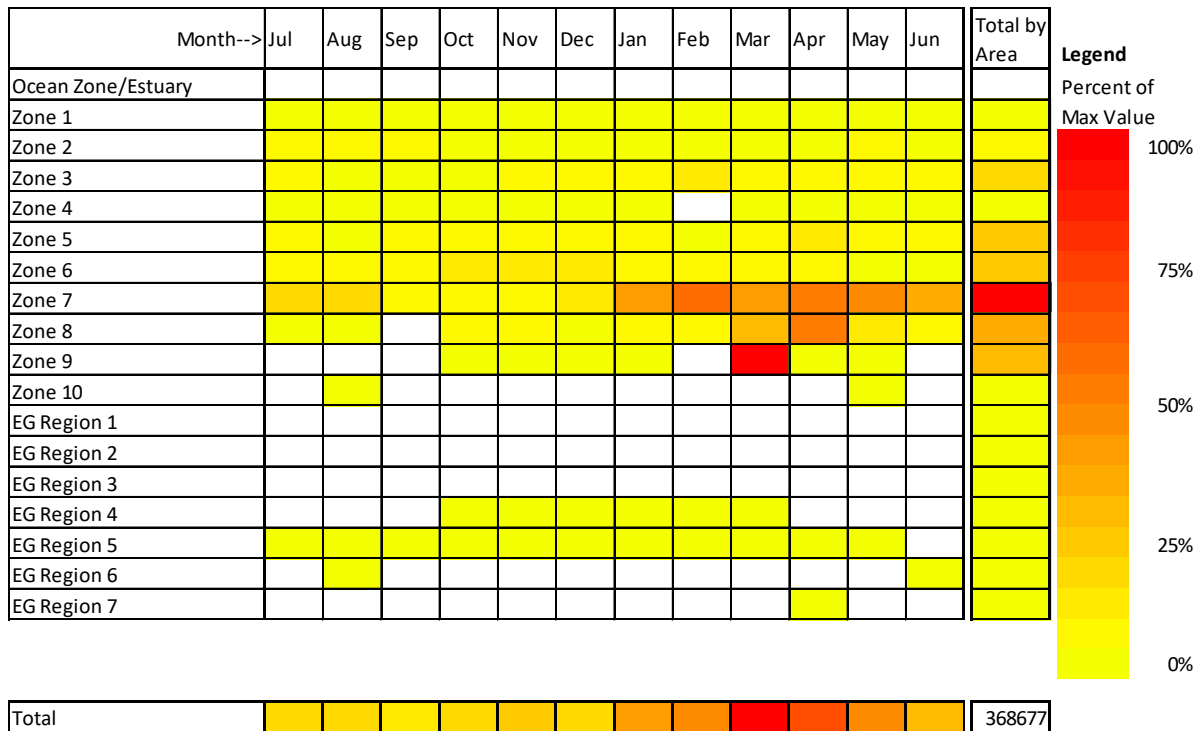


Table 2. The number of days sampled for Yellowtail Scad by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7						1	2	2	2	2	2	3	14
Zone 8							1	1			1	1	4
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	1	3	3	2	2	3	4	18

Table 3. The number of catches sampled for Yellowtail Scad by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7						1	3	4	3	3	4	4	22
Zone 8							1	1			1	1	4
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total	0	0	0	0	0	1	4	5	3	3	5	5	26

Table 4. The number of fish sampled for Yellowtail Scad by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/Estuary													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7						97	280	419	252	251	518	394	2211
Zone 8							123	80			86	93	382
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	97	403	499	252	251	604	487	2593

Table 5. The number of fish sampled for ageing Yellowtail Scad by month and area during 2017/18. The shaded heat map represents the reported commercial landings.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area
Ocean Zone/EG Region													
Zone 1													
Zone 2													
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7						20	20	19	40	20	40	19	178
Zone 8							0	20			20	20	60
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	20	20	39	40	20	60	39	238

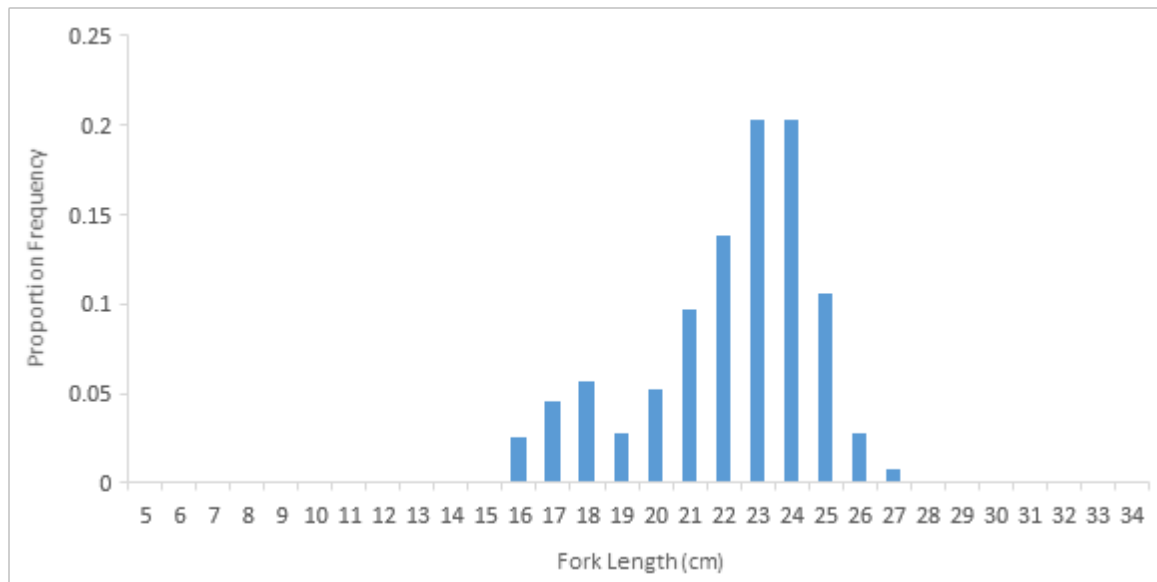


Figure 1. Length composition of Yellowtail Scad landed by the commercial fishery for 2017/18. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

The 5-month delay in the 2017/18 Port Monitoring program did not adversely affect sampling of the Yellowtail Scad fishery. The distribution of sampling, for the most part, approximated the fishery landings, with the exception of one high catch month during March in ocean zone 9.

Appendices

Staff

Core funded

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Commercial Trust funded

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Species Priority List 2017/18

Species priority list for research for 2017/18, ranked highest to lowest. The multi-criteria decision analysis (MCDA) was based on commercial and recreational management weightings. Species selected for port monitoring in 2017/18 are highlighted.

