MRFAC FINAL REPORT

SPECIES AND SIZE COMPOSITION OF RECREATIONAL CATCHES WITH PARTICULAR REFERENCE TO LICENSED FISHING METHODS

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Species and size composition of recreational catches, with particular reference to licensed fishing methods

Summary

There have been very few surveys of recreational sea fishing in Tasmania. The present study has been designed to complement a State-wide telephone/fishing diary survey of licensed fishing activity by providing size composition data for the major recreational finfish species. Representative size composition data is required to convert total catch in numbers (derived from the telephone/diary survey) into weights so that comparisons with the commercial catch (which is reported as weight) can be made. This study has also provided an opportunity to collect base-line information about the species composition of catches and examine the influences of targeting, fishing method and region on catch and size composition.

An access point creel survey design, covering fishing at a number of centres on the north and east coasts of Tasmania for the period December 1997 - April 1998, has been adopted. Over 1,200 fishing events, two thirds of which involved line fishing, were monitored with some 60 fish species represented by about 19,000 specimens recorded in the catches.

Rock lobster accounted for almost all of the catch taken by rock lobster pots while abalone and rock lobster were the primary components of the dive catch. Blue warehou, jackass morwong, flounder and bastard trumpeter were the major graball net species, mullet dominated the mullet net catch and whiting the beach seine catch. Flathead, mainly sand flathead, represented almost two-thirds of the line catch, with barracouta, squid and Australian salmon of secondary importance. Hand spears were used mainly to take flounder.

Due to regional differences in sampling intensity and the fact that sampling was weighted towards particular fishing types, the relative importance of the species in the monitored catch will not necessarily be representative of the entire fishery. Some of these biases can, however, be addressed by taking targeting into account. For instance, targeted fishing for blue warehou using graballs yielded a high proportion (58% by number) of the target species, with bastard trumpeter and jackass morwong the main by-catch species. By contrast, when fishing for flounder there was a minimal by-catch of other species.

A variety of target species were reported when line fishing, flathead being the most common. When targeted, flathead accounted for the vast majority of fish caught (90% by numbers). A relatively large sample of tuna fishing events was also monitored, with tuna generally representing less than 20% of the catch and barracouta the dominant species (over 60% by number). In instances where Australian salmon, barracouta or squid were targeted, catches were dominated by the particular target species.

Preliminary estimates of catch rate were calculated for rock lobster pot, graball net and line fishing. Rock lobster catch rates fell from 0.9 to 0.3 lobster per pot (or 0.04 to 0.01

per pot hour) between summer and autumn, suggesting a strong seasonal influence on catch rates. A catch rate of just over 5 fish per net day, regardless of season, was achieved using graballs. When fishing duration was taken into account, however, catch rates declined sharply from 0.7 to 0.3 fish per net hour between summer and autumn. Based on targeted fishing for blue warehou, graball catch rates fell from about 6 to 3 fish per net or 1.3 to 0.2 fish per net hour between summer and autumn.

Line fishing catch rates were generally higher in summer than in autumn, with catch rates for the east coast higher than those for the north coast. For flathead fishing, catches rates of between 3 and 4.8 fish per angler hour were achieved on the east coast, compared with about 1.9 for the north coast. Catch rates for tuna fishing were substantially lower, averaging around 0.2 to 1.0 fish per angler hour or just 0.1 tuna per angler hour.

Size composition data were gathered for a wide variety of finfish species and have been analysed on the basis of fishing method. Of particular importance to management is the finding that for sand flathead, flounder, jackass morwong, bastard trumpeter and wrasse, a significant proportion of the retained catch was undersized. These findings suggest that many anglers are unaware of the regulations relating to size limits.

For fishing gear such as nets, which are highly selective for size, it is important that mesh sizes and minimum size limits are ‘compatible’ to reduce the catch of undersized fish. Mesh size increases for graballs (including the definition of flounder nets) contained in the Scalefish Fishery Management Plan will go some way to reducing the catch of undersized fish. The major problem in relation to fish size, however, relates to flathead and, given the importance of the species in the recreational catch, there is a clear need to improve angler awareness of and compliance with the regulations.

