

The NSW Commercial Fisheries Port Monitoring Program

Data summary report for 2021/22

NSW Department of Primary Industries

6 October 2023

Published by the Department of Regional NSW

Title: The NSW Commercial Fisheries Port Monitoring Program

Subtitle: Data summary report for 2021/22

Department reference number: INT23/ 113456

Stewart, J., Craig, J., Hegarty, A-M., Young, C., Gould, A. and Clain, C. M. 2023. The NSW Commercial Fisheries Port Monitoring Program. Data summary report for 2021/22. NSW Department of Primary Industries - Fisheries: 102 pp.

More information

Dr John Stewart, Fisheries Resource Assessment, Sydney Institute of Marine Science, Mosman. www.dpi.nsw.gov.au

Acknowledgements

© State of New South Wales through Regional NSW [insert year]. You may copy, distribute, display, download and otherwise freely deal with this publication for any purpose, provided that you attribute the Regional NSW as the owner. However, you must obtain permission if you wish to charge others for access to the publication (other than at cost); include the publication in advertising or a product for sale; modify the publication; or republish the publication on a website. You may freely link to the publication on a departmental website.

Disclaimer: The information contained in this publication is based on knowledge and understanding at the time of writing ([Month YYYY]) and may not be accurate, current or complete. The State of New South Wales (including the Regional NSW), the author and the publisher take no responsibility, and will accept no liability, for the accuracy, currency, reliability or correctness of any information included in the document (including material provided by third parties). Readers should make their own inquiries and rely on their own advice when making decisions related to material contained in this publication.

Table of Contents

<i>Data summary report for 2021/22</i>	1
NSW Department of Primary Industries.....	1
<i>Table of Contents</i>	3
Introduction.....	6
Methods.....	7
Process for selection of species to monitor	7
COVID-related impacts on monitoring during 2021/22	8
<i>Australian Bonito</i>	9
STOCK STATUS OVERVIEW (2020)	9
Prioritization and justification.....	9
Aim of the Port Monitoring sampling for 2021/22	9
Sampling design.....	9
Sampling graded catches.....	9
Results	10
Commentary.....	12
<i>Bluespotted Flathead</i>	13
STOCK STATUS OVERVIEW (2020)	13
Prioritization and justification.....	13
Aim of the Port Monitoring sampling for 2021/22	13
Sampling design.....	13
Sampling graded catches.....	13
Results	14
Commentary.....	16
<i>Dusky Flathead</i>	17
STOCK STATUS OVERVIEW (2020)	17
Prioritization and justification.....	17
Aim of the Port Monitoring sampling for 2021/22	17
Sampling design.....	17
Sampling graded catches.....	18
Results	18
Commentary.....	21
<i>Eastern King Prawn</i>	22
STOCK STATUS OVERVIEW (2020)	22
Prioritization and justification.....	22
Aim of the Port Monitoring sampling for 2021/22	22
Sampling design.....	22
Sampling graded catches.....	22
Results	23
Commentary.....	26
<i>Eastern School Prawn</i>	27
STOCK STATUS OVERVIEW (2020)	27

Prioritization and justification.....	27
Aim of the Port Monitoring sampling for 2021/22	27
Sampling design.....	27
Sampling graded catches.....	27
Results	28
Commentary.....	31
<i>Eastern Sea Garfish.....</i>	<i>32</i>
STOCK STATUS OVERVIEW (2020)	32
Prioritization and justification.....	32
Aim of the Port Monitoring sampling for 2021/22	32
Sampling design.....	32
Sampling graded catches.....	33
Results	34
Commentary.....	36
<i>Giant Mud Crab</i>	<i>37</i>
STOCK STATUS OVERVIEW (2020)	37
Prioritization and justification.....	37
Aim of the Port Monitoring sampling for 2021/22	37
Sampling design.....	37
Sampling graded catches.....	37
Results	38
Commentary.....	40
<i>Grey Morwong.....</i>	<i>41</i>
STOCK STATUS OVERVIEW (2020)	41
Prioritization and justification.....	41
Aim of the Port Monitoring sampling for 2021/22	41
Sampling design.....	41
Sampling graded catches.....	41
Results	42
Commentary.....	45
<i>Mulloway.....</i>	<i>46</i>
STOCK STATUS OVERVIEW (2020)	46
Prioritization and justification.....	46
Aim of the Port Monitoring sampling for 2021/22	46
Sampling design.....	46
Sampling graded catches.....	46
Results	47
Commentary.....	50
<i>Pearl Perch.....</i>	<i>51</i>
STOCK STATUS OVERVIEW (2020)	51
Prioritization and justification.....	51
Aim of the Port Monitoring sampling for 2021/22	51

Sampling design.....	51
Sampling graded catches.....	51
Results	52
Commentary.....	54
<i>Sea Mullet</i>	<i>55</i>
STOCK STATUS OVERVIEW (2020)	55
Prioritization and justification.....	55
Aim of the Port Monitoring sampling for 2021/22	55
Sampling design.....	55
Results	56
Commentary.....	58
<i>Silver Trevally</i>	<i>59</i>
STOCK STATUS OVERVIEW (2020)	59
Prioritization and justification.....	59
Aim of the Port Monitoring sampling for 2021/22	59
Sampling design.....	59
Sampling graded catches.....	59
Results	60
Commentary.....	62
<i>Teraglin.....</i>	<i>63</i>
STOCK STATUS OVERVIEW (2020)	63
Prioritization and justification.....	63
Aim of the Port Monitoring sampling for 2021/22	63
Sampling design.....	63
Sampling graded catches.....	63
Results	64
Commentary.....	66
<i>Yellowtail Scad.....</i>	<i>67</i>
STOCK STATUS OVERVIEW (2020)	67
Prioritization and justification.....	67
Aim of the Port Monitoring sampling for 2021/22	67
Sampling design.....	67
Sampling graded catches.....	67
Results	68
Commentary.....	70
<i>Appendices</i>	<i>71</i>
Appendix A -Staff.....	71
Core funded.....	71
Commercial Trust funded	71
Appendix B - Species Priority List 2021/2022.....	72
Appendix C - Dusky Flathead age composition sampling design for 2021/22	73

Introduction

The Port Monitoring Program is a long-term collaboration between the commercial seafood industry (fishers, regional co-operatives and the Sydney Fish Markets) and NSW DPI (Fisheries). Port monitoring of the landed commercial catch has been an important component of fisheries assessments in NSW 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 age composition, 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 national Status of Australian Fish Stocks (SAFS) exploitation status assessments. Monitoring the size and age composition of the commercial catch is also a cost-effective option to insure against deficiencies of commercial catch per unit effort data. In addition to providing essential data for stock assessment and management, the program promotes industry co-ownership of monitoring data and supports the ongoing social licence to fish.

The Port Monitoring Program directly contributes to:

- Stock status assessments in terms of the current composition of, and long-term changes in, the size and age compositions in landings
- Validation of commercial logbook records
- Information on species compositions in species complexes (e.g. the trawl whiting species, Balmain 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
- 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. 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 a source of information for Fisheries Resource Assessment scientists responsible for stock assessment, as well as fisheries managers, industry and interested stakeholders. Review of the performance of the program is essential to maintain confidence in the data collected and to provide an opportunity for the scientists responsible for each species to refine the sampling protocols. The report also proves transparency around expenditure from the Commercial Trust that funds the operating budget and salaries of casual staff.

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 is a collaboration between industry and government. The Sydney Fish Markets and various key places of landing (including the Ballina, Iluka, Maclean, Coffs Harbour, Newcastle and Nelson Bay Fishermen's Co-operatives) allow DPI-Fisheries monitoring staff access to landed catches prior to being sold.

The 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 fisheries scientists primarily responsible for the assessment (species' leads) and/or management. 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/fishing zone are dependent upon the reported commercial landings provided by 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/fishing zone) in order to provide estimates that are representative of the entire fishing fleet in NSW. The Department has developed efficient computing applications to automate these processes. The project has also moved largely to electronic data collection. Electronic measuring boards have made data available in real time and largely removed the need for paper-based records and the associated data entry expense and potential data entry errors.

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 DPI-Fisheries stock assessment scientists. The process utilizes the Species Priority List (SPL) for Resource Assessment (see Appendix B) 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. These requirements being potentially 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 DMP is currently outdated and the SPL is outdated and was not designed specifically to be used for Port Monitoring. 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 being 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.

Fish assessed for age are purchased directly from either the Fishermen's co-operative or the Sydney Fish Markets. Where it is considered cost-effective (e.g. for high value species such as large Snapper and Mulloway), the fish have their otoliths removed and are resold to recoup costs.

Details of the prioritisation and justification, sampling aims, reported landings and sampling data for 2021/22 are presented below for each species separately. Stock status is based on the most

recent SAFS reports (<https://fish.gov.au/>). A brief commentary on how well the sampling met the aims is provided for each species.

COVID-related impacts on monitoring during 2021/22

Risks created by COVID prevented access to the Sydney Fish Markets for four months between July and October 2021. As a result, some species were under-sampled from central and southern areas during this period.

Australian Bonito

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales	Eastern Australia	Sustainable	Depletion estimates, Catch, Catch rates, Size composition, Harvest rates, Mortality

Prioritization and justification

Species Priority Ranking for 2021/22: 45

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring 26

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths – **13**

Rank for ages – **not required**

Aim of the Port Monitoring sampling for 2021/22

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

Sampling design

Length frequency data were collected through Coffs Harbour fishermen's co-op and the Sydney Fish Markets. For each location, all catches from a selected ocean zone that were on the floor on the day of sampling were sampled. Australian Bonito were measured from the tip of the nose to fork length (nearest cm rounding down).

Australian Bonito 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 Australian Bonito catches are graded, generally into XL, L, M, S or U. All grades are sampled from a catch. Approximately 10 times the number of size classes per grade are measured. 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 (kg) heat map of Australian Bonito by month and area during 2021/22.

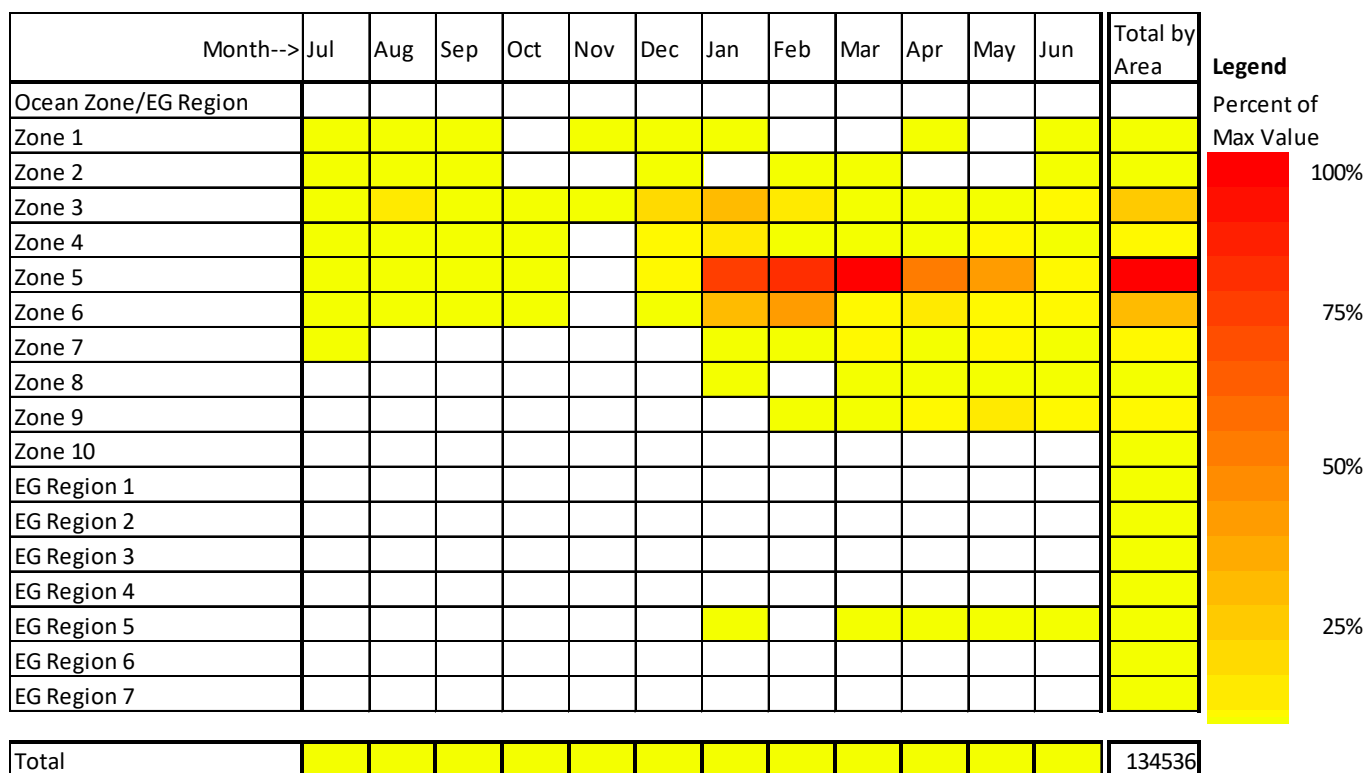


Table 2. The number of days sampled for Australian Bonito by month and area during 2021/22. The shaded heat map represents the reported commercial landings.

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		5	2	5	3	7	3		1			6	32
Zone 4													
Zone 5							2	4	3	2	2	1	14
Zone 6							1	2	2	3	1	2	11
Zone 7									2	2	1		5
Zone 8													
Zone 9											1		1
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)		5	2	5	3	0	7	6	6	8	7	5	63
Total		5	2	5	3	0	7	6	6	8	7	5	63

Table 3. The number of catches sampled for Australian Bonito by month and area during 2021/22. 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 (area known)													89
Total													89

Table 4. The number of Australian Bonito sampled by month and area during 2021/22. The shaded heat map represents the reported commercial landing.