MCDA score	Common Name	MCDA score	Common Name	MCDA score	Common Name
11.063	Bluespotted Flathead	3.708	Spanish Mackerel	1.255	Eastern Blue Groper
10.689		3.417	Loligo Squid	1.254	Mako Sharks
10.266	Gemfish	3.344	Cockles	1.252	Longtail Tuna
9.686		3.312	Bass Groper	1.251	Cunjevoi
9.598	Blacklip Abalone	3.308	Hapuku	1.250	Mangrove Jack
9.374		3.194	Tailor	1.250	Estuary Perch
9.301	Eastern King Prawn	3.134	Australian Bonito	1.198	Australian Herring
9.162	Pipi	3.060	Bugs	1.154	Freshwater Shrimp
8.307		3.001	Crimsonband Wrasse	1.100	Black Bream
8.285	Eastern Rock Lobster	2.965	Spotted Mackerel	1.073	Catfish
8.059		2.757	Royal Red Prawn	1.048	Australian Bass
7.917	Tiger Flathead	2.754	Common Jack Mackerel	1.021	Golden Perch
7.874	Pink Ling	2.740	John Dory	0.976	Maori Octopus
7.860		2.719	Mirror Dory	0.952	Pale Octopus
7.826	Spanner Crab	2.580	Trawl Octopus	0.950	Southern Bluefin Tuna
7.744	Dusky Flathead	2.462	Shovelnose Rays	0.943	Angel Sharks
7.675		2.382	Estuary Cobbler	0.914	Eastern Pigfish
7.672	Blue-eye Trevalla	2.360	Gloomy Octopus	0.337	Wobbeong Sharks
7.340		2.346	Mahi	0.335	Greentail Prawn
7.299	Redfish	2.307	Turban Shells	0.327	Red Gurnard and Latchets
7.106		2.263	Dart	0.322	Mackerel Tuna
7.076		2.232	Leatherjackets-other	0.320	Brown Tiger Prawn
7.020	Snapper	2.167	Octopus	0.309	Red Morwong
6.960		2.120	Sawsharks	0.309	Frigate Mackerel
6.819	Australian Sardine	2.094	Yabbies (freshwater)	0.307	Diamondfish
6.651	Yellowtail Kingfish	2.083	Murray Cod	0.306	Striped Perch
6.625		2.082	Whaler Sharks	0.305	Bigeyes
6.308	School Shark	2.021	Common Blacktip Sharks	0.304	Hammerhead Sharks
6.193		2.006	Sandbar Shark	0.303	Tiger Shark
6.034		2.005	Dusky Whaler	0.303	Tilefish
5.727	Ocean Perch	1.966	Goulds (Arrow) Squid	0.302	Boarfish
5.675	Luderick	1.956	Jackass Morwong	0.301	Blue Shark
5.464	Sand Whiting	1.942	Purple Sea Urchin	0.300	Mantis Shrimps
5.258	Dogfish	1.877	Rock Blackfish	0.300	Ghostsharks
5.094	Eastern Australian Salmon	1.859	Yellowfin Tuna	0.300	Banded Morwong
5.067	Trumpeter Whiting	1.850	Striped Marlin	0.022	Forktail Catfish
5.029	Pearl Perch	1.437	Red Mullet	0.004	Bastard Trumpeter
4.965	Ghost Nipper	1.436	Flounders	0.003	Ribaldo
4.943	Silver Sweep	1.411	Soles	0.001	Bluethroat Wrasse
4.667	Gummy Shark	1.386	Whitebait - Sandy Sprat	0.001	Blue Warehou
4.667	Ocean Jackets	1.348	Sand Mullet	0.000	Spangled Emperor
4.481	Beachworms	1.346	Cuttlefish	0.000	Elephantfish
4.450	Balmain Bugs	1.336	Eastern Red Scorpionfish	0.000	School Mackerel
4.199	River Eels	1.310	River Garfish	0.000	Snook
4.118	Common Silverbiddy	1.285	Banded Rockcod	0.000	Silver Warehou
4.026	Goldspot Mullet	1.268	Hairtail		
4.017	Tarwhine	1.265	Whaler Sharks - other		
4.013	Teraglin	1.265	Southern Maori Wrasse		
3.950	Green Sea Urchin	1.258	Australian Anchovy		
3.947	Southern Calamari	1.256	Cobia		

Clarence River co-op protocols 2017/18

Clarence River co-op

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Sampling schedule

2017/18	Macleay	Iluka
Eastern School/Stout Whiting		1 day/month
Giant Mud Crab	4 days/month	
Mulloway	4 days/month	
School Prawn	3 days/month	
Yellowfin Bream	4 days/month	

SAMPLING PROTOCOLS

Mulloway (*Argyrosomus japonicus*)

Sample days

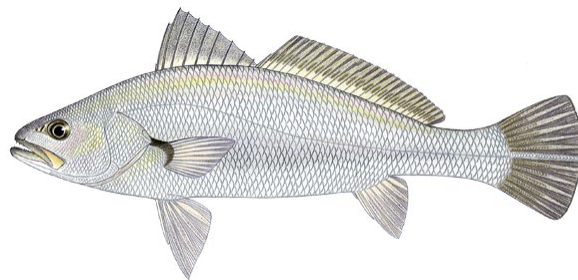
- 4 days/month

Lengths required

- Measure all the catches of mulloway on the floor on the day of sampling.
- Measure catches as total length (TL) to the nearest whole cm below true length.

Otoliths required

- From 1st January 2018, collect mulloway otoliths for DJ's project.



Yellowfin bream (*Acanthopagrus australis*)

Sample days

- 4 days/month

Otoliths required

- 20 otoliths per catch taken proportionately from each grade. Total of 40 otoliths per month.
- Collect fork length (0.1 cm), body weight (0.1g), sex, gonad stage, gonad weight (0.1g) and otoliths (start field code **CR-Aa1**)

Lengths required

- Measure all the catches on the floor on the day and time of sampling. Try and measure from as many different fishermen as time allows.
- Measure catches as fork length (FL) to the nearest whole cm below true length.



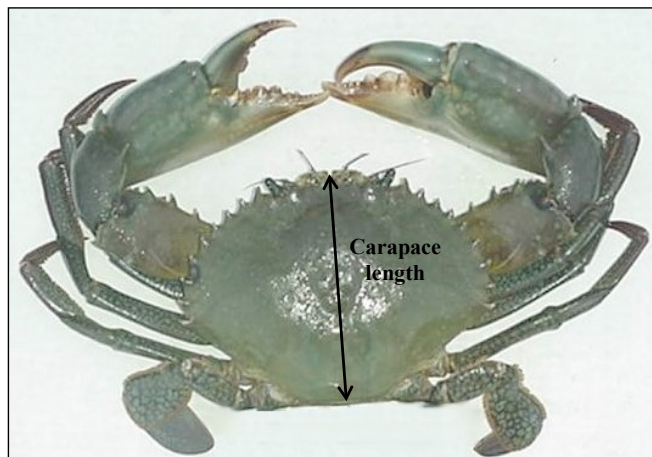
Mud crab (*Scylla serrata*)

Sample days

- 4 days per month

Lengths required

- Measure all crabs on the floor on the day of sampling.
- Measure as carapace length (CL) to the nearest whole millimetre below true length with calipers (see diagram below for CL measurement).
- A separate length frequency needs to be recorded for each sex, maturity AND grade (A, B or C).
- Please use the crab-specific data sheet for mud crabs



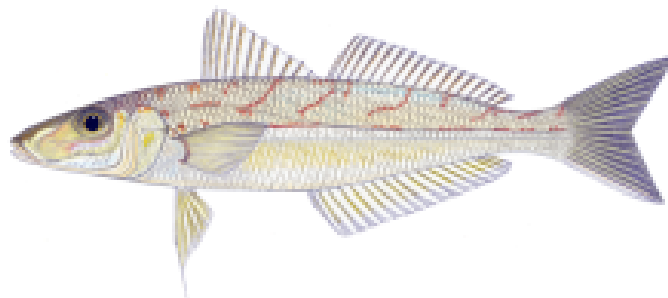
Eastern School/Stout Whiting (*Sillago flindersi* and *Sillago robusta*)

Sample days

- 1 day per month

Lengths required

- Measure from export box and record species split and length frequencies.
- Measure catches as fork length (FL) to the nearest whole cm below true length.



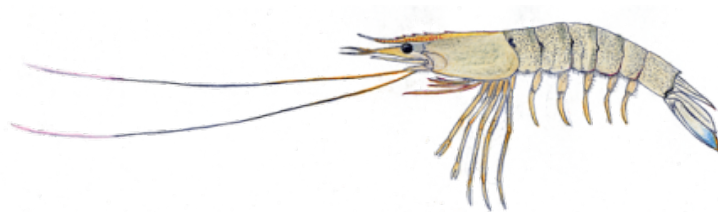
School Prawn (*Metapenaeus macleayi*)

Sample days

- 3 days/month

Lengths required

- 3 catches per day, at least 50 prawns per grade. Sample from each grade in a catch.
- The following data needs to be recorded for each individual prawn measured within a sample: Sex (male or female) and Carapace length (to the nearest 0.1 cm).
- Can purchase 0.5kg and process in the lab if time is limited in the co-op.



How to measure prawns

The length of prawns is expressed as a carapace length. The carapace length is measured as the length in a straight line from the base of the eye orbit (or eye socket) to the center of the posterior margin of the carapace (i.e. the back of the carapace), as shown in Figure 1. Carapace length is measured in millimeters (mm).

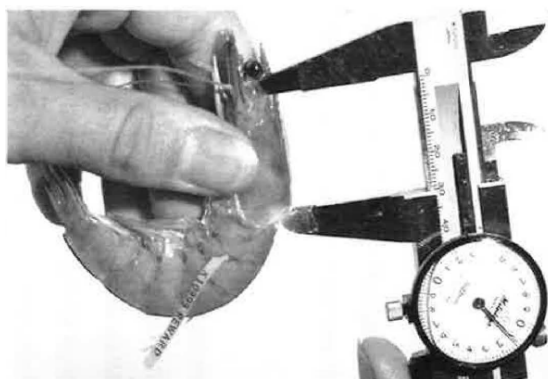


Figure 1. Carapace length of a prawn being measured using calipers. Note the locations of the caliper jaws at the back of the eye socket and back of the carapace.

How to determine sex

A prawn's gender can be determined by examining its genitalia:

- **Male prawns** are identified by a copulatory organ (petasma) between the first pair of swimming legs (see Figure 2);

- **Female prawns** have identical swimming legs and no organ between the foremost pair. Rather, females have a thelycum between the fifth pair of walking legs which provides an anchor site for the male sperm packet received during copulation (see Figure 2).

Males and females can therefore be separated on the presence or absence of a petasma between the first pair of swimming legs and the presence or absence of a thelycum between the last pair of walking legs.