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1 Introduction

Up until recently very little information has been available about the recreational fishery in Tasmania. A survey conducted in the early 1980s by the Australian Bureau of Statistics (ABS) indicated that about one quarter of Tasmanians (some 110,000 persons) were engaged in some form of salt water fishing activity, of whom about one fifth fished at least once a month (ABS 1984). No estimates of catch or catch composition were provided.

In 1984 a survey of recreational fishing was conducted in the Derwent Estuary, providing some information on motivation, expenditure and catch rates, but no information on effort levels, total catch or catch composition (Winter 1985).

A survey of home seafood production in Tasmania for the twelve months to April 1992 produced estimates of around 1,000 tonnes for finfish (including trout), 60 tonnes for rock lobster and 25 tonnes for abalone, suggesting that the recreational catch is significant (ABS 1994).

More recently Lyle and Smith (1998) conducted a telephone survey to collect information about previous fishing activity for fishers holding sea fishing licences (ie rock lobster pot, rock lobster dive, abalone dive, graball, mullet or beach seine net licences). Catch (numbers) and effort (days fished) estimates were derived for rock lobster and abalone, along with estimates of effort and main species targeted and caught by net fishing. In 1995/96, an estimated 110,000 rock lobster and 133,000 abalone were caught by recreational anglers. The main species targeted and caught by graball nets were bastard trumpeter and blue warehou (snotty trevally). The smaller mullet nets were used mainly to catch mullet and Australian salmon, while flounder and mullet were the main species caught by beach seine. Species composition and catch levels for net fishing were not included in this survey.

In late 1996, a major survey of licensed recreational fishing in Tasmania commenced, with data collection based on a combination of a fishing diary and telephone interviews. Participating fishers completed details of their fishing activity in a diary and this information was collated by telephone interviewers. Information provided for each fishing activity, or 'event', included location, fishing method, species targeted, time spent fishing and retained catch by species. The survey period covered eighteen months, from November 1996 to April 1998, with data analysis now in progress. While the survey yielded important information on species composition and quantities caught, direct comparisons with the commercial fishery are complicated since the recreational catch was expressed as numbers of fish whereas the commercial catch is reported in terms of weight. Total catch numbers can, however, be converted into weights if information about the size composition of the catch is known. By determining the average size (weight) for a species and multiplying this by the total number caught, catches can be expressed in terms of weight.

The present study, based on an access point creel survey, has been designed to collect representative size composition data for the major recreational finfish species.

Secondary objectives were to collect base-line information about the catch composition, examine the influences of targeting, fishing method and region on catch and size composition. By conducting the survey concurrently with the telephone/diary survey and collecting the same type of information relating to catch and effort, it will be possible to provide catch rate comparisons between surveys and, potentially, validate the telephone/diary survey data.

2 Methods

A team of creel survey agents located at Stanley, Bridport, St Helens, Tasman Peninsula and Southport, were recruited and trained in fish identification and interview techniques. Research personnel conducted additional interviews, expanding the area of coverage on the east coast. In this way, broad spatial coverage of the east and north coasts was achieved. The survey was conducted between December 1997 and April 1998, inclusive.

A non-random survey design was adopted in order to maximise the number of interviews and the types of fishing surveyed. Survey agents were encouraged to survey boat ramps in their local area at times when fishers were likely to be returning from a fishing trip and/or checking gear. Sampling effort was therefore concentrated on weekends, public holidays and in the early mornings and evenings. In addition, greater sampling intensity was directed during the peak fishing months of December-February and also during the Easter holiday period. Choice of sampling site on a given day was determined to some extent by local knowledge of the type of fishing conducted within that area. In this manner, sampling of recreational fishers was weighted towards certain types of fishing (in particular gillnetting) and targeting (for example blue warehou for gillnet and tuna for line fishing). As a consequence, the relative proportions of each fishing method (and targeting) was not considered to be representative of proportions within the overall fishery.

Where feasible, interviews were conducted with all fishing parties returning to shore at each site, otherwise fishing parties were selected at random. Therefore, when method, fishing region, time of year and targeting are taken into account, systematic biases in terms of catch rates, catch and size composition were minimised.