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	208	58	177	50		384	518		2			226	1623
Zone 4													
Zone 5							332	1272	249	491	217	11	2572
Zone 6							348	471	548	543	36	191	2137
Zone 7									121	68	18		207
Zone 8													
Zone 9											70		70
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)	208	58	177	50	0	384	1198	1743	920	1102	341	428	6609
Total	208	58	177	50	0	384	1198	1743	920	1102	341	428	6609

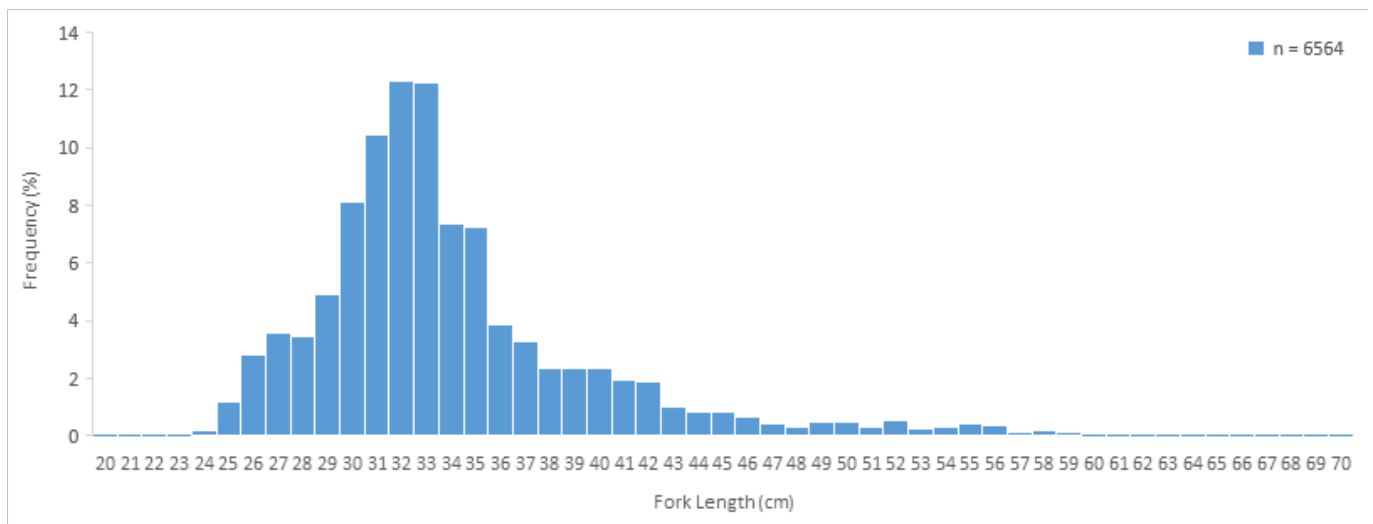


Figure 1. Length composition of Australian Bonito sampled through the Port Monitoring program during 2021/22. Australian Bonito were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES. Number of lengths used to create figure may differ slightly from number of lengths measured due to length rules in PISCES software.

Commentary

Despite the COVID-related limitations of sampling at the Sydney Fish Markets, sampling largely captured the peak times and areas for landings. It is considered that comprehensive sampling of Australian Bonito was achieved during 2021/22.

Bluespotted Flathead

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales	Eastern Australia	Sustainable	Catch, effort, standardised CPUE, length and age compositions, biomass depletion and harvest rate estimates

Prioritization and justification

Species Priority Ranking for 2021/22: **3**

Data and Monitoring Plan for 2021/22

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 – **not required**

Aim of the Port Monitoring sampling for 2021/22

To collect size composition data that are representative of the NSW commercial fishery.

Sampling design

Length frequency data were collected through Maclean/Iluka, Coffs Harbour and the Sydney Fish Markets. For each location, all catches from a selected ocean zone that were on the floor on the day of sampling were sampled. Bluespotted Flathead were measured from the tip of the nose to total length (nearest cm rounding down).

Bluespotted Flathead 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 Bluespotted Flathead catches are graded, generally into XL, L, M, S or U. All grades are sampled from a catch. 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 5. Reported landings (kg) heat map of Bluespotted Flathead by month and area during 2021/22.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area	Legend Percent of Max Value
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													56799.1	

Table 6. The number of days sampled for Bluespotted Flathead by month and area during 2021/22. 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		5	2	3	5	5	4	2	1	2	4	4	3	40
Zone 3		5	2	3	2	4	3	4	3	2	5	3	6	42
Zone 4														
Zone 5									1	2	1		4	
Zone 6						1		1		1	1	1	5	
Zone 7													1	
Zone 8						1					2	2	5	
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)	10	4	6	7	11	7	6	6	6	11	10	13	97	
Total	10	4	6	7	11	7	6	6	6	11	10	13	97	

Table 7. The number of catches sampled for Bluespotted Flathead by month and area during 2021/22. 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 (area known)													138
Total													138

Table 8. The number of fish sampled for Bluespotted Flathead by month and area during 2021/22. 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	372	230	358	404	379	108	78	5	64	72	107	62	2239
Zone 3	113	46	125	50	169	117	281	82	86	157	76	530	1832
Zone 4													
Zone 5								140	75	37			252
Zone 6					196			136		186	170	24	712
Zone 7												49	49
Zone 8					173						398	256	827
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)	485	276	483	454	917	225	359	363	225	452	751	921	5911
Total	485	276	483	454	917	225	359	363	225	452	751	921	5911

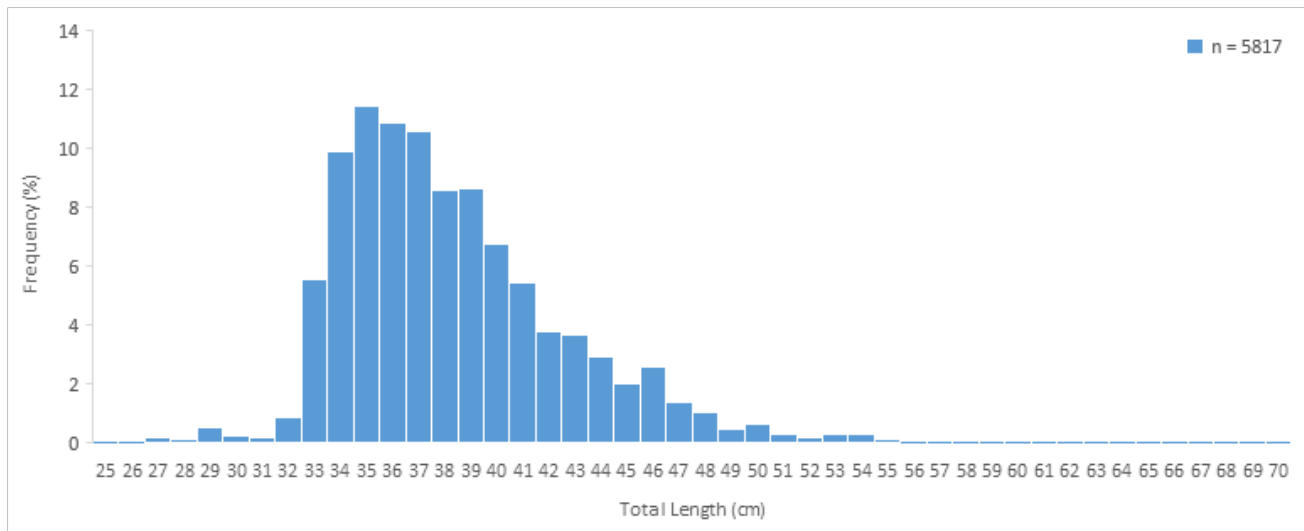


Figure 2. Length composition of Bluespotted Flathead landed by the commercial fishery during 2021/22. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES. Number of lengths used to create figure may differ slightly from number of lengths measured due to length rules in PISCES software.

Commentary

Sampling was missed during the peak months (July to Oct) and areas (zones 5 and 6) due to COVID-related restrictions at the Sydney Fish Markets. Excellent coverage continued in the more northern zones. It is not known whether the slight decline in average sizes sampled when compared to recent years was as a result of this sampling gap.

Dusky Flathead

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales	New South Wales	Sustainable	Commercial catch, CPUE, and length frequency

Prioritization and justification

Species Priority Ranking for 2021/22: 31

Data and Monitoring Plan for 2021/22

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 – **5**

Aim of the Port Monitoring sampling for 2021/22

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

Sampling design

Length-frequency data from the Estuary General Fishery were collected for the estuary catches from Tuggerah Lakes and Wallis Lakes through the Sydney Fish Market, and from the Clarence River via the Clarence River Fishermen's Co-op at Maclean. Attempts were made to sample all catches from these locations on the floor on the day of sampling. Dusky Flathead were measured from the tip of the nose to total length (nearest cm rounding down).

Due to 2021/22 COVID restrictions, sampling from both Wallis Lake and Tuggerah Lakes was limited to the peak period between March and June inclusive. With a target of 180 fish from each estuary, 15 fish from three different catches were also purchased each month (each from different days/catches), from each estuary, for ageing purposes. Fish were selected from each grade in the approximate ratio of each grade in the total catch by weight.

Clarence River Dusky Flathead sampling was done as per 'normal' protocols, with 20–30 otolith pairs collected each month.

Dusky Flathead sampling was based on month and estuary region for data expansion using reported commercial landings for each month and region. These expansions were done using the PISCES software.

Sampling graded catches

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

Results

Table 9. Reported landings (kg) heat map of Dusky Flathead by month and area during 2021/22.

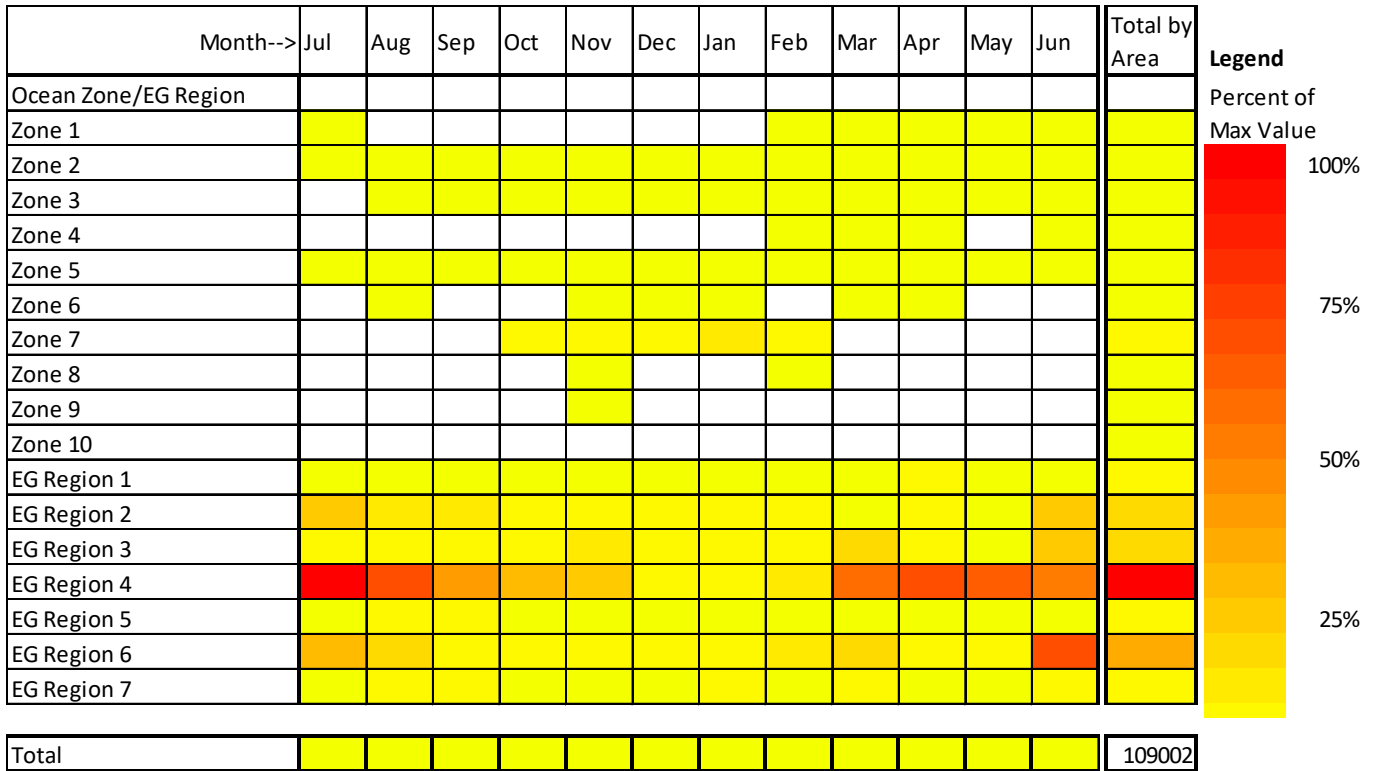


Table 10. The number of days sampled for Dusky Flathead by month and area during 2021/22. The shaded heat map represents the reported commercial landings.

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 (area known)													69
Total													69

Table 11. The number of catches sampled for Dusky Flathead by month and area during 2021/22. 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													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2	19	9	10	20	20	10	8	19	7	21	14	25	182
EG Region 3													
EG Region 4					6		1	7	14	6	6	6	46
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	19	9	10	20	26	10	9	26	21	28	20	31	229
Total	19	9	10	20	26	10	9	26	21	28	20	31	229

Table 12. The number of Dusky Flathead sampled by month and area during 2021/22. 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 (area known)													5961
Total													5961

Table 13. The number of fish sampled for ageing Dusky Flathead by month and area during 2021/22. 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		5	6	46	38	30	30	30	19	41	30	30	335
EG Region 3													
EG Region 4									91	76	79	90	336
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)		5	6	46	38	30	30	30	110	117	109	120	671
Total		5	6	46	38	30	30	30	110	117	109	120	671

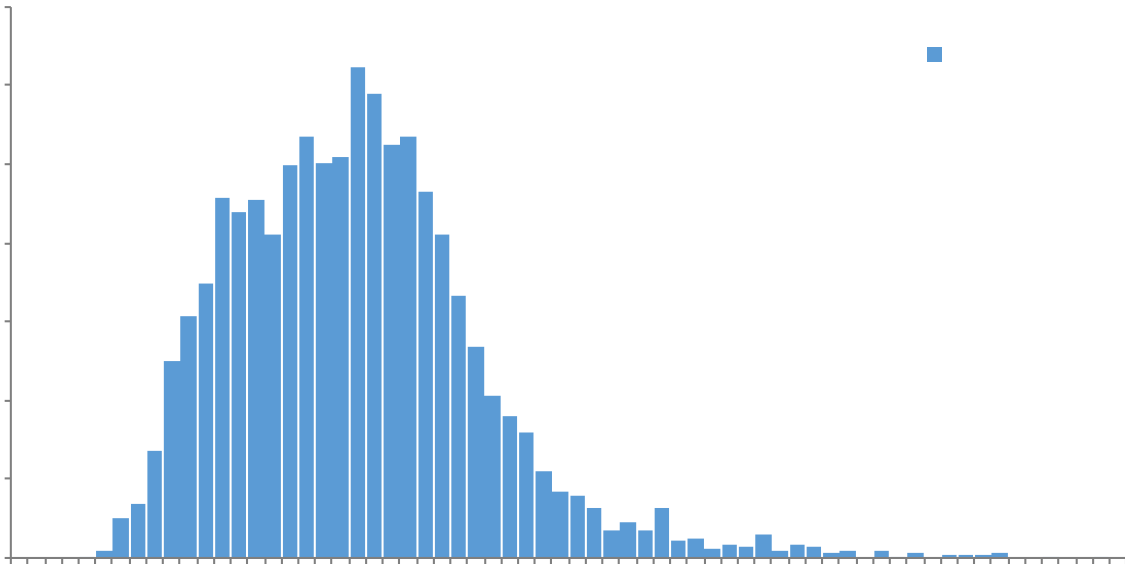


Figure 3. Length composition of Dusky Flathead landed by the commercial fishery for 2021/22. Dusky Flathead were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES. Number of lengths used to create the figure may differ slightly from number of lengths measured due to length rules in PISCES software.