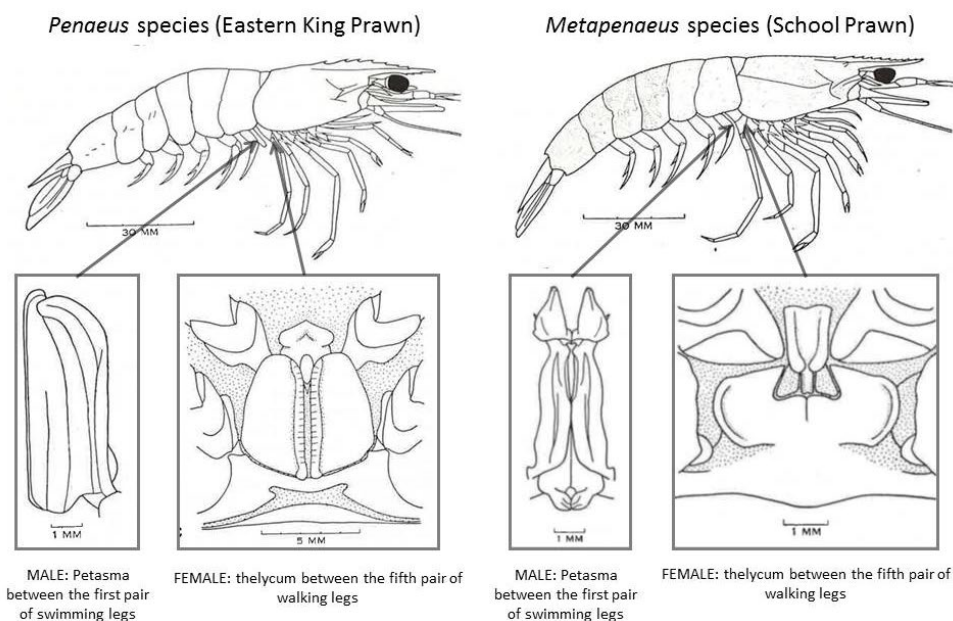


Figure 2. Idealized diagram of prawn copulatory organs for sex identification (pictures from Dall *et al.* 1990).

EQUIPMENT & PROCEDURES

Contact details

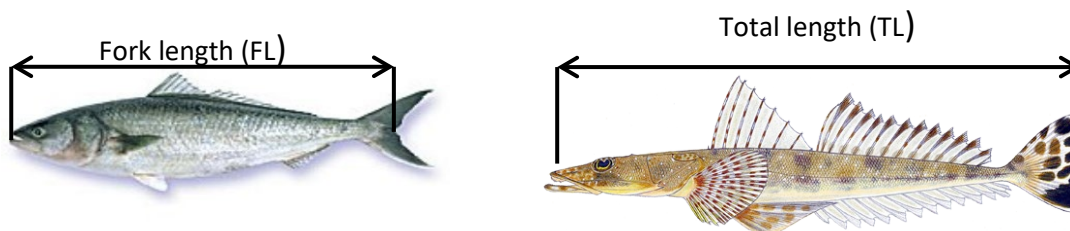
For sending log sheets, datasheets, otoliths or if any equipment needs to be replaced, please contact us via the following details:

Anne-Marie Hegarty/Caitlin Young
NSW Fisheries
Sydney Institute of Marine Science
Bldg 19 Chowder Bay Road, Mosman, 2088, NSW
Ph. (02) 9435 468
Anne-Marie: 0416 289 042 and Caitlin: 0439 497 924
Fax (02) 9527 8459
Email: anne-marie.hegarty@dpi.nsw.gov.au or caitlin.young@dpi.nsw.gov.au

Or John Stewart on 9435 4668

Sampling Procedures – General

- ❑ Catches sampled should be ungraded (or graded as one size only) to reduce any bias.
- ❑ If sub-sampling is required be careful to sample from each size grade (unless specified otherwise in species protocol). If any size grade is unable to be sampled (eg. if a buyer takes all boxes from one of the grades during the time you are sampling) discontinue sampling this catch or **do not sample this catch** at all i.e. **all grades need to be sampled**. If all grades are not sampled the data is unusable unless there is a component of the catch that is ungraded. If this is the case then measure all of the ungraded portion of the catch and indicate on the data sheet that the other size grades existed.
- ❑ When sub-sampling, each grade must be recorded separately on datasheets. The weight of the fish sampled and the total weight of the grade need to be recorded ('sampled' and 'out of' respectively). Don't use the total catch weight – this may be written in the notes area as extra information
- ❑ Samples can be taken from single or multiple catches depending on the quantity available.
- ❑ If the entire sample is taken from a single catch then try to sample a different fisher during the next sample period to reduce bias (although not essential).
- ❑ If multiple catches of a species is sampled then the data from each fisher is to be kept separate.
- ❑ All fish are to be measured to the nearest 1 cm below actual fork length (FL) or (TL) if the species has no fork length, eg. If the FL = 40.8cm it should be recorded as 40cm.



- ❑ Use a pencil to scribe length marks on the measuring board, using any method you find easiest to interpret later.
- ❑ Ensure datasheet (completed in pencil) is correctly labelled/completed.
- ❑ Transcribe data from the measuring board(s) to the datasheet(s) as early as possible to minimise any mistakes or confusion in regards to markings.
- ❑ After measuring, return the fish/invertebrate to the box with care. If the box was packed in a certain way then it must be re-packed exactly the same.

Otolith sampling procedures

- ❑ All data for these fish are collected separate from length frequency data.
- ❑ If the fish are whole then they must be purchased before removing the otoliths – see ‘Purchasing fish samples’ and ‘Resale of fish’ below for further details. When purchasing fish from multiple catches, complete each transaction separately. Don’t mix fish from different catches.
- ❑ If the fish are gilled and gutted the otoliths can be removed without purchasing. Approval must be given by Co-op staff to do this. Once otoliths are removed make sure that all sharp parts such as bone fragments are removed from the fish and that the fish does not appear damaged in any way. If all is in order, return the fish to the box and to the floor/cool room.
- ❑ If, for example, 20 otoliths are required each month then take 10 otoliths from two different catches/sample days. If measuring approx. 100 fish, set every 10th fish aside (after measuring to the nearest whole cm below true length and recording on length frequency datasheet).
- ❑ Fish set aside need their FL or TL (if no fork) re-measured prior to otoliths being removed (to the nearest 0.1cm – not the nearest whole cm) and recorded on the measuring board (or Biological Data Sheet). Otoliths should be placed in an ice-tray for storage prior to cleaning.
- ❑ Otolith condition:
 - Whole otoliths are required for the next stage of processing.
 - If you have badly broken both otoliths for a fish, record this on the envelope and datasheet and place in envelope as normal. Please then take otoliths from an additional fish eg. you will then have 11 otolith samples instead of 10 (spare blank envelopes are provided for extra monthly otolith samples).
 - If only one otolith is present, please note on the envelope.
 - Otoliths **MUST** be sent as soon as collected so that they can be checked by NSW DPI staff and if necessary extra fish can be sampled for that month as replacements.
- ❑ If practical, remove gill and guts of fish for resale (dispose of in an appropriate manner).
- ❑ Fish not for resale need to be disposed of in an appropriate manner such as disposal at the Co-op – see staff for procedure and location of bin.
- ❑ Before transferring otoliths to envelopes write any information including the date to prevent breakage.
- ❑ After all otoliths have been removed, clean with water and store in labelled envelopes (don’t seal it down) Label the otolith envelopes with the species field code on the bottom left hand corner of each envelope. Record the corresponding field code in the notes column on the biological datasheet.

Data Sheets

Length Frequency Data Sheet (for finfish species)

The items underlined **MUST be completed.**

- Species
- Biological samples taken? Y / N – Yes, if fish put aside for otolith sample. No, if otolith sample is not taken from this sample.
- Date caught
- Location - where the fish were caught including whether caught in an estuary or ocean.
- Fisher – name of fisher who caught the fish
- Method used to catch the species (see Method list at the end of this document).
- Process - write any process here such as whole, frozen, etc (see SFM process list at the end of this document).
- Disposal – the location that the sample was processed (eg. Ballina Fishermen's Coop).
- Processed by – the individual processing the sample.
- Notes – any comments.
- Sample weight (kg) – weight of all fish measured.
- Out of - Total catch (or grade) weight (kg) – total weight of the catch the sample was taken from if the catch was of one grade only or ungraded OR total weight of the grade sampled.
- Size grade – eg. ungraded, small, medium, large or x-large (see SFM Size Codes list at the end of this document).

Crab-specific length frequency datasheet

- ❑ The catch information on this data sheet is the same as that on the Length Frequency Data Sheet (for finfish species).
- ❑ Record a length frequency for each sex and maturity (i.e. immature and mature for both males and females) – there are heading fields allocated for this information.