Interviews were generally conducted with one angler, on behalf of the entire fishing party. A small number of interviews (<2%) were conducted with beach or jetty anglers, the remainder involved boat fishing. If there was no evidence of fishers (ie no boat trailers) at a given site, survey agents would move to alternative landing sites.

The following information was collected (see Appendix 1 for interview form):

- number of anglers in the fishing party,
- post code of boat owner,
- type of waters fished (estuary, coastal and/or offshore),
- fishing method/gear (and units of gear where appropriate),
- gear details for gillnets (mesh size and net length),
- fishing platform (boat, shore or both),
- estimated start time, end time and any breaks from fishing,

- species targeted (up to two), and
- species and number of fish caught and kept (ie harvested[1])

Where more than one fishing method had been used, every effort was made to collect information pertaining to each gear type separately. In this study a 'fishing event' refers to a fishing operation which was completed on the day of interview and is defined by the fishing method/gear used and the species targeted. In a small number of instances anglers were unable to attribute their catch to each of the different methods employed (ie to the event level) and these data have not been used in the analysis of catch rates or species and size composition.

Survey agents sought permission to measure the catch and in doing so were able to assess the ability of anglers to correctly identify their catch to species. Lengths were based on the measurement of snout to the medial caudal ray[2], with the exception of sharks and squid which were measured for total length or mantle length, respectively. Measurements are reported to the centimetre rounded down, ie 30.1 and 30.8 cm are recorded as 30 cm. Rock lobster and abalone were not measured for size.

Where anglers had filleted their catches at sea it was not feasible to confirm species identification or count or measure the catch.

In an effort to increase sample sizes for gillnet catches, several recreational fishers provided supplementary data on the size composition of their gillnet catches. These data have not, however, been incorporated in the catch rate or species composition analyses.

[1] In recreational fishing studies it is common to distinguish between catch and harvest, 'catch' referring to the total number (weight) of fish caught including those released, whereas 'harvest' refers only to those fish retained. In this report all references to catch or catch rates refer only to the retained portion of the catch.

[2] For species with emarginate or forked caudal fins this measurement represented fork length, whereas species with truncate or rounded caudal fin this measurement was total length.

3 Results and Discussion

3.1 Overview

In total, over 1,200 fishing events were monitored in the survey, over half of which came from the Tasman Peninsula (Table 1). It should be noted that the number of events monitored in each area was influenced both by the effectiveness of the individual survey agents as well as the level of fishing activity in the area. Refusals by anglers to participate in the survey was minimal, at around 3% of all fishing parties approached by survey agents.

For the purpose of analysis, the north and east coasts of Tasmania were divided into four regions, North-west, North-east, East and South-east (Fig. 1). No sampling was conducted on the west coast or offshore Bass Strait Islands.