Commentary

The 2021/22 COVID restrictions prevented sampling at the Sydney Fish Markets until November 2021 (expected), meaning that sampling for this financial year required being compressed into 8 months. The associated increased intensity of sampling fish for ageing was not feasible given resources available for the Port Monitoring project and required review. Such a review was timely given the need to continually provide the most cost-efficient monitoring possible, with anticipation that greater cost-recovery from industry for such work will occur in the future.

To investigate whether a simple random sampling design could: (i) adequately compare to the current Age Length Key-derived age composition, and; (ii) be done with fewer age estimates, data from the most recent (2016/17) age sampling were used. These analyses indicated that a simple random sampling design with a target of 125 individuals would produce an age composition that was both unbiased and acceptably precise. See Appendix C for details.

Given the compressed sampling design, comprehensive sampling for Dusky Flathead was achieved during 2021/22 in terms of both length and age sampling and the results appear consistent with previous years. The key estuaries for commercial landings were sampled, except for Lake Illawarra in region 6. Ongoing issues with access to the Wallis Lake Fishermen's Co-op meant fish from that estuary had to be sampled on the Sydney Fish Market floor by Sydney-based staff.

Eastern King Prawn

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales, Queensland	Eastern Australia	Sustainable	Biomass; catch, effort and CPUE relative to MSY reference points

Prioritization and justification

Species Priority Ranking for 2021/22: **15**

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring: **7**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **7**

Rank for ages – **not required**

Aim of the Port Monitoring sampling for 2021/22

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

Sampling design

Length Frequency data from the Ocean Prawn Trawl Fishery were collected through Ballina, Maclean/Iluka and Coffs Harbour Fishermen’s Co-ops. For each location, sampling 2-3 catches per day was attempted. Eastern King 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 4. Carapace length is measured in millimetres (mm).

Eastern King Prawn 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

All Eastern King Prawn catches are graded, generally into Jumbo, XL, L, M, S/M or S. All grades are sampled; at least 50 prawns from each grade.

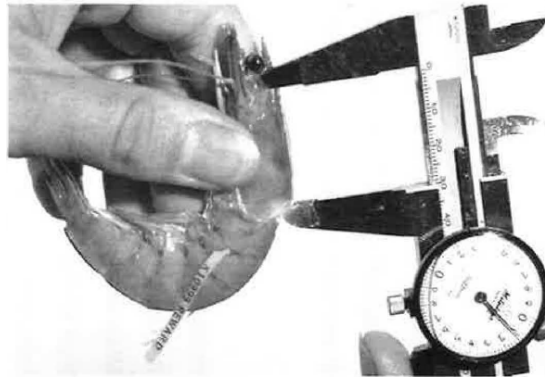


Figure 4. Carapace length of a prawn being measured using callipers. Note the locations of the calliper jaws at the back of the eye socket and back of the carapace.

Results

Table 14. Reported landings (kg) heat map of Eastern King Prawn by month and area during 2021/22.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area	Legend
Ocean Zone/EG Region														Percent of Max Value 100% 75% 50% 25%
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													448504	

Table 15. The number of days sampled for Eastern King Prawn by month and area during 2021/22. 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 (area known)													78
Total													78

Table 16. The number of catches sampled for Eastern King Prawn by month and area during 2021/22. 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					2	2	4						8
Zone 2	3	2	3	4	4	4	3	3	3	5	4	5	43
Zone 3	4	2	5	3	5	4	4	4	4	4	4	4	47
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)	7	4	8	7	11	10	11	7	7	9	8	9	98
Total	7	4	8	7	11	10	11	7	7	9	8	9	98

Table 17. The number of individuals sampled for Eastern King Prawn by month and area during 2021/22. 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 (area known)													13657
Total													13657

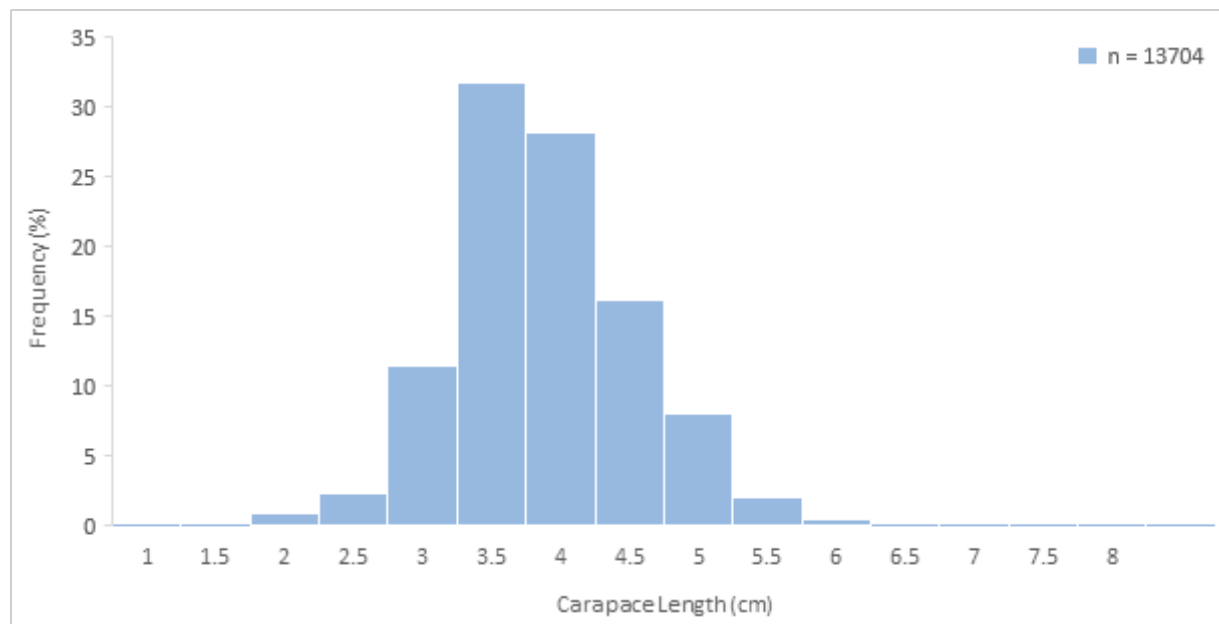


Figure 5. Length composition of Eastern King Prawn landed by the offshore trawl commercial fishery for 2021/22. Prawns were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES. Number of lengths used to create figure may differ slightly from number of lengths measured due to length rules in PISCES software.

Commentary

Sampling was unaffected by the COVID-related restrictions due to the fishery mainly operating in northern NSW, and generally reflected the spatial and temporal distribution of the landings. The target number of catches measured per sampling day proved to be unfeasible for most co-ops. Commonly catches had up to 5 or 6 different grades and needed to move quickly through the co-op process for transport; this made sampling multiple catches per day difficult. Future sampling may need to be modified to account for these logistical issues.

Eastern School Prawn

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales	New South Wales	Sustainable	Catch, effort, standardised catch rate, environmental models

Prioritization and justification

Species Priority Ranking for 2021/22: **22**

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring: **13**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **9**

Rank for ages – **not required**

Aim of the Port Monitoring sampling for 2021/22

To collect size composition data that are representative of the commercial landed catch in key areas of NSW.

Sampling design

Length Frequency data from the Estuary General Fishery, Estuarine Prawn Trawl Fishery and Ocean Trawl Fishery were collected through the Maclean Fishermen’s Co-op and the Sydney Fish Markets. Sampling primarily focused on the Clarence River, Tuggerah Lakes and Hawkesbury River. For each location, sampling 2-3 catches per day was attempted. 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 6. Carapace length is measured in millimetres (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 Eastern School Prawn catches are graded, generally into XL, L or U. All grades are sampled; at least 50 prawns from each grade.

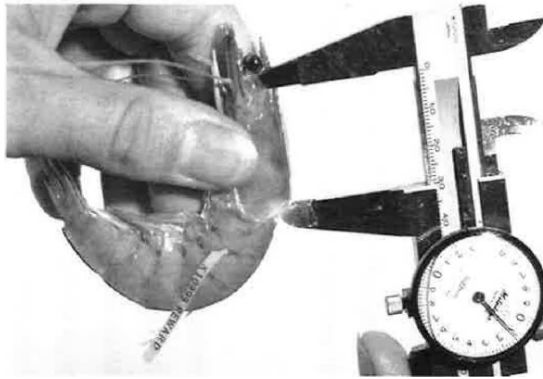


Figure 6. Carapace length of a prawn being measured using callipers. Note the locations of the calliper jaws at the back of the eye socket and back of the carapace.

Results

Table 18. Reported landings (kg) heat map of Eastern School Prawn by month and area during 2021/22.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area	Legend Percent of Max Value
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													766116	

Table 19. The number of days sampled for Eastern School Prawn by month and area during 2021/22. 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 (area known)													54
Total													54

Table 20. The number of catches sampled for Eastern School Prawn by month and area during 2021/22. 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	2		6
Zone 3													
Zone 4													
Zone 5													
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2			6	2	4	3	4	4	2	5	3	4	37
EG Region 3													
EG Region 4					6	4			2				12
EG Region 5					4	3	4	8	5	2			26
EG Region 6													
EG Region 7													
Total (area known)	0	0	6	2	14	11	8	13	9	9	5	4	81
Total	0	0	6	2	14	11	8	13	9	9	5	4	81

Table 21. The number of individuals sampled for Eastern School Prawn by month and area during 2021/22. 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 (area known)													7951
Total													7951

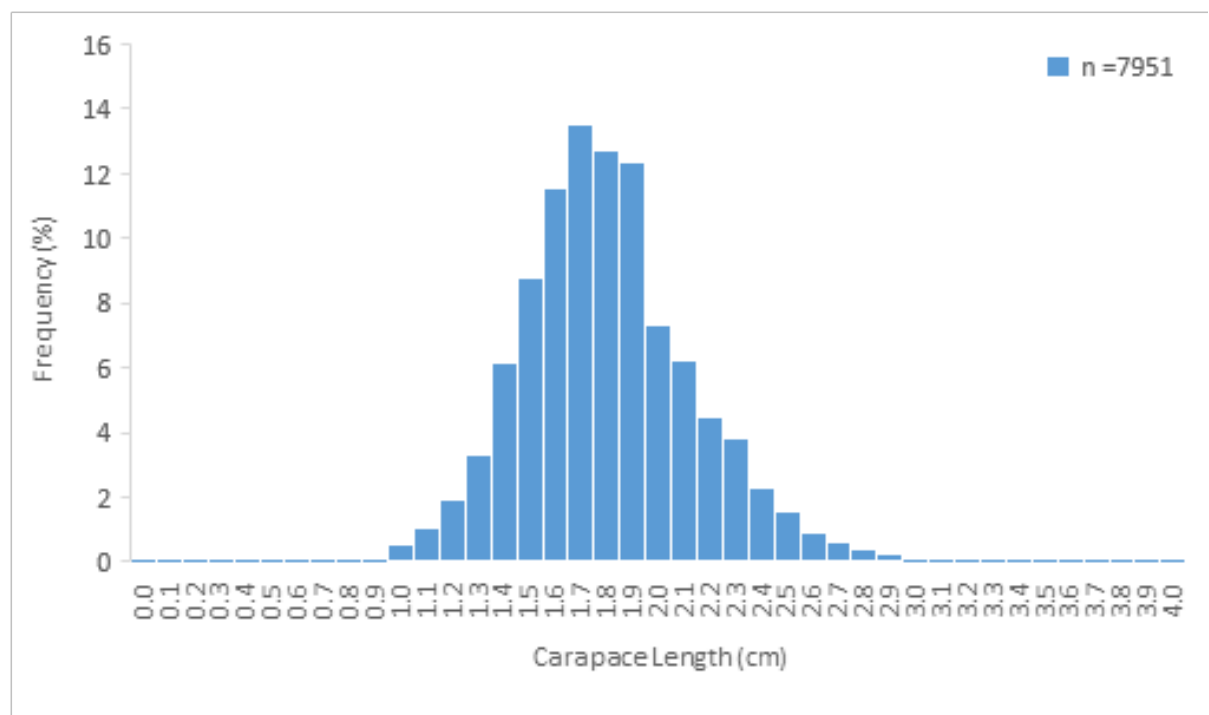


Figure 7. Length composition of Eastern School Prawn landed by the commercial fishery for 2021/22. Prawns were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

Sampling generally reflected the spatial and temporal distribution of the landings and resulted in a robust length sample.

Eastern Sea Garfish

STOCK STATUS OVERVIEW (2020)

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

Prioritization and justification

Species Priority Ranking for 2021/22: **26**

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring **17**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **11**

Rank for ages – **not required**

Aim of the Port Monitoring sampling for 2021/22

To collect size 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 sampling is done at the Forster boat ramp and a fisher's processing shed near Forster. Sampling instructions sent to field staff are in Figure 8. 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 Sea Garfish per catch were purchased for ageing. Fish were selected from each grade in the approximate ratio of each grade in the total catch by weight.