Biological Data Sheet

- ❑ The catch information needed on the Biological Data Sheet is the same as that on the Length Frequency Data Sheet.
- ❑ The biological information required is species specific. Refer to individual species protocols.
 - MetricID – leave blank.
 - Fish # – this is a number to identify each fish – Each monthly sample should start at 1 and increase by 1.
 - Grade – this is the size grading of the fish – X-small, small, medium, large, X-large, or ungraded – see SFM size codes at the end of this document for abbreviations/codes.
 - Sex – from examining gonad – male (M), female (F), juvenile (J), juvenile/male (JM), juvenile/female (JF), hermaphrodite (H) or unknown (U). **Leave blank unless specified in species protocol.**
 - Length - FL – fork length in cm (to the nearest 0.1 cm).
 - Length - TL – Leave blank unless specified in species protocol.
 - Body weight (g) – whole weight in grams (to the nearest 0.1 g if have electronic scales – leave blank unless specified in species protocol).
 - Gonad weight (g) – leave blank unless specified in protocol.
 - Gonad stage – leave blank unless specified in protocol.
 - EnvelopeID – **leave blank.**
 - Notes – Field code and comments.

Occupational Health & Safety Guidelines

Fisheries staff or volunteers required to work at Fishermen's Co-operatives as part of their duties should at all times follow the procedures outlined below.

- ❑ Always comply with the policies issued by the SFM/Fish Co-op/business for personnel visiting or working, including any instructions given by their staff.
- ❑ Staff should have with them at all times the appropriate equipment to fulfil the OH&S requirements of NSW DPI and the Food Safe guidelines.

When on these premises the following must be worn:

- Protective clothing i.e. Overalls and/or plastic apron
- Protective footwear with non-slip soles
- Head covering i.e. Cap
- Clothing suitable for the cold temperatures
- When handling product – gloves

A first aid kit must be available at all times when working.

- ❑ At all times be aware of your surroundings, minimise risks to your health and safety as well as those people around you – at no time place market, co-operative staff, fishers or other personnel at risk with your operations.

If a staff member feels at any time that the work they are doing is compromising their health and safety they must cease those duties and notify their supervisor immediately. Duty of care is the responsibility of the individual and the manager.

Safe Food Handling Guidelines

Persons should be fully aware that the product held at fish receivers is for public consumption and therefore safe food handling vigilance is required at all times when entering or working on these premises. The following guidelines should be adhered to:

Personal hygiene

- Wash and dry hands thoroughly before handling product (even if using gloves).
- Do not enter premises if suffering from any illness with symptoms of fever, vomiting, diarrhoea or advised by GP not to handle food.
- Extra precautions must be taken if have any infections/cuts on hands, arms or face, or have discharge from nose, eyes or ears, including sufficient coverings (e.g. bandages, mask) to prevent contamination or taking medications to minimise symptoms. If possible do not work when in this condition.

Contamination prevention

- All contact surfaces (bench, measuring boards, gloves, stationary items etc) must be cleaned prior to touching product and regularly during task.
- Only food-safe cleaning products to be used and items rinsed thoroughly to remove any residue.
- At no time should hazardous substances or contaminated equipment come in contact with product, this includes being used in areas where product may move through.

Temperature control

- Product must be kept cold at all times
 - Leave in cold storage until needed
 - Ice workbench under product
 - Return ice to fish boxes and top-up if not sufficient
- Minimise handling times.

Remember that product being handled is sold for human consumption and must be treated safely to prevent any risk to health.

Wallis Lake co-op protocols 2017/18

Wallis Lake co-op

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Sampling schedule

2017/18	Wallis Lake
Grey morwong	4 days/month
Giant Mud Crab	4 days/month
Blue swimmer crab	4 days/month
School Prawn	3 days/month
Yellowfin Bream	4 days/month
Mulloway	4 days/month

SAMPLING PROTOCOLS

Mulloway (*Argyrosomus japonicus*)

Sample days

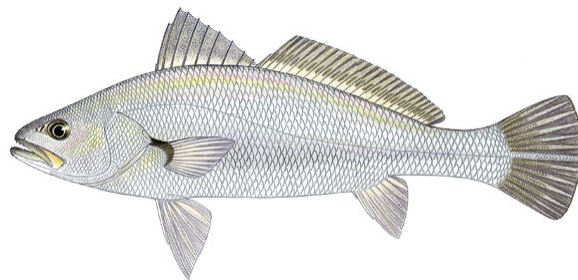
- 4 days/month

Lengths required

- Measure all the catches of mulloway on the floor on the day of sampling.
- Measure catches as total length (TL) to the nearest whole cm below true length.

Otoliths required

- From 1st January 2018, collect mulloway otoliths for DJ's project.



Yellowfin bream (*Acanthopagrus australis*)

Sample days

- 4 days/month

Otoliths required

- 20 otoliths per catch taken proportionately from each grade. Total of 40 otoliths per month.
- Collect fork length (0.1 cm), body weight (0.1g), sex, gonad stage, gonad weight (0.1g) and otoliths (start field code **CR-Aa1**)

Lengths required

- Measure all the catches on the floor on the day and time of sampling. Try and measure from as many different fishermen as time allows.
- Measure catches as fork length (FL) to the nearest whole cm below true length.



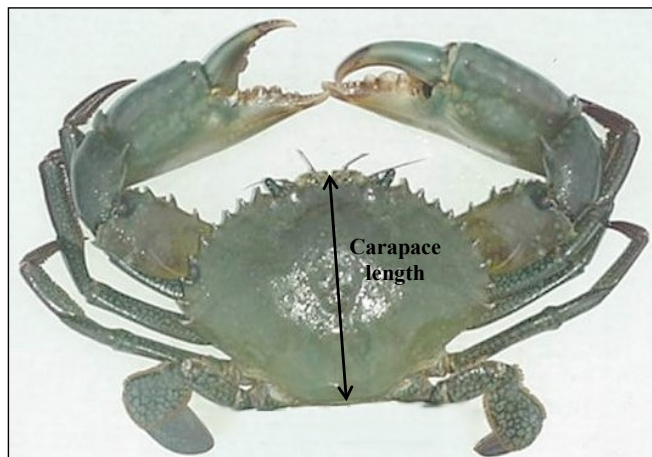
Mud crab (*Scylla serrata*)

Sample days

- 4 days per month

Lengths required

- Measure all crabs on the floor on the day of sampling.
- Measure as carapace length (CL) to the nearest whole millimetre below true length with calipers (see diagram below for CL measurement).
- A separate length frequency needs to be recorded for each sex, maturity AND grade (A, B or C).
- Please use the crab-specific data sheet for mud crabs



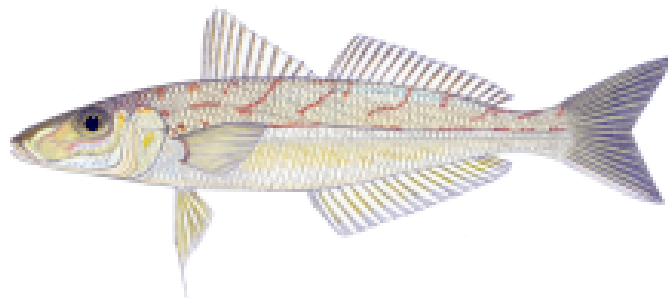
Eastern School/Stout Whiting (*Sillago flindersi* and *Sillago robusta*)

Sample days

- 1 day per month

Lengths required

- Measure from export box and record species split and length frequencies.
- Measure catches as fork length (FL) to the nearest whole cm below true length.



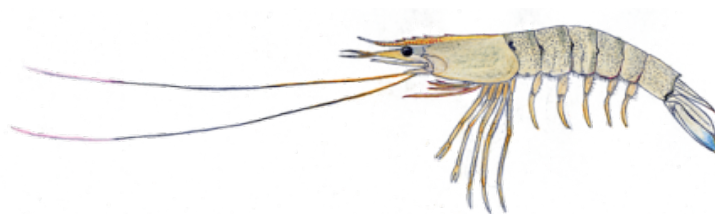
School Prawn (*Metapenaeus macleayi*)

Sample days

- 3 days/month

Lengths required

- 3 catches per day, at least 50 prawns per grade. Sample from each grade in a catch.
- The following data needs to be recorded for each individual prawn measured within a sample:
Sex (male or female) and Carapace length (to the nearest 0.1 cm).
- Can purchase 0.5kg and process in the lab if time is limited in the co-op.



How to measure prawns

The length of prawns is expressed as a carapace length. The carapace length is measured as the length in a straight line from the base of the eye orbit (or eye socket) to the center of the posterior margin of the carapace (i.e. the back of the carapace), as shown in Figure 1. Carapace length is measured in millimeters (mm).

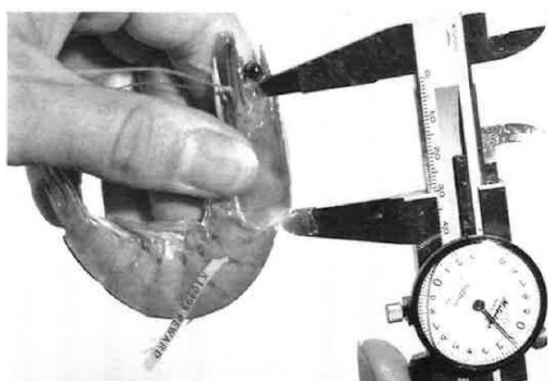


Figure 1. Carapace length of a prawn being measured using calipers. Note the locations of the caliper jaws at the back of the eye socket and back of the carapace.

How to determine sex

A prawn's gender can be determined by examining its genitalia:

- **Male prawns** are identified by a copulatory organ (petasma) between the first pair of swimming legs (see Figure 2);

- **Female prawns** have identical swimming legs and no organ between the foremost pair. Rather, females have a thelycum between the fifth pair of walking legs which provides an anchor site for the male sperm packet received during copulation (see Figure 2).

Males and females can therefore be separated on the presence or absence of a petasma between the first pair of swimming legs and the presence or absence of a thelycum between the last pair of walking legs.

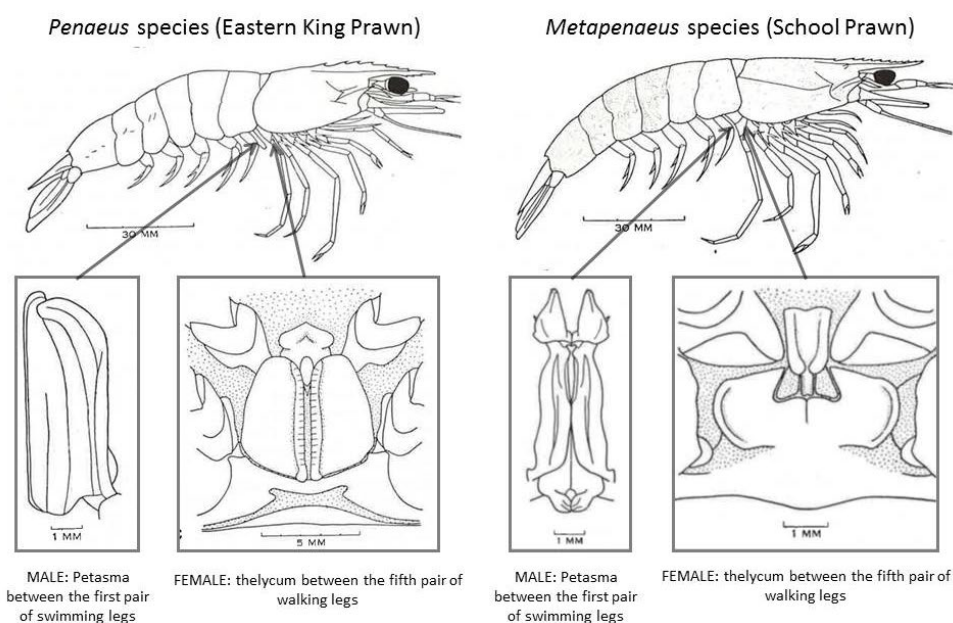


Figure 2. Idealized diagram of prawn copulatory organs for sex identification (pictures from Dall *et al.* 1990).

EQUIPMENT & PROCEDURES

Contact details

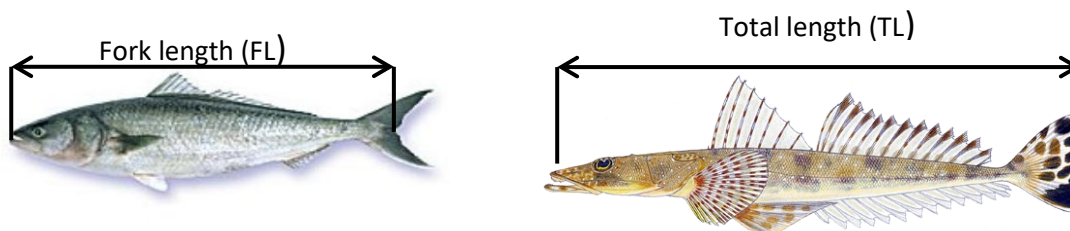
For sending log sheets, datasheets, otoliths or if any equipment needs to be replaced, please contact us via the following details:

Anne-Marie Hegarty/Caitlin Young
NSW Fisheries
Sydney Institute of Marine Science
Bldg 19 Chowder Bay Road, Mosman, 2088, NSW
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Anne-Marie: 0416289042 (A-M) and Caitlin: 0439 497 924
Fax (02) 9527 8459
Email: anne-marie.hegarty@dpi.nsw.gov.au or caitlin.young@dpi.nsw.gov.au

Or John Stewart on 9435 4668

Sampling Procedures – General

- ❑ Catches sampled should be ungraded (or graded as one size only) to reduce any bias.
- ❑ If sub-sampling is required be careful to sample from each size grade (unless specified otherwise in species protocol). If any size grade is unable to be sampled (eg. if a buyer takes all boxes from one of the grades during the time you are sampling) discontinue sampling this catch or **do not sample this catch** at all i.e. **all grades need to be sampled**. If all grades are not sampled the data is unusable unless there is a component of the catch that is ungraded. If this is the case then measure all of the ungraded portion of the catch and indicate on the data sheet that the other size grades existed.
- ❑ When sub-sampling, each grade must be recorded separately on datasheets. The weight of the fish sampled and the total weight of the grade need to be recorded ('sampled' and 'out of' respectively). Don't use the total catch weight – this may be written in the notes area as extra information
- ❑ Samples can be taken from single or multiple catches depending on the quantity available.
- ❑ If the entire sample is taken from a single catch then try to sample a different fisher during the next sample period to reduce bias (although not essential).
- ❑ If multiple catches of a species is sampled then the data from each fisher is to be kept separate.
- ❑ All fish are to be measured to the nearest 1 cm below actual fork length (FL) or (TL) if the species has no fork length, eg. If the FL = 40.8cm it should be recorded as 40cm.



- ❑ Use a pencil to scribe length marks on the measuring board, using any method you find easiest to interpret later.
- ❑ Ensure datasheet (completed in pencil) is correctly labelled/completed.
- ❑ Transcribe data from the measuring board(s) to the datasheet(s) as early as possible to minimise any mistakes or confusion in regards to markings.
- ❑ After measuring, return the fish/invertebrate to the box with care. If the box was packed in a certain way then it must be re-packed exactly the same.

Otolith sampling procedures

- ❑ All data for these fish are collected separate from length frequency data.
- ❑ If the fish are whole then they must be purchased before removing the otoliths – see ‘Purchasing fish samples’ and ‘Resale of fish’ below for further details. When purchasing fish from multiple catches, complete each transaction separately. Don’t mix fish from different catches.
- ❑ If the fish are gilled and gutted the otoliths can be removed without purchasing. Approval must be given by Co-op staff to do this. Once otoliths are removed make sure that all sharp parts such as bone fragments are removed from the fish and that the fish does not appear damaged in any way. If all is in order, return the fish to the box and to the floor/cool room.
- ❑ If, for example, 20 otoliths are required each month then take 10 otoliths from two different catches/sample days. If measuring approx. 100 fish, set every 10th fish aside (after measuring to the nearest whole cm below true length and recording on length frequency datasheet).
- ❑ Fish set aside need their FL or TL (if no fork) re-measured prior to otoliths being removed (to the nearest 0.1cm – not the nearest whole cm) and recorded on the measuring board (or Biological Data Sheet). Otoliths should be placed in an ice-tray for storage prior to cleaning.
- ❑ Otolith condition:
 - Whole otoliths are required for the next stage of processing.
 - If you have badly broken both otoliths for a fish, record this on the envelope and datasheet and place in envelope as normal. Please then take otoliths from an additional fish eg. you will then have 11 otolith samples instead of 10 (spare blank envelopes are provided for extra monthly otolith samples).
 - If only one otolith is present, please note on the envelope.
 - Otoliths **MUST** be sent as soon as collected so that they can be checked by NSW DPI staff and if necessary extra fish can be sampled for that month as replacements.
- ❑ If practical, remove gill and guts of fish for resale (dispose of in an appropriate manner).
- ❑ Fish not for resale need to be disposed of in an appropriate manner such as disposal at the Co-op – see staff for procedure and location of bin.
- ❑ Before transferring otoliths to envelopes write any information including the date to prevent breakage.
- ❑ After all otoliths have been removed, clean with water and store in labelled envelopes (don’t seal it down) Label the otolith envelopes with the species field code on the bottom left hand corner of each envelope. Record the corresponding field code in the notes column on the biological datasheet.