Sea Garfish 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.

Sampling graded catches

Almost all Sea Garfish catches are graded, generally into XL, L, M, S or U. All grades are sampled during a sampling event. 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

- Opportunistically up to 4 days per month

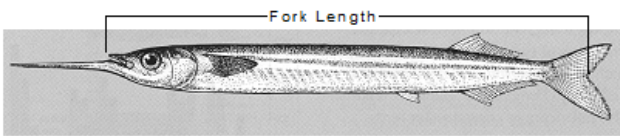
Lengths required

- 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. Collect otoliths from 2 catches per month; 40 otoliths in total per month.

Field code **NB-Ha 1**



The diagram shows a side view of a Sea Garfish. A horizontal line with arrows at both ends is drawn above the fish, starting from the tip of its upper jaw and extending to the fork in its tail. The text 'Fork Length' is centered above this line.

Figure 8. Sea Garfish sampling instructions for field staff.

Results

Table 22. Reported landings (kg) heat map of Eastern Sea Garfish by month and area during 2021/22.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area	Legend Percent of Max Value
Ocean Zone/EG Region														
Zone 1										Yellow			Yellow	
Zone 2													Yellow	
Zone 3													Yellow	
Zone 4									Yellow				Yellow	
Zone 5	Yellow	Yellow	Yellow					Orange	Orange	Yellow		Yellow	Red	100%
Zone 6													Yellow	75%
Zone 7								Orange					Orange	
Zone 8											Orange		Orange	
Zone 9									Yellow	Yellow	Yellow	Yellow	Yellow	
Zone 10								Yellow	Red	Orange	Yellow		Red	50%
EG Region 1													Yellow	
EG Region 2													Yellow	
EG Region 3													Yellow	
EG Region 4							Yellow	Yellow	Orange				Orange	
EG Region 5													Yellow	
EG Region 6								Yellow					Yellow	25%
EG Region 7													Yellow	
Total													19629.1	

Table 23. The number of days sampled for Eastern Sea Garfish by month and area during 2021/22. 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										Yellow			Yellow
Zone 2													Yellow
Zone 3													Yellow
Zone 4									1				1
Zone 5	Yellow	Yellow	Yellow					5	5	2		Yellow	12
Zone 6													Yellow
Zone 7								2					2
Zone 8									2	1	2		5
Zone 9									Yellow	Yellow	Yellow	Yellow	Yellow
Zone 10								Yellow	Red	Orange	Yellow		Red
EG Region 1													Yellow
EG Region 2													Yellow
EG Region 3													Yellow
EG Region 4							Yellow	Yellow	1				1
EG Region 5													Yellow
EG Region 6								Yellow					Yellow
EG Region 7													Yellow
Total (area known)	0	0	0	0	0	0	0	7	9	3	2	0	21
Total	0	0	0	0	0	0	0	7	9	3	2	0	21

Table 24. The number of catches sampled for Eastern Sea Garfish by month and area during 2021/22. 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 (area known)													26
Total													26

Table 25. The number of fish sampled for Eastern Sea Garfish by month and area during 2021/22. 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									80				80
Zone 5								653	744	301			1698
Zone 6													
Zone 7								484					484
Zone 8									223	146	790		1159
Zone 9													
Zone 10													
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4									274				274
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	0	0	0	0	0	0	0	1137	1321	447	790	0	3695
Total	0	0	0	0	0	0	0	1137	1321	447	790	0	3695

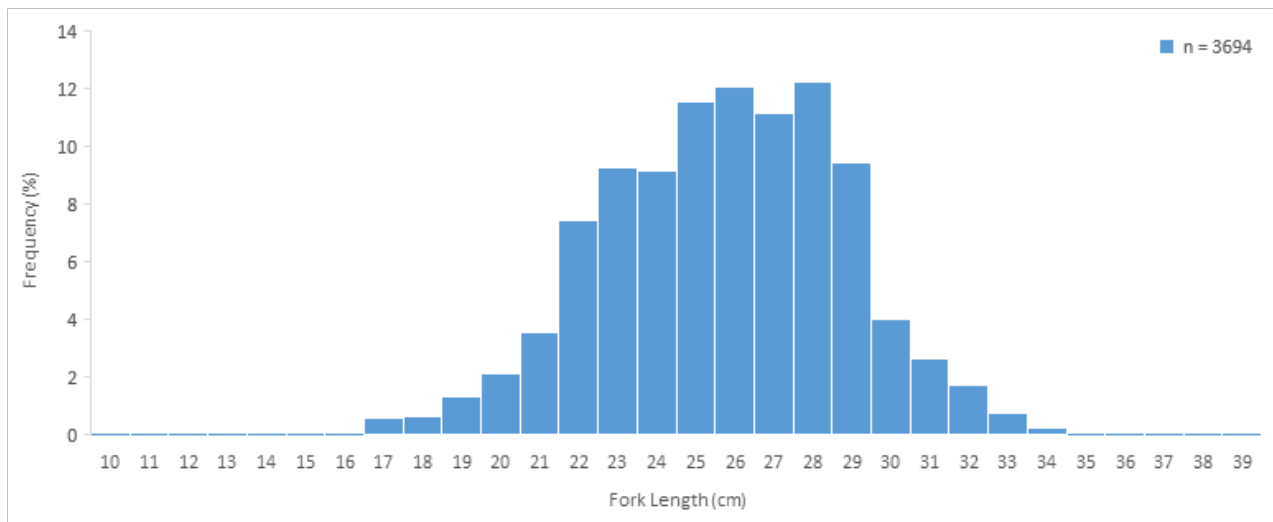


Figure 9. Length composition of Eastern Sea Garfish landed by the commercial fishery for 2021/22. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

Comprehensive sampling of Sea Garfish was achieved during 2021/22, generally reflecting the spatial and temporal operations of the fishery, with the exception of fish from ocean zone 10. Sea Garfish from ocean zone 10 are sometimes sent to Melbourne for marketing, making them unavailable to sample through the current port monitoring program. Note that otoliths were not collected during 2021/22.

Giant Mud Crab

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales	Estuary General Fishery	Sustainable	Catch, catch rate, biomass, fishing mortality

Prioritization and justification

Species Priority Ranking for 2021/22: 16

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring 9

Base case port monitoring required to inform a reliable assessment:

Rank for biology – not required

Rank for lengths - 7

Rank for ages – not required

Aim of the Port Monitoring sampling for 2021/22

To collect size composition data that are representative of the commercial landed catch from the Clarence River and Coffs Harbour Fishermen's Co-ops.

Sampling design

Length frequency data were collected through the Clarence River (Maclean) and Coffs Harbour Fishermen's co-operatives. 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 stage of 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 during a sampling event.

Results

Table 26. Reported landings (kg) heat map of Giant Mud Crab by month and area during 2021/22.

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													83999.6

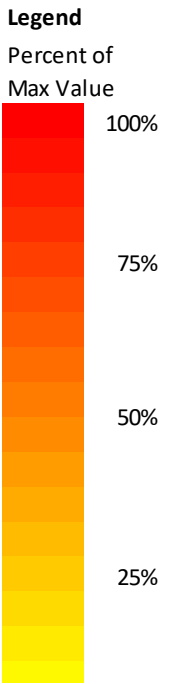


Table 27. The number of days sampled for Giant Mud Crab by month and area during 2021/22. The shaded heat map represents the reported commercial landings.

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				2
EG Region 2	2		1	1	2	2	2	2	1	3	1	1	18
EG Region 3	3		2	3	3	2	2	3	2	2	3	2	27
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	5	0	3	4	5	4	5	5	4	5	4	3	47
Total	5	0	3	4	5	4	5	5	4	5	4	3	47

Table 28. The number of catches sampled for Giant Mud Crab by month and area during 2021/22. 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 (area known)													103
Total													103

Table 29. The number of Giant Mud Crabs sampled by month and area during 2021/22. 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							27		49				76
EG Region 2	87		29	38	262	335	410	237	145	92	40	67	1742
EG Region 3	73		80	50	241	207	496	514	398	344	235	119	2757
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	160	0	109	88	503	542	933	751	592	436	275	186	4575
Total	160	0	109	88	503	542	933	751	592	436	275	186	4575

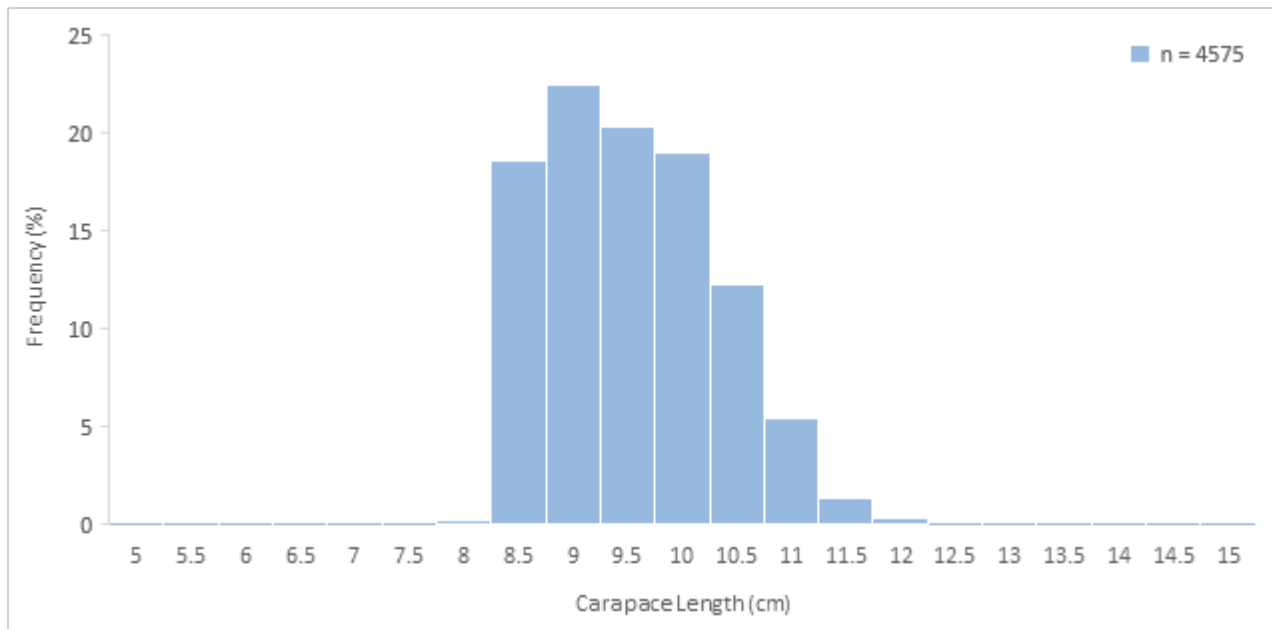


Figure 10. Length composition of Giant Mud Crab landed by the commercial fishery for 2021/22. Crabs were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

Excellent coverage was achieved for the main fishery in regions 2 and 3; however, greater sampling in Estuary General Regions 1 and 4 would increase coverage of the fishery. Ongoing issues in accessing landings at the Wallis Lake co-op continue to inhibit monitoring and assessment.

Grey Morwong

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
Commonwealth, New South Wales, Queensland	Eastern Australia	Depleted	Catch, Catch rates, size structure, age structure, fishing mortality

Prioritization and justification

Species Priority Ranking for 2021/22: **9**

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring **5**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **3**

Rank for ages – **2**

Aim of the Port Monitoring sampling for 2021/22

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

Sampling design

Length frequency data from the commercial fishery were collected for as many ocean zones as possible through the Clarence River (Maclean) and Coffs Harbour Fishermen's co-operatives and the Sydney Fish Markets. For each location, all catches from an ocean zone that were on the floor on the day of sampling were attempted to be sampled. Grey Morwong were measured from the tip of the nose to fork length (nearest cm rounding down).

Otoliths were collected from Grey Morwong, with the aim of sampling 20 fish from Coffs Harbour, 15 from ocean zone 6 and 25 from ocean zones 7-10 each month.

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 during a sampling event, and because catches are relatively small, all fish in each catch are usually measured.

Results

Table 30. Reported landings (kg) heat map of Grey Morwong by month and area during 2021/22.

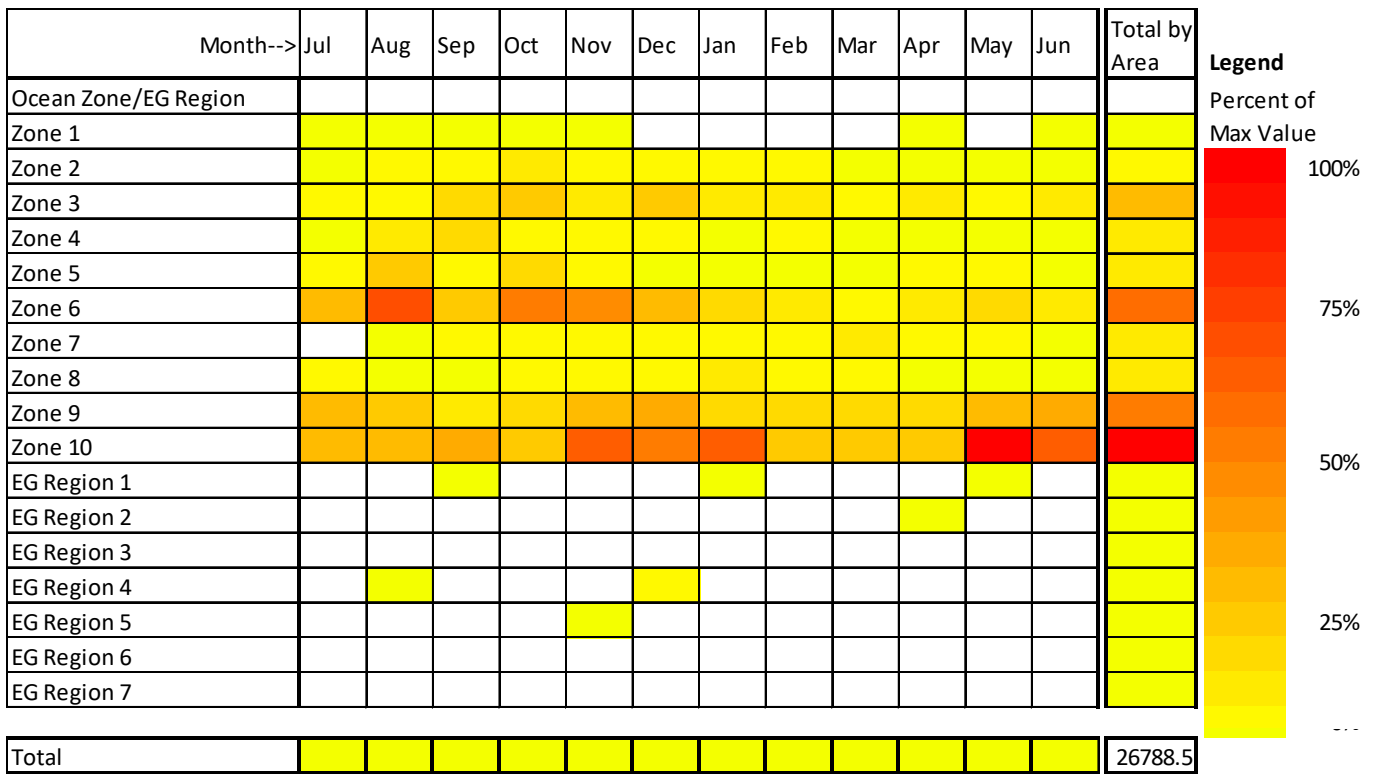


Table 31. The number of days sampled for Grey Morwong by month and area during 2021/22. The shaded heat map represents the reported commercial landings.