Data Sheets

Length Frequency Data Sheet (for finfish species)

The items underlined **MUST be completed.**

- Species
- Biological samples taken? Y / N – Yes, if fish put aside for otolith sample. No, if otolith sample is not taken from this sample.
- Date caught
- Location - where the fish were caught including whether caught in an estuary or ocean.
- Fisher – name of fisher who caught the fish
- Method used to catch the species (see Method list at the end of this document).
- Process - write any process here such as whole, frozen, etc (see SFM process list at the end of this document).
- Disposal – the location that the sample was processed (eg. Ballina Fishermen's Coop).
- Processed by – the individual processing the sample.
- Notes – any comments.
- Sample weight (kg) – weight of all fish measured.
- Out of - Total catch (or grade) weight (kg) – total weight of the catch the sample was taken from if the catch was of one grade only or ungraded OR total weight of the grade sampled.
- Size grade – eg. ungraded, small, medium, large or x-large (see SFM Size Codes list at the end of this document).

Crab-specific length frequency datasheet

- ❑ The catch information on this data sheet is the same as that on the Length Frequency Data Sheet (for finfish species).
- ❑ Record a length frequency for each sex and maturity (i.e. immature and mature for both males and females) – there are heading fields allocated for this information.

Biological Data Sheet

- ❑ The catch information needed on the Biological Data Sheet is the same as that on the Length Frequency Data Sheet.
- ❑ The biological information required is species specific. Refer to individual species protocols.
 - MetricID – leave blank.
 - Fish # – this is a number to identify each fish – Each monthly sample should start at 1 and increase by 1.
 - Grade – this is the size grading of the fish – X-small, small, medium, large, X-large, or ungraded – see SFM size codes at the end of this document for abbreviations/codes.
 - Sex – from examining gonad – male (M), female (F), juvenile (J), juvenile/male (JM), juvenile/female (JF), hermaphrodite (H) or unknown (U). **Leave blank unless specified in species protocol.**
 - Length - FL – fork length in cm (to the nearest 0.1 cm).
 - Length - TL – Leave blank unless specified in species protocol.
 - Body weight (g) – whole weight in grams (to the nearest 0.1 g if have electronic scales – leave blank unless specified in species protocol).
 - Gonad weight (g) – leave blank unless specified in protocol.
 - Gonad stage – leave blank unless specified in protocol.
 - EnvelopeID – **leave blank.**
 - Notes – Field code and comments.

Occupational Health & Safety Guidelines

Fisheries staff or volunteers required to work at Fishermen's Co-operatives as part of their duties should at all times follow the procedures outlined below.

- ❑ Always comply with the policies issued by the SFM/Fish Co-op/business for personnel visiting or working, including any instructions given by their staff.
- ❑ Staff should have with them at all times the appropriate equipment to fulfil the OH&S requirements of NSW DPI and the Food Safe guidelines.

When on these premises the following must be worn:

- Protective clothing i.e. Overalls and/or plastic apron
- Protective footwear with non-slip soles
- Head covering i.e. Cap
- Clothing suitable for the cold temperatures
- When handling product – gloves

A first aid kit must be available at all times when working.

- ❑ At all times be aware of your surroundings, minimise risks to your health and safety as well as those people around you – at no time place market, co-operative staff, fishers or other personnel at risk with your operations.

If a staff member feels at any time that the work they are doing is compromising their health and safety they must cease those duties and notify their supervisor immediately. Duty of care is the responsibility of the individual and the manager.

Safe Food Handling Guidelines

Persons should be fully aware that the product held at fish receivers is for public consumption and therefore safe food handling vigilance is required at all times when entering or working on these premises. The following guidelines should be adhered to:

Personal hygiene

- Wash and dry hands thoroughly before handling product (even if using gloves).
- Do not enter premises if suffering from any illness with symptoms of fever, vomiting, diarrhoea or advised by GP not to handle food.
- Extra precautions must be taken if have any infections/cuts on hands, arms or face, or have discharge from nose, eyes or ears, including sufficient coverings (e.g. bandages, mask) to prevent contamination or taking medications to minimise symptoms. If possible do not work when in this condition.

Contamination prevention

- All contact surfaces (bench, measuring boards, gloves, stationary items etc) must be cleaned prior to touching product and regularly during task.
- Only food-safe cleaning products to be used and items rinsed thoroughly to remove any residue.
- At no time should hazardous substances or contaminated equipment come in contact with product, this includes being used in areas where product may move through.

Temperature control

- Product must be kept cold at all times
 - Leave in cold storage until needed
 - Ice workbench under product
 - Return ice to fish boxes and top-up if not sufficient
- Minimise handling times.

Remember that product being handled is sold for human consumption and must be treated safely to prevent any risk to health.

Newcastle and Nelson Bay co-op protocols 2017/18

Newcastle and Nelson Bay

Sampling Procedures Dec 2017 – June 2018

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Sampling schedule

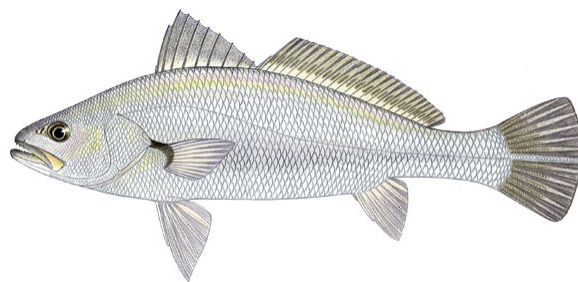
2017/18	Nelsons Bay	Newcastle
Eastern School Whiting		4 days/month
Eastern Sea Garfish	4 days/month 40 otos/month	
Giant Mud Crab		4 days/month
Grey Morwong (OTL fishery)	4 days/month	Opportunistic
Mulloway	Opportunistic	4 days/month
School Prawn		3 days/month
Silver Trevally	Opportunistic	4 days/month
Yellowfin Bream	4 days/month 40 otos/month	

SAMPLING PROTOCOLS

Mulloway (*Argyrosomus japonicus*)

Sample days

- **Nelson Bay** – Opportunistically when available to sample, up to 4 days/month
- **Newcastle** – 4 days/month



Lengths required

- Measure all the catches of mulloway on the floor on the day of sampling.
- Measure catches as total length (TL) to the nearest whole cm below true length.

Yellowfin bream (*Acanthopagrus australis*)

Sample days

- **Nelson Bay** – 4 days/month

Otoliths required

- 20 otoliths per catch taken proportionately from each grade. Total of 40 otoliths per month.
- Collect fork length (0.1 cm), body weight (0.1g), sex, gonad stage, gonad weight (0.1g) and otoliths (start field code **NB-Aa1**)



Lengths required

- Measure all the catches on the floor on the day and time of sampling. Try and measure from as many different fishermen as time allows.
- Measure catches as fork length (FL) to the nearest whole cm below true length.

Grey (rubberlip) morwong (*Nemadactylus douglasii*)

Sample days

- **Nelson Bay** – 4 days/month
- **Newcastle** – opportunistically



Lengths required

- Ocean Trap and Line fishery only
- Measure all the catches of grey morwong on the floor on the day of sampling.
- Measure catches as fork length (FL) to the nearest whole cm below true length.

Sea garfish (*Hyporhamphus australis*)

Sample days

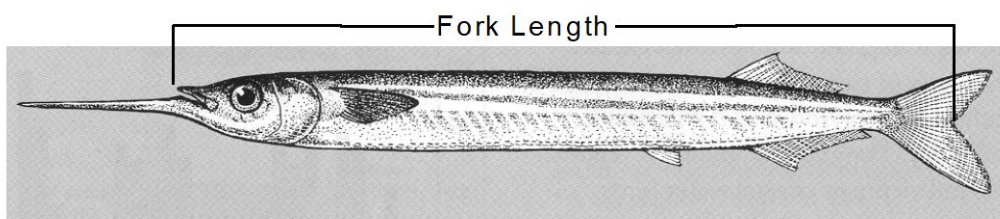
- **Nelsons Bay only** - January 2017 to June 2018
- Opportunistically up to 4 days per month

Lengths required

- Sea garfish are almost always graded by size. Sample from **each grade 80-100 fish** (approx. 3-10kgs depending on size). Make sure you weigh the sub-sample taken from each grade. If whole catch is ungraded then only need to do one sample of 80-100 length measurements
- Measure catches as fork length (FL - from the tip of the top jaw to the fork in the tail – see figure below) to the nearest whole cm below true length.
- You will need to record the total catch weight, total weight of each size grade and the total weight of the fish measured from each size grade.
- Try and measure from as many different fishermen as time allows.