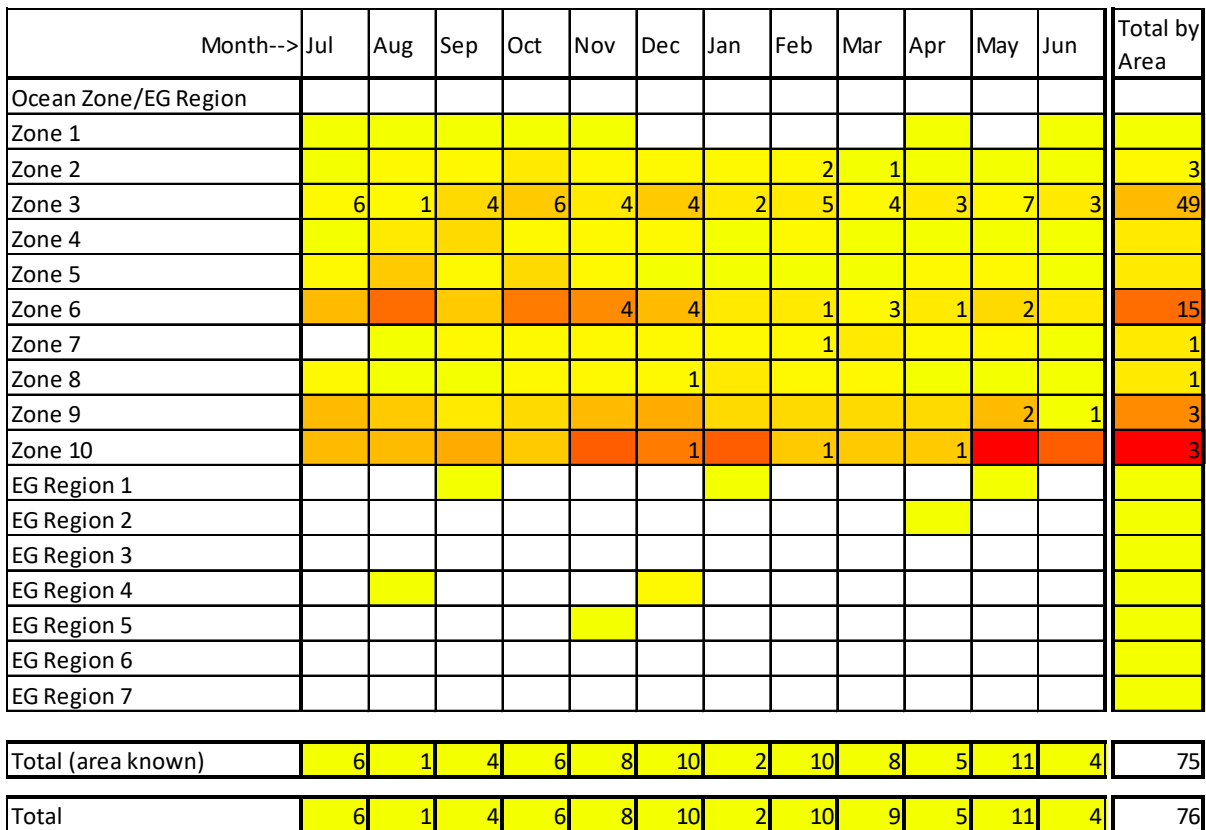


Table 32. The number of catches sampled for Grey Morwong by month and area during 2021/22. The shaded heat map represents the reported commercial landings.

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 (area known)													91
Total													92

Table 33. The number of fish sampled for Grey Morwong by month and area during 2021/22. 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								24	32				56
Zone 3	46	22	61	202	75	146	26	160	96	90	56	41	1021
Zone 4													
Zone 5													
Zone 6					352	231		19	91	13	65		771
Zone 7								20					20
Zone 8						8							8
Zone 9											188	151	339
Zone 10						26		56		17			99
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5													
EG Region 6													
EG Region 7													
Total (area known)	46	22	61	202	427	411	26	279	219	120	309	192	2314
Total	46	22	61	202	427	411	26	279	262	120	309	192	2357

Table 34. The number of fish sampled for ageing Grey Morwong by month and area during 2021/22. 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 (area known)													393
Total													467

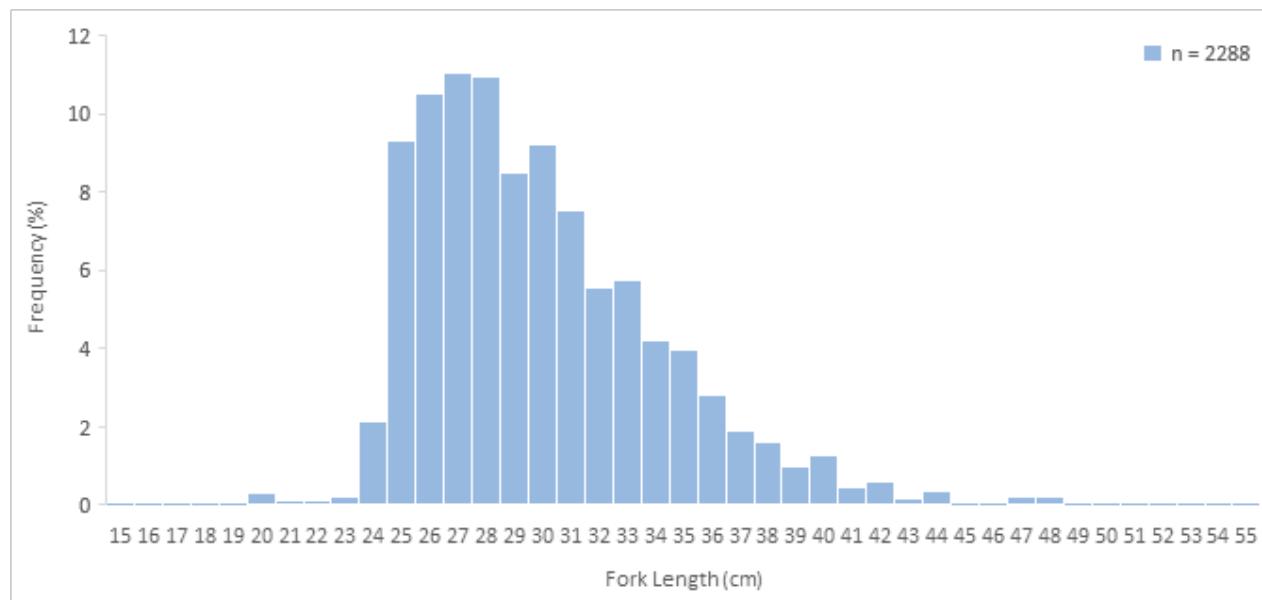


Figure 11. Length composition of Grey Morwong landed by the commercial fishery for 2021/22. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES. The number of lengths used to create the Figure may differ slightly from the number of lengths measured due to length rules in the PISCES software.

Commentary

Risks created by COVID prevented access to the Sydney Fish Markets for four months between July and October 2021 that inhibited sampling of Grey Morwong. Despite this, sampling for 2021/22 was reasonably comprehensive, noting that greater sampling for lengths and ages from fish from the far south coast (ocean zones 9 and 10) would provide better alignment with the spatial operation of the fishery.

Four catches, including a total of 74 fish for ageing purposes, were sampled from commonwealth waters. Consequently, no area of capture could be assigned to these samples and they are not included in Fig. 11. These numbers are reflected in the tables above.

Mulloway

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales	New South Wales	Depleted	Catch, Catch rates, Size Composition, Yield-per-recruit, Mortality Rates, Spawning Potential Ratio

Prioritization and justification

Species Priority Ranking for 2021/22: 12

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring **7**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **5**

Rank for ages – **3**

Aim of the Port Monitoring sampling for 2021/22

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

Sampling design

Length Frequency data were collected through the Ballina, Clarence River (both Iluka and Maclean), and Coffs Harbour Fishermen's co-ops and the Sydney Fish Markets. Landings from all commercial fisheries were monitored. For each location sampled on a day, all catches that were available were attempted to be sampled. Mulloway were measured from the tip of the nose to total length (nearest cm rounding down).

Mulloway otoliths were opportunistically sampled from gilled and gutted fish coming through the co-ops.

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

Sampling graded catches

Mulloway catches are often graded, generally into XL, L, M, S or U. All grades are sampled on a sampling event, and because catches are often relatively small in terms of numbers of fish, all fish in each catch are usually measured.

Results

Table 35. Reported landings (kg) heat map of Mulloway by month and area during 2021/22.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area	Legend Percent of Max Value
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													77661.5	

Table 36. The number of days sampled for Mulloway by month and area during 2021/22. 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					1								1
Zone 2				1	2				2	1			6
Zone 3			1	2	7	2		2	1	1	1	4	21
Zone 4													
Zone 5						1		1	2	2			6
Zone 6										1			1
Zone 7												2	2
Zone 8								1	1				2
Zone 9													
Zone 10													
EG Region 1													
EG Region 2	3	2	1	2	3	2		5	2	3	2	5	30
EG Region 3	1		1	2	1				1	1	1	2	10
EG Region 4					2			1	1	2	4	3	13
EG Region 5					1	2		1	3	1	1		9
EG Region 6					2	2					1		5
EG Region 7													
Total (area known)	4	2	3	7	19	9	0	11	13	12	10	16	106
Total	4	2	3	7	19	9	0	11	13	13	11	16	108

Table 37. The number of catches sampled for Mulloway by month and area during 2021/22. 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 (area known)													136
Total													138

Table 38. The number of fish sampled for Mulloway by month and area during 2021/22. 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					1								1
Zone 2				1	7			2	2				12
Zone 3			1	3	17	2		3	9	1	2	16	54
Zone 4													
Zone 5						3		2	25	64			94
Zone 6										8			8
Zone 7												95	95
Zone 8								64	1				65
Zone 9													
Zone 10													
EG Region 1													
EG Region 2	70	58	1	2	7	3		16	22	5	3	8	195
EG Region 3	1		1	12	3				1	1	1	5	25
EG Region 4					21			3	2	9	114	81	230
EG Region 5					8	6		9	27	7	33		90
EG Region 6					93	2					32		127
EG Region 7													
Total (area known)	71	58	3	18	157	16	0	97	89	97	185	205	996
Total	71	58	3	18	157	16	0	97	89	103	187	205	1004

Table 39. The number of fish sampled for ageing Mulloway by month and area during 2021/22. 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 (area known)													230
Total													230

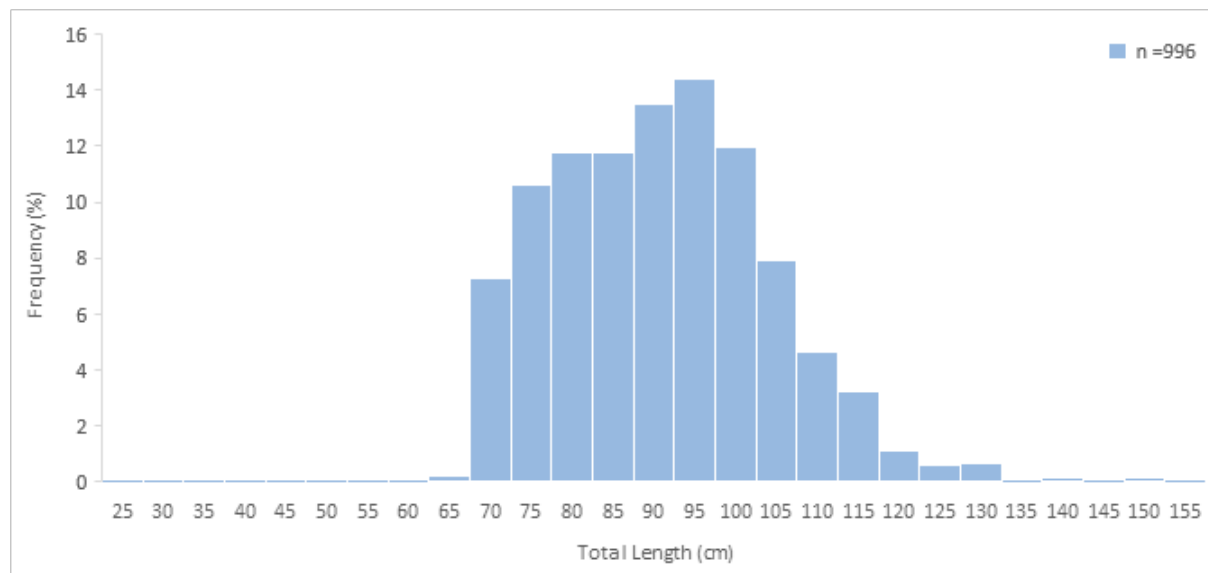


Figure 12. Length composition of Mulloway landed by the commercial fishery for 2021/22. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES. Number of lengths used to create figure may differ slightly from number of lengths measured due to length rules in PISCES software.

Commentary

Sampling for Mulloway was comprehensive during 2021/22. The distribution of sampling was similar to the spatial and temporal operation of the fishery.

Pearl Perch

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales, Queensland	Eastern Australia	Depleted	Biomass, Standardised Catch Rate, Fishery-Dependent Length and Age Frequency, Estimates of Total Mortality Rate, Catch and Effort

Prioritization and justification

Species Priority Ranking for 2021/22: **25**

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring: **16**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **10**

Rank for ages – **not required**

Aim of the Port Monitoring sampling for 2021/22

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

Sampling design

Length Frequency data were collected for ocean zones through the Ballina, Clarence River (both Iluka and Maclean) and Coffs Harbour Fishermen's co-operatives. For each location, all catches that were on the floor on the day of sampling were attempted to be sampled. Pearl Perch were measured from the tip of the nose to fork length (nearest cm rounding down).

Pearl Perch 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 Pearl Perch catches are ungraded, however, where there was more than one grade, all grades were sampled. Because there are so few numbers of fish in each catch, subsampling is rarely needed.

Results

Table 40. Reported landings (kg) heat map of Pearl Perch by month and area during 2021/22.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area	Legend Percent of Max Value
Ocean Zone/EG Region														
Zone 1														100%
Zone 2														75%
Zone 3														50%
Zone 4														25%
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													6730.87	

Table 41. The number of days sampled for Pearl Perch by month and area during 2021/22. 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		1		3	3	5	2	1	3	4	2	4	35
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)	1	0	3	3	5	2	1	3	5	2	4	7	36
Total	1	0	3	3	5	2	1	3	5	2	4	7	36

Table 42. The number of catches sampled for Pearl Perch by month and area during 2021/22. 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 (area known)													37
Total													37

Table 43. The number of fish sampled for Pearl Perch by month and area during 2021/22. 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									4				4
Zone 3	2		23	20	43	44	2	13	81	10	16	70	324
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)	2	0	23	20	43	44	2	13	85	10	16	70	328
Total	2	0	23	20	43	44	2	13	85	10	16	70	328

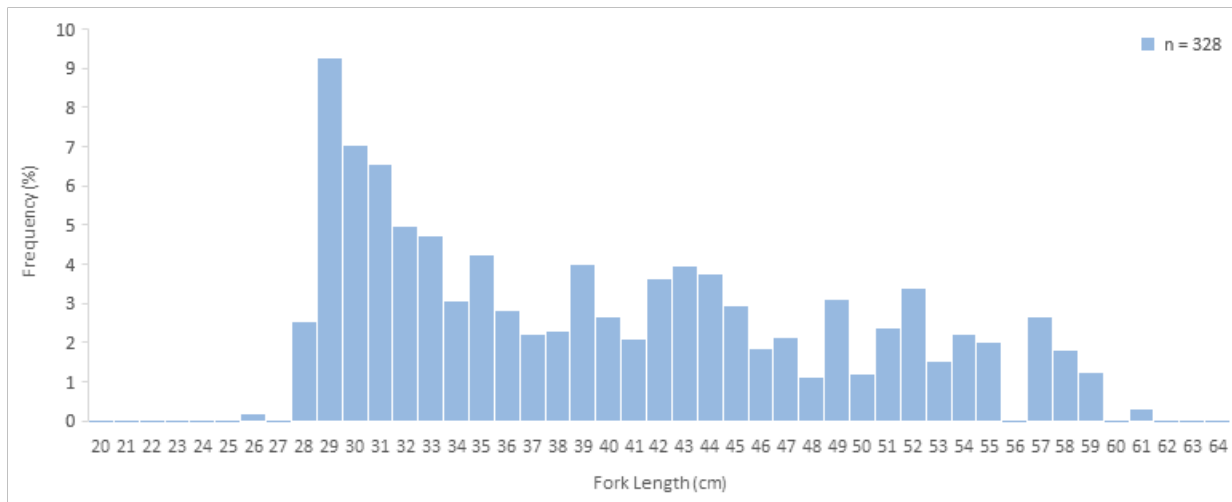


Figure 13. Length composition of Pearl Perch landed by the commercial fishery for 2021/22. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

Given the very small nature of the commercial fishery (approximately 7 t in 2021/22) the port monitoring coverage was fairly balanced and adequate to inform the length structure for the fishery, however, greater sampling in Ocean Zone 1 would have improved this.

Sea Mullet

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales, Queensland	Eastern Australia	Sustainable	Spawning stock biomass, Catch, CPUE, Length and age compositions

Prioritization and justification

Species Priority Ranking for 2021/22: 18

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring **11**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - **8**

Rank for ages – **4**

Aim of the Port Monitoring sampling for 2021/22

To collect size and age composition data that are representative of the commercial landed catch during the spawn-run fishery for NSW.

Sampling design

All sampling was done during a 2-week period in May through Markwell Fisheries in Chinderah. For each catch sampled, length frequency data from an ungraded subsample of approximately 120kg was collected. A separate length frequency was recorded for each sex. Sea Mullet were measured from the tip of the nose to fork length (nearest cm rounding down).

For each catch, a subsample of 15 randomly selected males and 15 randomly selected females were processed for ageing.

Sea Mullet 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.

Results

Table 44. Reported landings (kg) heat map of Sea Mullet by month and area during 2021/22.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area	Legend Percent of Max Value
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													1766861	

Table 45. The number of days sampled for Sea Mullet by month and area during 2021/22. 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											3		3
Zone 4											3		3
Zone 5											1		1
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2											2		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	9	0	9
Total	0	0	0	0	0	0	0	0	0	0	9	0	9

Table 46. The number of catches sampled for Sea Mullet by month and area during 2021/22. 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 (area known)													12
Total													12

Table 47. The number of fish sampled for Sea Mullet by month and area during 2021/22. 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											626		626
Zone 4											748		748
Zone 5											102		102
Zone 6													
Zone 7													
Zone 8													
Zone 9													
Zone 10													
EG Region 1													
EG Region 2											324		324
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	1800	0	1800
Total	0	0	0	0	0	0	0	0	0	0	1800	0	1800

Table 48. The number of fish sampled for ageing Sea Mullet by month and area during 2021/22. 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 (area known)													347
Total													347

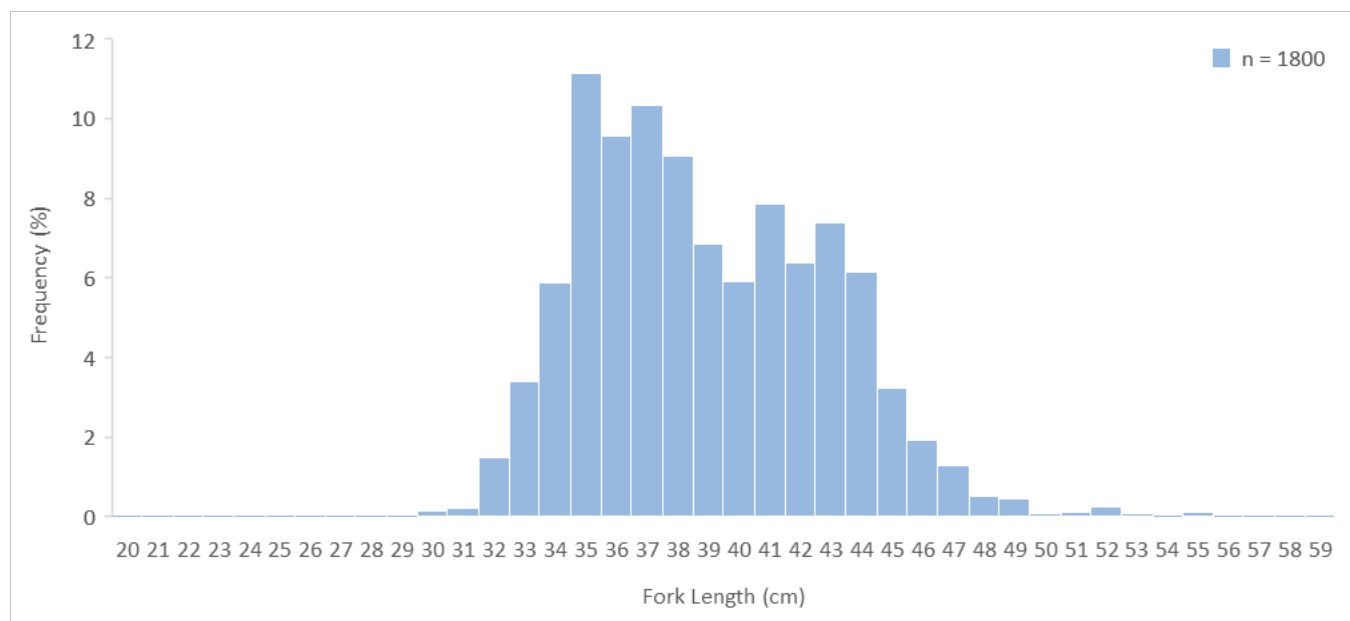


Figure 14. Length composition of Sea Mullet landed by the commercial fishery for 2021/22. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

The 2021/22 Sea Mullet spawn run fishery was relatively quiet, and catches were scarce during the two weeks our team were stationed at Markwell’s factory. Nevertheless the 12 catches we were able to sample provided a reasonable coverage from the fishery.

Silver Trevally

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales	New South Wales	Depleted	Catch, CPUE, biomass, fishing mortality, spawning potential, length and age structures

Prioritization and justification

Species Priority Ranking for 2021/22: 1

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring 1

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths - 1

Rank for ages – 1

Aim of the Port Monitoring sampling for 2021/22

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

Sampling design

Length Frequency data from all state fisheries were collected through the Sydney Fish Markets. For each location, all catches that were on the floor on the day of sampling were attempted to be 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

Silver Trevally catches are generally graded 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 usually measured.

Results

Table 49. Reported landings (kg) heat map of Silver Trevally by month and area during 2021/22.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area	Legend Percent of Max Value
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													36088	

Table 50. The number of days sampled for Silver Trevally by month and area during 2021/22. 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		2
Zone 6					4	5	1	2	3			1	16
Zone 7						1			2				3
Zone 8					1			1					2
Zone 9											1	1	2
Zone 10						2							2
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5					1	1							2
EG Region 6								1	2			1	4
EG Region 7								1					1
Total (area known)	0	0	0	0	6	9	0	4	2	8	2	3	34
Total	0	0	0	0	7	9	0	4	2	8	3	3	36

Table 51. The number of catches sampled for Silver Trevally by month and area during 2021/22. 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												1	
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)													43
Total													46

Table 52. The number of fish sampled for Silver Trevally by month and area during 2021/22. 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										21	72		93
Zone 6					509	395		60	45	229		86	1324
Zone 7						41				141			182
Zone 8					44			102					146
Zone 9											13	47	60
Zone 10						67							67
EG Region 1													
EG Region 2													
EG Region 3													
EG Region 4													
EG Region 5					8	129							137
EG Region 6								67		39		81	187
EG Region 7								96					96
Total (area known)	0	0	0	0	561	632	0	325	45	430	85	214	2292
Total	0	0	0	0	667	632	0	404	45	430	187	214	2579

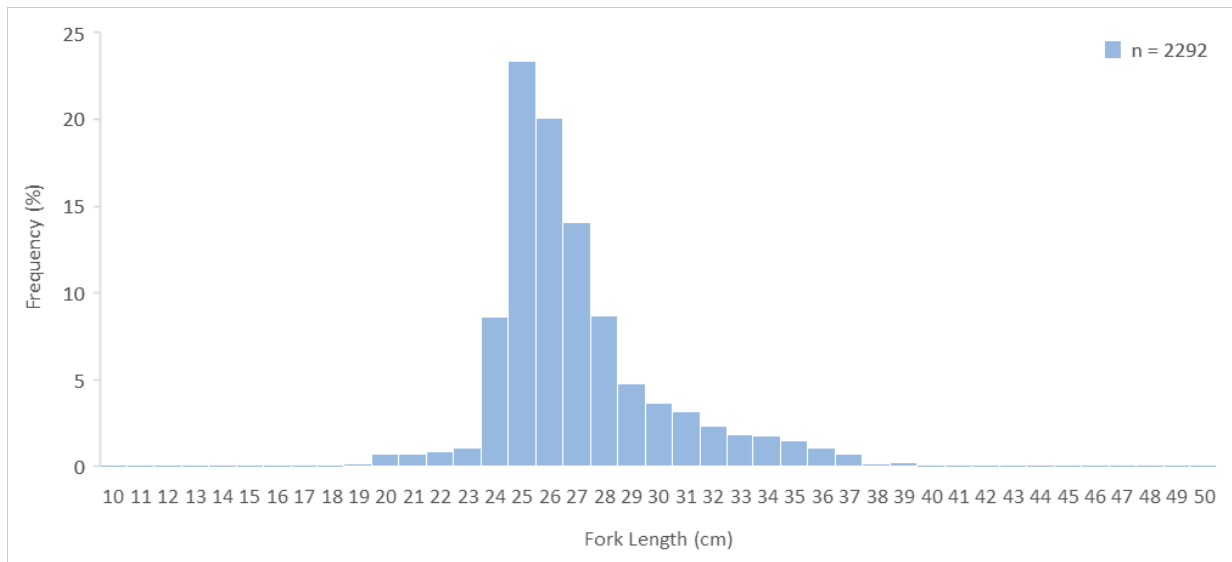


Figure 15. Length composition of Silver Trevally landed by the commercial fishery for 2021/22. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES. Number of lengths used to create figure may differ slightly from number of lengths measured due to length rules in PISCES software.

Commentary

Port monitoring for Silver Trevally during 2021/22 adequately covered the spatial and temporal operation of the fishery. The shift towards the total harvest comprising a greater proportion of estuary landings was captured through our sampling protocols.

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
New South Wales, Queensland	Eastern Australia	Sustainable	Depletion estimates, Catch, Effort, CPUE, Size composition, Age composition, Harvest rates

Prioritization and justification

Species Priority Ranking for 2021/22: 81

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring: **33**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths – **14**

Rank for ages – **not required**

Aim of the Port Monitoring sampling for 2021/22

To collect size composition data that are representative of the NSW commercial fishery landings.

Sampling design

Length Frequency data from the Ocean Trap and Line Fishery were collected for all ocean zones through the Ballina, Clarence River and Coffs Harbour Fishermen's co-operatives 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 attempted to be sampled. Teraglin were measured from the tip of the nose to fork length (nearest cm rounding down).