Otoliths required

- 20 otoliths per catch taken proportionately from each grade. Two samples per month= 40



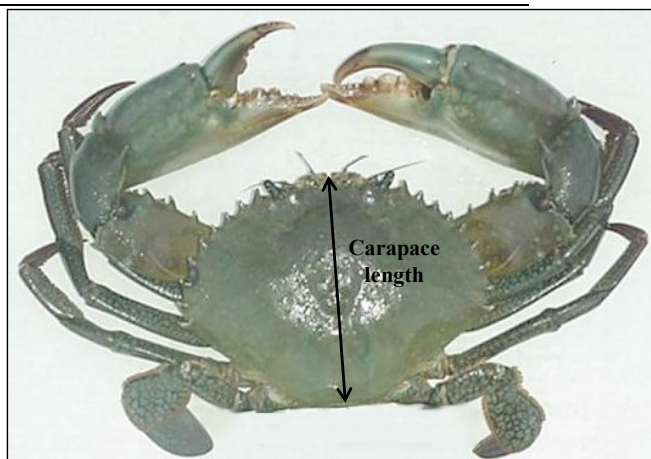
Mud crab (*Scylla serrata*)

Sample days

- **Newcastle** – 4 days per month

Lengths required

- Measure all crabs on the floor on the day of sampling.
- Measure as carapace length (CL) to the nearest whole millimetre below true length with calipers (see diagram below for CL measurement).
- A separate length frequency needs to be recorded for each sex, maturity AND grade (A, B or C).
- Please use the crab-specific data sheet for mud crabs



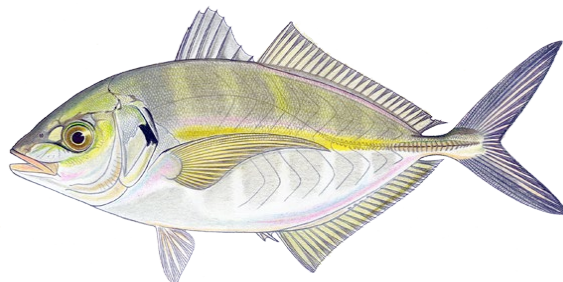
Silver trevally (*Pseudocaranx dentex*)

Sample days

- **Nelson Bay and Newcastle** – Sample opportunistically from both fish trawl and ocean trap and line.
- Up to 4 days per month

Lengths required

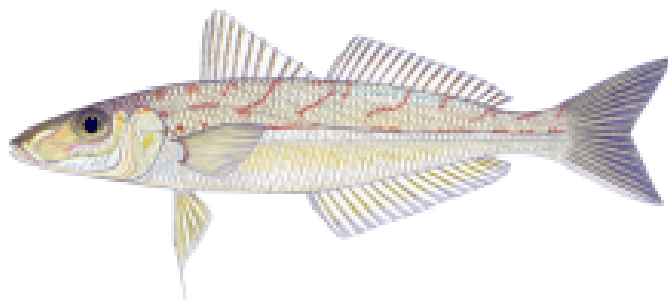
- Measure all the catches of silver trevally on the floor on the day of sampling.
- Measure catches as fork length (FL) to the nearest whole cm below true length.



Eastern School Whiting (*Sillago flindersi*)

Sample days

- **Newcastle**– 4 days per month



Lengths required

- Measure all the catches of eastern school whiting on the floor on the day of sampling. Fish trawl only.
- Sub-sampling may be required for large catches. . Try and measure from as many different fishermen as time allows.
- Measure catches as fork length (FL) to the nearest whole cm below true length.

School Prawn (*Metapenaeus macleayi*)

Sample days

- **Newcastle only**– Dec 2017- June 2018
- 3 days/month



Lengths required

- 3 catches per day, at least 50 prawns per grade. Sample from each grade in a catch.
- The following data needs to be recorded for each individual prawn measured within a sample: Sex (male or female) and Carapace length (to the nearest 0.1 cm).
- Can purchase 0.5kg and process in the lab if time is limited in the co-op.

How to measure prawns

The length of prawns is expressed as a carapace length. The carapace length is measured as the length in a straight line from the base of the eye orbit (or eye socket) to the center of the posterior margin of the

carapace (i.e. the back of the carapace), as shown in Figure 1. Carapace length is measured in millimeters (mm).

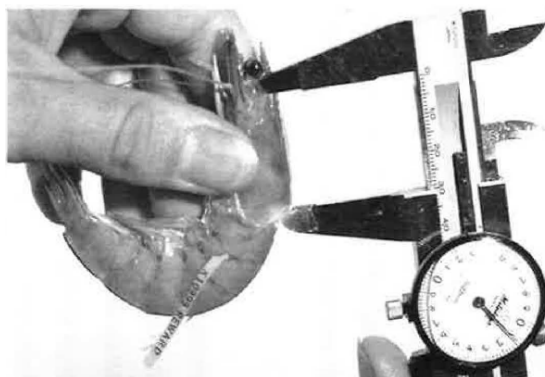


Figure 1. Carapace length of a prawn being measured using calipers. Note the locations of the caliper jaws at the back of the eye socket and back of the carapace.

How to determine sex

A prawn's gender can be determined by examining its genitalia:

- **Male prawns** are identified by a copulatory organ (petasma) between the first pair of swimming legs (see Figure 2);
- **Female prawns** have identical swimming legs and no organ between the foremost pair. Rather, females have a thelycum between the fifth pair of walking legs which provides an anchor site for the male sperm packet received during copulation (see Figure 2).

Males and females can therefore be separated on the presence or absence of a petasma between the first pair of swimming legs and the presence or absence of a thelycum between the last pair of walking legs.

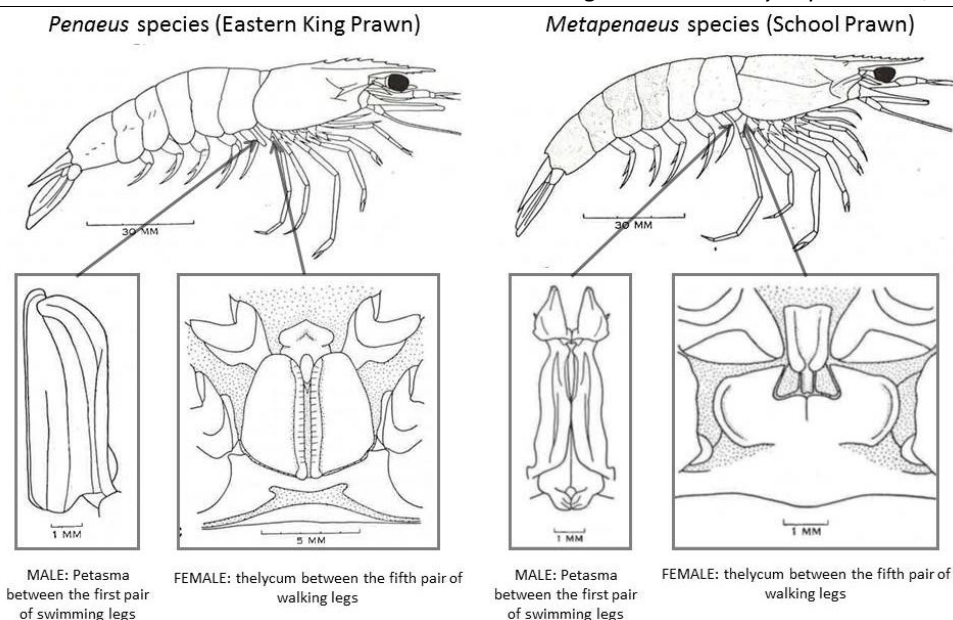


Figure 2. Idealized diagram of prawn copulatory organs for sex identification (pictures from Dall *et al.* 1990).

EQUIPMENT & PROCEDURES

Contact details

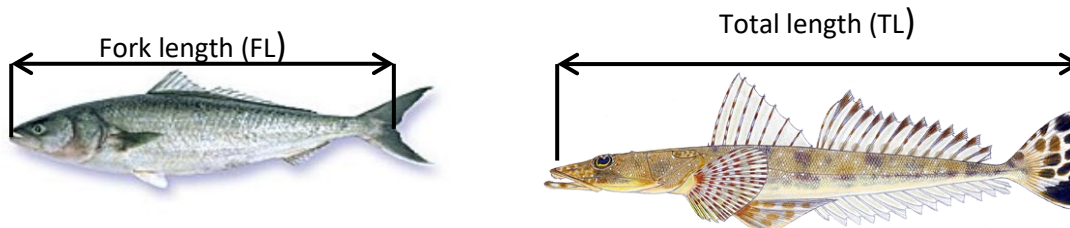
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Anne-Marie Hegarty/Caitlin Young
 NSW Fisheries
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 Bldg 19 Chowder Bay Road, Mosman, 2088, NSW
 Ph. (02) 9435 468
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 Fax (02) 9527 8459
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Or John Stewart on 9435 4668

Sampling Procedures – General

- ❑ Catches sampled should be ungraded (or graded as one size only) to reduce any bias.
- ❑ If sub-sampling is required be careful to sample from each size grade (unless specified otherwise in species protocol). If any size grade is unable to be sampled (eg. if a buyer takes all boxes from one of the grades during the time you are sampling) discontinue sampling this catch or **do not sample this catch** at all i.e. **all grades need to be sampled**. If all grades are not sampled the data is unusable unless there is a component of the catch that is ungraded. If this is the case then measure all of the ungraded portion of the catch and indicate on the data sheet that the other size grades existed.
- ❑ When sub-sampling, each grade must be recorded separately on datasheets. The weight of the fish sampled and the total weight of the grade need to be recorded ('sampled' and 'out of' respectively). Don't use the total catch weight – this may be written in the notes area as extra information
- ❑ Samples can be taken from single or multiple catches depending on the quantity available.
- ❑ If the entire sample is taken from a single catch then try to sample a different fisher during the next sample period to reduce bias (although not essential).
- ❑ If multiple catches of a species is sampled then the data from each fisher is to be kept separate.
- ❑ All fish are to be measured to the nearest 1 cm below actual fork length (FL) or (TL) if the species has no fork length, eg. If the FL = 40.8cm it should be recorded as 40cm.



- ❑ Use a pencil to scribe length marks on the measuring board, using any method you find easiest to interpret later.
- ❑ Ensure datasheet (completed in pencil) is correctly labelled/completed.
- ❑ Transcribe data from the measuring board(s) to the datasheet(s) as early as possible to minimise any mistakes or confusion in regards to markings.
- ❑ After measuring, return the fish/invertebrate to the box with care. If the box was packed in a certain way then it must be re-packed exactly the same.

Otolith sampling procedures

- ❑ All data for these fish are collected separate from length frequency data.
- ❑ If the fish are whole then they must be purchased before removing the otoliths – see ‘Purchasing fish samples’ and ‘Resale of fish’ below for further details. When purchasing fish from multiple catches, complete each transaction separately. Don’t mix fish from different catches.
- ❑ If the fish are gilled and gutted the otoliths can be removed without purchasing. Approval must be given by Co-op staff to do this. Once otoliths are removed make sure that all sharp parts such as bone fragments are removed from the fish and that the fish does not appear damaged in any way. If all is in order, return the fish to the box and to the floor/cool room.
- ❑ If, for example, 20 otoliths are required each month then take 10 otoliths from two different catches/sample days. If measuring approx. 100 fish, set every 10th fish aside (after measuring to the nearest whole cm below true length and recording on length frequency datasheet).
- ❑ Fish set aside need their FL or TL (if no fork) re-measured prior to otoliths being removed (to the nearest 0.1cm – not the nearest whole cm) and recorded on the measuring board (or Biological Data Sheet). Otoliths should be placed in an ice-tray for storage prior to cleaning.
- ❑ Otolith condition:
 - Whole otoliths are required for the next stage of processing.
 - If you have badly broken both otoliths for a fish, record this on the envelope and datasheet and place in envelope as normal. Please then take otoliths from an additional fish eg. you will then have 11 otolith samples instead of 10 (spare blank envelopes are provided for extra monthly otolith samples).
 - If only one otolith is present, please note on the envelope.
 - Otoliths **MUST** be sent as soon as collected so that they can be checked by NSW DPI staff and if necessary extra fish can be sampled for that month as replacements.
- ❑ If practical, remove gill and guts of fish for resale (dispose of in an appropriate manner).
- ❑ Fish not for resale need to be disposed of in an appropriate manner such as disposal at the Co-op – see staff for procedure and location of bin.
- ❑ Before transferring otoliths to envelopes write any information including the date to prevent breakage.
- ❑ After all otoliths have been removed, clean with water and store in labelled envelopes (don’t seal it down) Label the otolith envelopes with the species field code on the bottom left hand corner of each envelope. Record the corresponding field code in the notes column on the biological datasheet.

Data Sheets

Length Frequency Data Sheet (for finfish species)

The items underlined **MUST be completed.**

- Species
- Biological samples taken? Y / N – Yes, if fish put aside for otolith sample. No, if otolith sample is not taken from this sample.
- Date caught
- Location - where the fish were caught including whether caught in an estuary or ocean.
- Fisher – name of fisher who caught the fish
- Method used to catch the species (see Method list at the end of this document).
- Process - write any process here such as whole, frozen, etc (see SFM process list at the end of this document).
- Disposal – the location that the sample was processed (eg. Ballina Fishermen's Coop).
- Processed by – the individual processing the sample.
- Notes – any comments.
- Sample weight (kg) – weight of all fish measured.
- Out of - Total catch (or grade) weight (kg) – total weight of the catch the sample was taken from if the catch was of one grade only or ungraded OR total weight of the grade sampled.
- Size grade – eg. ungraded, small, medium, large or x-large (see SFM Size Codes list at the end of this document).

Crab-specific length frequency datasheet

- ❑ The catch information on this data sheet is the same as that on the Length Frequency Data Sheet (for finfish species).
- ❑ Record a length frequency for each sex and maturity (i.e. immature and mature for both males and females) – there are heading fields allocated for this information.

Biological Data Sheet

- ❑ The catch information needed on the Biological Data Sheet is the same as that on the Length Frequency Data Sheet.
- ❑ The biological information required is species specific. Refer to individual species protocols.
 - MetricID – leave blank.
 - Fish # – this is a number to identify each fish – Each monthly sample should start at 1 and increase by 1.
 - Grade – this is the size grading of the fish – X-small, small, medium, large, X-large, or ungraded – see SFM size codes at the end of this document for abbreviations/codes.
 - Sex – from examining gonad – male (M), female (F), juvenile (J), juvenile/male (JM), juvenile/female (JF), hermaphrodite (H) or unknown (U). **Leave blank unless specified in species protocol.**
 - Length - FL – fork length in cm (to the nearest 0.1 cm).
 - Length - TL – Leave blank unless specified in species protocol.
 - Body weight (g) – whole weight in grams (to the nearest 0.1 g if have electronic scales – leave blank unless specified in species protocol).
 - Gonad weight (g) – leave blank unless specified in protocol.
 - Gonad stage – leave blank unless specified in protocol.
 - EnvelopeID – **leave blank.**
 - Notes – Field code and comments.

Occupational Health & Safety Guidelines

Fisheries staff or volunteers required to work at Fishermen's Co-operatives as part of their duties should at all times follow the procedures outlined below.

- ❑ Always comply with the policies issued by the SFM/Fish Co-op/business for personnel visiting or working, including any instructions given by their staff.
- ❑ Staff should have with them at all times the appropriate equipment to fulfil the OH&S requirements of NSW DPI and the Food Safe guidelines.

When on these premises the following must be worn:

- Protective clothing i.e. Overalls and/or plastic apron
- Protective footwear with non-slip soles
- Head covering i.e. Cap
- Clothing suitable for the cold temperatures
- When handling product – gloves

A first aid kit must be available at all times when working.

- ❑ At all times be aware of your surroundings, minimise risks to your health and safety as well as those people around you – at no time place market, co-operative staff, fishers or other personnel at risk with your operations.

If a staff member feels at any time that the work they are doing is compromising their health and safety they must cease those duties and notify their supervisor immediately. Duty of care is the responsibility of the individual and the manager.

Safe Food Handling Guidelines

Persons should be fully aware that the product held at fish receivers is for public consumption and therefore safe food handling vigilance is required at all times when entering or working on these premises. The following guidelines should be adhered to:

Personal hygiene

- Wash and dry hands thoroughly before handling product (even if using gloves).
- Do not enter premises if suffering from any illness with symptoms of fever, vomiting, diarrhoea or advised by GP not to handle food.
- Extra precautions must be taken if have any infections/cuts on hands, arms or face, or have discharge from nose, eyes or ears, including sufficient coverings (e.g. bandages, mask) to prevent contamination or taking medications to minimise symptoms. If possible do not work when in this condition.

Contamination prevention

- All contact surfaces (bench, measuring boards, gloves, stationary items etc.) must be cleaned prior to touching product and regularly during task.
- Only food-safe cleaning products to be used and items rinsed thoroughly to remove any residue.
- At no time should hazardous substances or contaminated equipment come in contact with product, this includes being used in areas where product may move through.

Temperature control

- Product must be kept cold at all times
 - Leave in cold storage until needed
 - Ice workbench under product
 - Return ice to fish boxes and top-up if not sufficient
- Minimise handling times.

Remember that product being handled is sold for human consumption and must be treated safely to prevent any risk to health