Teraglin 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 Teraglin catches are graded, generally into XL, L, M, S or U. All grades are sampled during a sampling event. 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 53. Reported landings (kg) heat map of Teraglin by month and area during 2021/22.

Month-->	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Total by Area	Legend Percent of Max Value
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													7215.75	

Table 54. The number of days sampled for Teraglin by month and area during 2021/22. 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				2	1					1			4
Zone 3					3		1	2				3	9
Zone 4					1								1
Zone 5					2						2		4
Zone 6					4	2				1			7
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	2	11	2	1	2	0	2	2	3	25
Total	0	0	0	2	11	2	1	2	0	2	2	3	25

Table 55. The number of catches sampled for Teraglin by month and area during 2021/22. 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					1								
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)													27
Total													27

Table 56. The number of Teraglin sampled by month and area during 2021/22. 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				52	14					2			68
Zone 3					22		2	46				155	225
Zone 4					27								27
Zone 5					91						159		250
Zone 6					274	139				7			420
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	52	428	139	2	46	0	9	159	155	990
Total	0	0	0	52	428	139	2	46	0	9	159	155	990

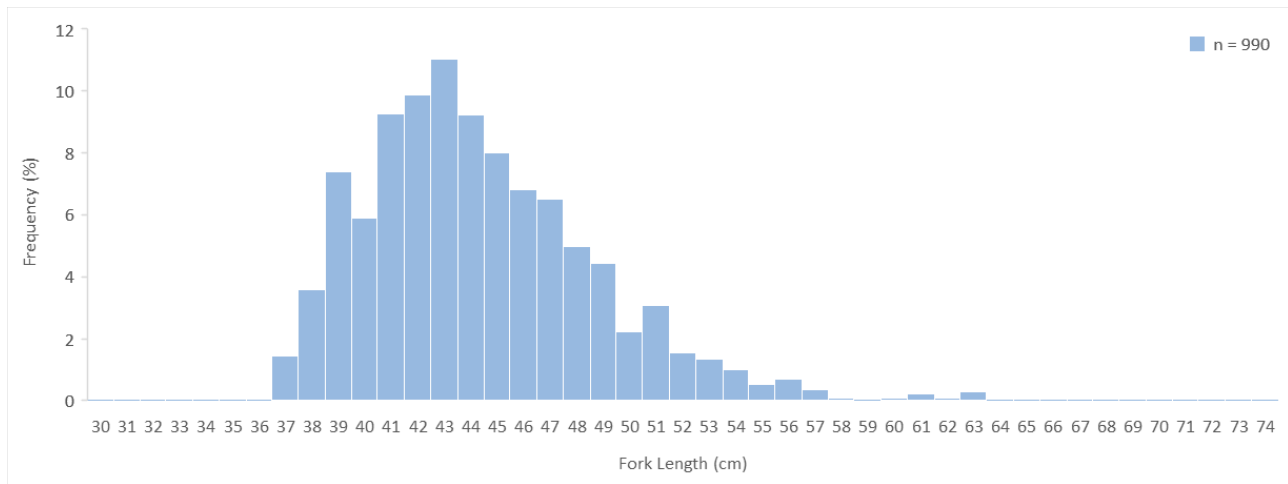


Figure 16. Length composition of Teraglin landed by the commercial fishery for 2021/22. Fish were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software PISCES.

Commentary

The commercial fishery for Teraglin was very small during 2021/22 at around only 7 t state-wide. The port monitoring for Teraglin during 2021/22 provided length information that aligned reasonably well with the spatial and temporal operation of the fishery.

Yellowtail Scad

STOCK STATUS OVERVIEW (2020)

Stock status determination			
Jurisdiction	Stock	Stock status	Indicators
Commonwealth, New South Wales, Queensland	Eastern Australia	Sustainable	Historical catch and effort data, natural mortality, fishing mortality, fishing gear selectivity.

Prioritization and justification

Species Priority Ranking for 2021/22: 11

Data and Monitoring Plan for 2021/22

Ranking for Port Monitoring **6**

Base case port monitoring required to inform a reliable assessment:

Rank for biology – **not required**

Rank for lengths – **4**

Rank for ages – **3**

Aim of the Port Monitoring sampling for 2021/22

To collect size and age composition data that are representative of the NSW commercial ocean-hauling fishery landings.

Sampling design

Length Frequency data from the purse seine fisheries off Wollongong and Ulladulla (ocean zones 7 and 8) were collected from the Sydney Fish Markets. For each location, all catches were attempted to be sampled on any given day. Yellowtail Scad were measured from the tip of the nose to the fork length (nearest cm rounding down).

A sample of 25 fish from ocean zones 7 and 8 were also purchased at the Sydney Fish Market each month for ageing. Fish were selected from each grade in the approximate ratio of each grade in the total catch by weight.

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

Sampling graded catches

Almost all Yellowtail Scad catches are graded, generally into XL, L, M, S or U. 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 were weighed and the total weight of each grade recorded and the sample scaled up accordingly, using the PISCES software.

Results

Table 57. Reported landings (kg) heat map of Yellowtail Scad by month and area during 2021/22.

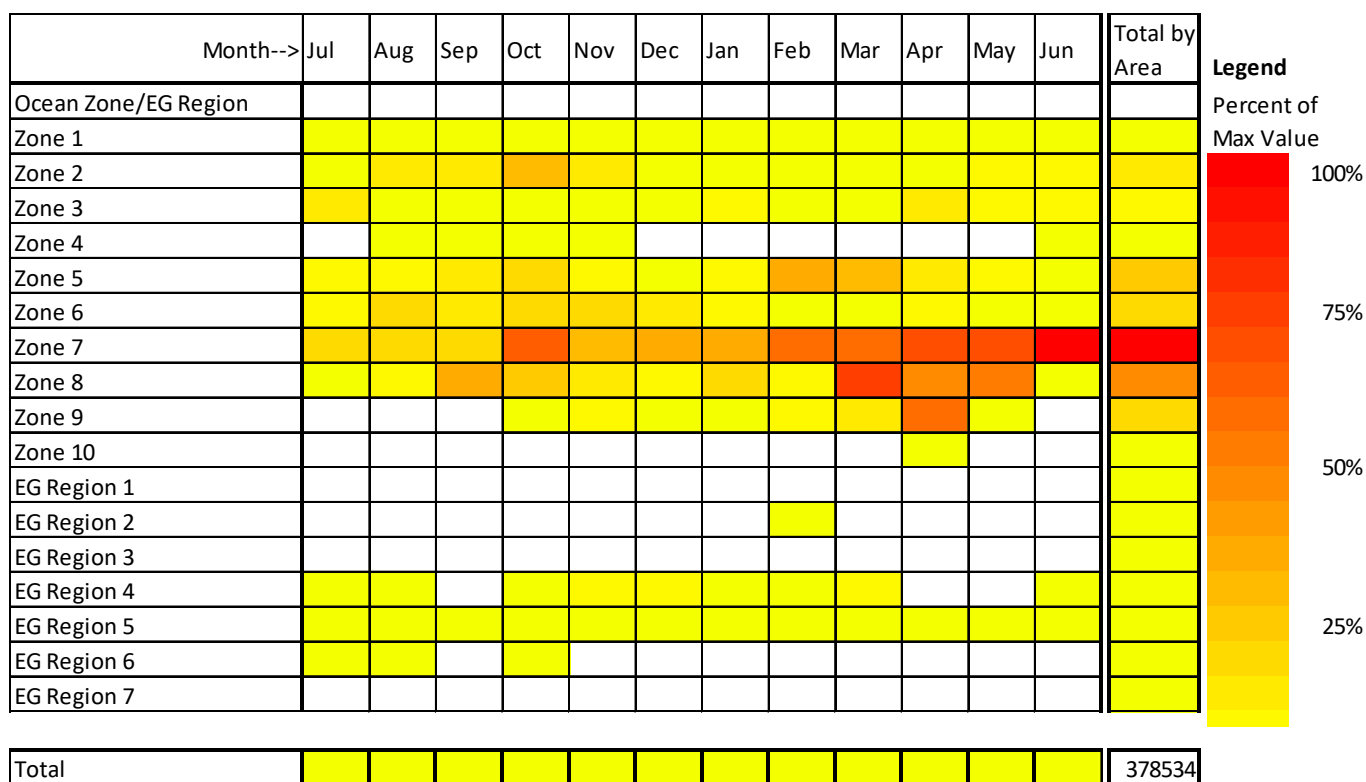


Table 58. The number of days sampled for Yellowtail Scad by month and area during 2021/22. The shaded heat map represents the reported commercial landings.

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						2	2		2	3	6	5	4	24
Zone 8						1	2		1	1				5
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	3	4	0	3	4	6	5	4		29
Total	0	0	0	0	3	4	0	3	4	6	5	4		29

Table 59. The number of catches sampled for Yellowtail Scad by month and area during 2021/22. 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 (area known)													40
Total													40

Table 60. The number of fish sampled for Yellowtail Scad by month and area during 2021/22. 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					184	544		210	264	517	496	409	2624
Zone 8					100	222		70	70				462
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	284	766	0	280	334	517	496	409	3086
Total	0	0	0	0	284	766	0	280	334	517	496	409	3086

Table 61. The number of fish sampled for ageing Yellowtail Scad by month and area during 2021/22. 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 (area known)													327
Total													327

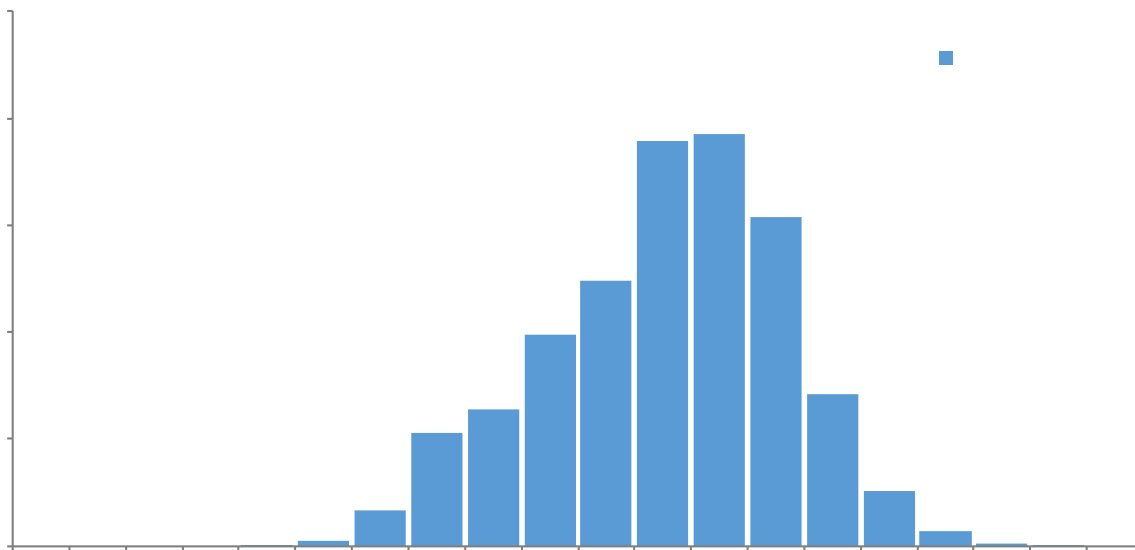


Figure 17. Length composition of Yellowtail Scad landed by the commercial fishery for 2021/22. Yellowtail Scad were sampled through the Port Monitoring program and combined according to the reported commercial landings in each sampling strata using the software.

Commentary

Monitoring of Yellowtail Scad during 2021/22 was slightly inhibited by the COVID-related loss of access to the Sydney Fish Markets between July and October 2021; however overall sampling aligned well with the spatial and temporal operation of the fishery.

Appendices

Appendix A -Staff

Core funded

John Stewart

James Craig

Anne-Marie Hegarty

Caitlin Young

Antony Gould

Commercial Trust funded

David Barker

Glen Cuthbert

Glenn Campbell

Chantelle Clain

Holly Gunton

Nick Meadows

Appendix B - Species Priority List 2021/2022

Species priority list for research for 2021/2022, ranked highest to lowest. The multi-criteria decision analysis (MCDA) was based on commercial and recreational management weightings. Species selected for port monitoring in 2021/2022 are highlighted.

MCDA rank	Common Name	MCDA rank	Common Name	MCDA rank	Common Name
1	Silver Trevally	51	Gummy Shark	101	Australian Anchovy
2	Gemfish	52	Shovelnose Rays	102	Periwinkles (Turban Shell) - other
3	Bluespotted Flathead	53	Loligo Squid	103	Eastern Blue Groper
4	Eastern School Whiting	54	Spanish Mackerel	104	Mako Sharks
5	Eastern Rock Lobster	55	Bass Groper	105	Longtail Tuna
6	Stout Whiting	56	Royal Red Prawn	106	Cunjevoi
7	Blue Mackerel	57	Common Jack Mackerel	107	Estuary Perch
8	Tiger Flathead	58	Crimsonband Wrasse	108	Freshwater Shrimp
9	Grey Morwong	59	Tailor	109	Australian Bass
10	Spanner Crab	60	Long Spined Sea Urchin (Purple/Black)	110	Bastard Trumpeter
11	Yellowtail Scad	61	Spotted Mackerel	111	Bluethroat Wrasse
12	Mulloway	62	Blacktip Sharks (Common)	112	Spangled Emperor
13	Blue-eye Trevalla	63	Sandbar Shark	113	Snook
14	Australian Sardine	64	Cobia	114	Short Spined Sea Urchin (Green)
15	Eastern King Prawn	65	Dusky Whaler	115	Angel Sharks
16	Giant Mud Crab	66	John Dory	116	Eastern Pigfish
17	Red Sea Urchin	67	Mirror Dory	117	Trawl Octopus
18	Sea Mullet	68	Yellowfin Tuna	118	Wobbegong Sharks
19	Pipi	69	Jackass Morwong	119	Greentail Prawn
20	Redfish	70	Murray Cod	120	Red Gurnard and Latchets
21	Blacklip Abalone	71	Estuary Cobbler	121	Mackerel Tuna
22	Eastern School Prawn	72	Golden Perch	122	Gloomy Octopus
23	Yellowfin Bream	73	Dart	123	Red Morwong
24	Blue Swimmer Crab	74	Mahi Mahi	124	Frigate Mackerel
25	Pearl Perch	75	Leatherjackets-other	125	Diamondfish
26	Eastern Sea Garfish	76	Whaler Sharks - other	126	Striped Perch
27	School Shark	77	Yabby (freshwater)	127	Bigeyes
28	Southern Bluefin Tuna	78	Mangrove Jack	128	Hammerhead Sharks
29	Luderick	79	Australian Herring	129	Tiger Shark
30	Ghost Nipper	80	Sawsharks	130	Tilefish
31	Dusky Flathead	81	Teraglin	131	Boarfish
32	Pink Ling	82	Rock Blackfish	132	Blue Shark
33	Sand Whiting	83	Goulds (Arrow) Squid	133	Mantis Shrimps
34	Blue Warehou	84	Ribaldo	134	Ghostsharks
35	Trumpeter Whiting	85	Elephantfish	135	Banded Morwong
36	Snapper	86	School Mackerel	136	Maori Octopus
37	Silver Sweep	87	Striped Marlin	137	Catfish
38	Beachworms	88	Silver Warehou	138	Tiger Prawn (Brown)
39	Eastern Australian Salmon	89	Flounders	139	Pale Octopus
40	Dogfish	90	Red Mullet		
41	Hapuku	91	Soles		
42	Ocean Jackets	92	Whitebait - Sandy Sprat		
43	Yellowtail Kingfish	93	Sand Mullet		
44	Southern Calamari	94	Cuttlefish		
45	Australian Bonito	95	Eastern Red Scorpionfish		
46	River Eels	96	Black Bream		
47	Balmain Bugs	97	River Garfish		
48	Common Silverbidy	98	Banded Rockcod		
49	Tarwhine	99	Hairtail		
50	Goldspot Mullet	100	Southern Maori Wrasse		

Appendix C - Dusky Flathead age composition sampling design for 2021/22

The default method of generating age compositions in landed catch through the DPI Port Monitoring Programme has been a 2-stage one. Lots of length sampling done within a spatially and temporally stratified design, with samples re-weighted according to relative reported commercial landings within each strata. Collection of fish to estimate ages is done through a set number each month as decided by the species lead and port monitoring staff. These are generally collected to be representative of the catches from which they are sampled, i.e. fish are selected at random from within size grades, and in proportion to the relative sizes of each grade. Typically these ages are compiled into an age-length key (ALK). An ALK is a matrix that describes the probability of a fish being a certain age given its length from the sample. There is another way that ALK's are compiled that involves targeted numbers of fish per size class (e.g. say 20 fish per size bin; however DPI has not followed this method as it inevitably over-samples the tail ends of the length distributions and ageing fish is expensive).

It is a relatively simple matter to apply this ALK matrix to the length frequency distribution data to generate an estimated age composition.

ALKs can have inherent biases in that they represent the variation in observed lengths at age for a sampling period (year). This variation can vary annually depending on relative year class strengths and inter-annual variation in growth rates – hence it is recommended that ALKs be updated to match the period that length samples are also collected.

There are other methods of sampling fisheries for age composition. Some random sampling design may be used, with the assumption that the fish taken to age are representative of the entire fishery being sampled.

The 2021/22 COVID restrictions prevented sampling until November 2021 (expected), meaning that sampling for this financial year required being compressed into 8 months. The associated increased intensity of sampling fish for ageing was not feasible given resources available for the Port Monitoring project and required a review. Such a review was timely given the need to continually provide the most cost-efficient monitoring possible, with anticipation that greater cost-recovery from industry for such work will be implemented in the future. Ageing fish is relatively resource intensive and expensive. The current estimated rate within the NSW DPI ageing laboratory at SIMS is approximately \$50 per otolith (for a final age and including materials and staff time and is calculated based on 100% cost-recovery – so the 'real' cost is somewhat less – around \$22 each).

Currently, the sampling protocol for obtaining an age composition for Dusky Flathead includes sampling 30 fish per month from each of three estuaries (Clarence River, Wallis Lake and Tuggerah Lakes), during the peak months (Jul, Aug, Sep, Oct, Mar, Apr, May, Jun) so 240 fish per location. That is ballpark \$36,000 worth of processing and reading and that does not include the cost of purchasing the fish (potentially 720 x (mean TL = 46 cm or ~ 0.6kg) x \$11 (average prices SFM) = ~\$4,750. So roughly around \$42K in total (as we tend to pay top prices at pre-auction sales), or nearly \$14K per estuary.

To investigate whether a simple random sampling design could: (i) adequately compare to the current ALK-derived age composition, and; (ii) be done with fewer age estimates, data from the most recent (2016/17) age sampling were used. All 694 age estimates from that year, pooled across all estuaries, were used. Comparisons were made with the fully scaled ALK-derived estimates, hereafter referred to as the 'known age' sample (Fig. 1).

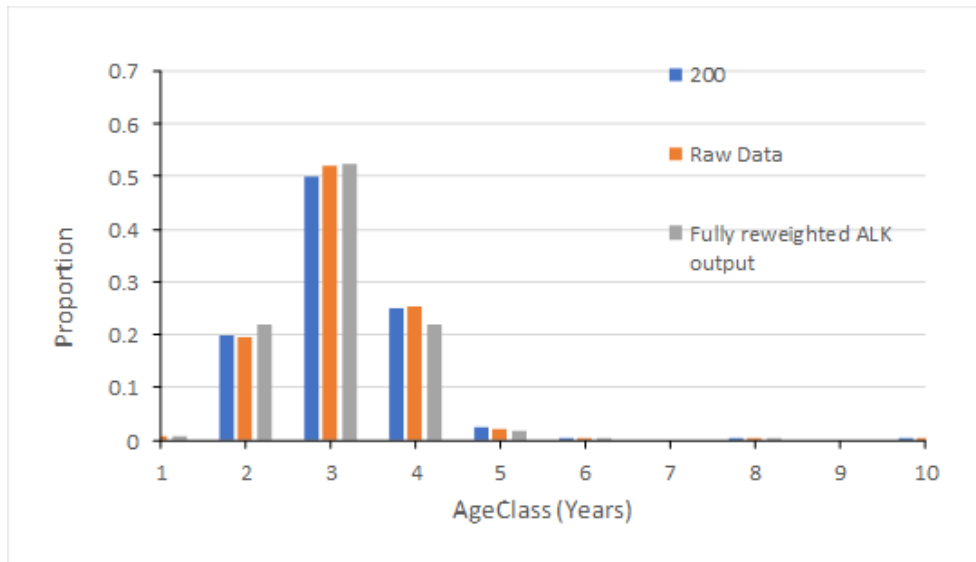


Figure 1. Dusky Flathead ages for 2016/17. The 'known age' composition is in grey. An example of a single random draw of 200 ages is shown in comparison.

Firstly, the probability that randomly drawn ages would be statistically different from the known age sample was tested for a range of sample sizes (50, 75, 100, 125, 150, 200, 250, 300). These samples were drawn (without replacement) at random from the 694 available ages and the process repeated 100 times for each sample size. The resulting age composition from each run was compared to the known age sample using a KS test, the results being 100 statistical comparisons for each sample size examined. The results showed as sample sizes increased that the probability of a significant difference from the known age sample declined (Figs. 2 and 3). 125 was the smallest sample size that produced an average P-value of less than 0.05. There was considerable variability in the random sample age compositions when compared to the known age sample for all sample sizes.

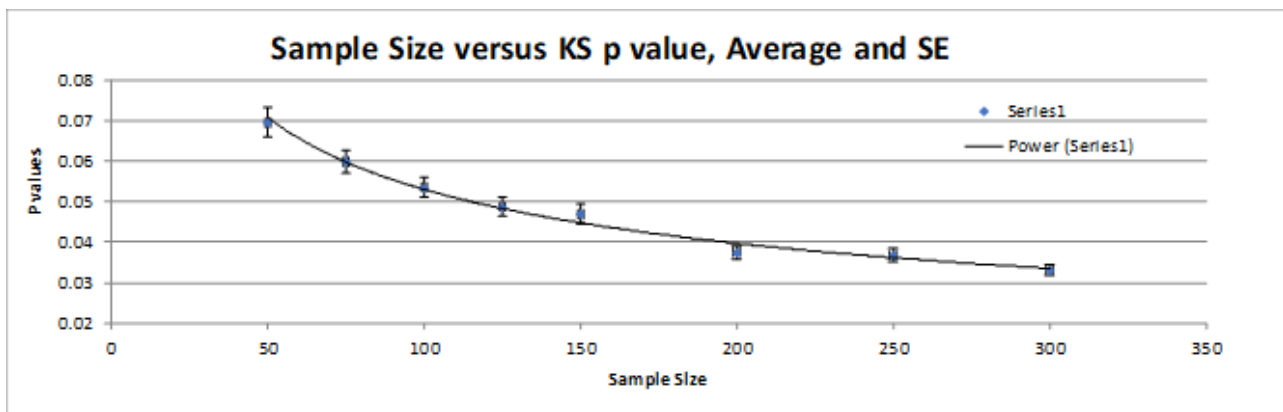


Figure 2. Mean P-values with standard errors when comparing randomly drawn age compositions with varying sample sizes with the known age composition.

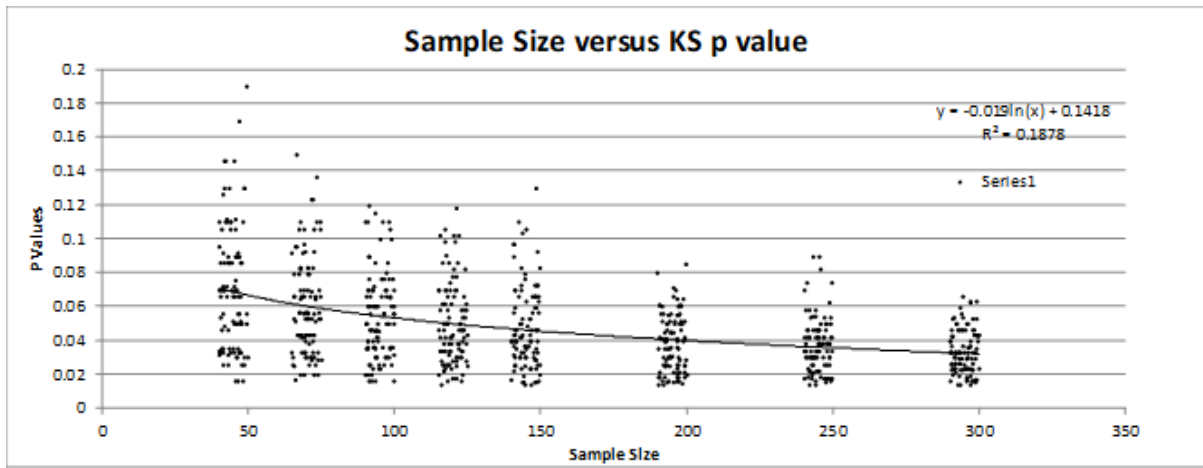


Figure 3. Individual P-values when comparing randomly drawn age compositions with varying sample sizes with the known age composition. Data have been jittered for ease of viewing.

Secondly, the precision of age compositions was examined using a mean weighted coefficient of variation (MWCV) analysis. The MWCV from each randomly drawn subset of ages, this time starting from 60 and incrementing by 20 each time until just under 700, was calculated. The results indicated good precision even at the lower sample sizes, with nearly all runs at 120 samples having MWCV of less than 0.15.

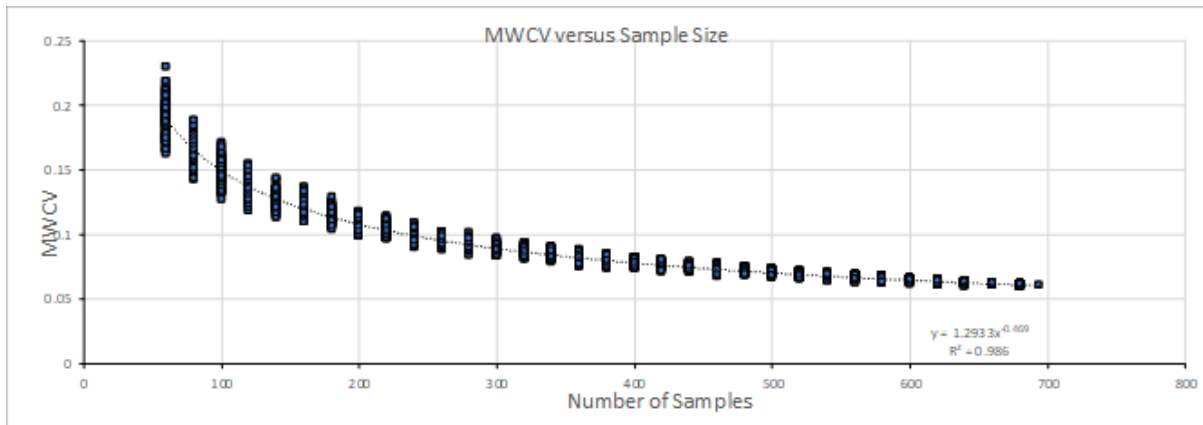


Figure 4. Mean weighted CVs of the age compositions drawn at random for varying sample sizes

Conclusion

These analyses indicate that a simple random sampling design with a target of 125 individuals would produce an age composition that is both unbiased and precise. The analyses used are also relatively precautionary, as the KS test is very sensitive to changes in compositions especially those with few x-axis bins. Also note that while the 694 Dusky Flathead ages from which these analyses took random draws were similar in composition to the ‘known age’ composition (Fig. 1), they were not the same – hence another level of uncertainty (for example a random subset may have been not significantly different from the 694 fish composition, but significantly different from the ‘known age’ composition).

Cost saving would be substantial, with 375 fish across three estuaries as opposed to 720, with a cost saving of approximately \$20,000 based on processing, analyses and fish purchase. These saving could be allocated to other priority species for ageing work.

Given the ‘season’ for this fishery has historically been March to June, and to exceed the 125 fish estimated to be needed to account for uncertainties, a target of 45 per month was deemed sufficient. 15 fish from 3 different catches, drawn from each size grade in the same proportion as that size grade compares to the other grades within a catch, was sampled.

Note. This random sampling design was not considered to be appropriate for the Clarence River fishery due to logistics of obtaining fish for otoliths.