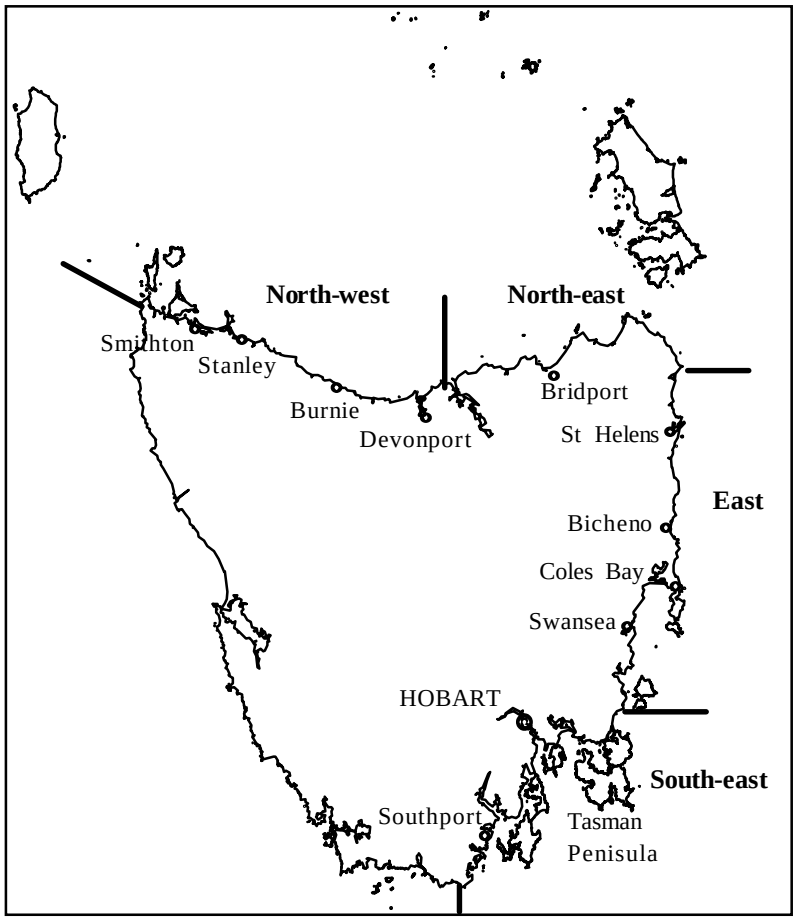

Fig. 1. Map of Tasmania showing regions and locations referred to in this report.

Almost two thirds of all events monitored involved line fishing, including handline, trolling and use of squid jigs (Table 1). Other fishing methods/gear surveyed included

rock lobster pots, diving (snorkel, SCUBA and surface air or hookah), gillnetting (graball and mullet net)[3], beach seine and hand spear (surface).

Table 1 Number of fishing events monitored between December 1997 and April 1998, by region and fishing method.

	Fishing method									
		Dive			Gillnet					
Region - Location(s)	R. Lob. Pot	Snork-el	SCUBA	Surf. air	Grab-all	Mullet	Beach seine	Line	Spear	**Total**
North-west - Stanley/Smithton	3	3		3	3	3	1	33		**49**
North-east - Bridport		1	1		4			212		**218**
East -										**176**
St Helens	5	1	1		7			162		
Bicheno	1				3			16		**20**
Swansea/Coles Bay	2			2	4			57		**65**
South-east -										
Tasman Peninsula	128	1	20	16	188	1	1	289	5	**649**
Southport	26			1	22	1		13		**63**
Total	**165**	**6**	**22**	**22**	**231**	**5**	**2**	**782**	**5**	**1240**

In addition, a further 31 graball and 13 mullet net fishing events that were monitored by selected recreational fishers have been used to supplement size composition data.

3.2 Catch Composition

Over 60 species or species groups of fish were recorded in the monitored catches, represented by almost 19,000 individuals (Table 2). Common and scientific names of all species recorded are presented in Appendix 2.

Line fishing yielded about 75% of the total catch numbers, with flathead (principally sand flathead and to a lesser extent tiger flathead) accounting for half of all fish caught (Table 2). Other species of significance included barracouta, blue warehou, Australian salmon, jackass morwong (perch), squid (arrow and calamary), abalone and rock lobster.

[3] By regulation, graball and mullet nets are distinguished on the basis of mesh size, graball mesh size ranges between 100-140 mm whereas mullet net mesh size is 60-70 mm.

Table 2 Catch (numbers) by fishing method for fishing events monitored between December 1997 and April 1998.

	Fishing method									
		Dive			Gillnet					
Species	R.Lob. pot	Snork-el	SCUBA	Surf. air	Grab-all	Mullet net	Beach seine	Line	Spear	**Total**
Rock lobster	258	0	60	94	9	0	0	0	0	**421**
Abalone	0	90	230	321	0	0	0	0	0	**641**
Australian salmon	0	0	0	0	105	0	0	558	0	**663**
Barracouta	0	0	0	0	47	0	0	1821	0	**1868**
Black bream	0	0	0	0	0	0	0	2	0	**2**
Blue eye trevalla	0	0	0	0	0	0	0	1	0	**1**
Boarfish	0	0	0	1	12	0	0	1	0	**14**
Cod	0	0	0	0	82	4	0	60	0	**146**
Dory	0	0	0	0	8	0	0	0	0	**8**
Eel	1	0	0	0	0	0	0	0	0	**1**
Flathead, rock	0	0	0	0	0	2	0	0	0	**2**
Flathead, sand	0	0	0	0	16	0	0	7210	25	**7251**
Flathead, tiger	0	0	0	0	11	0	0	725	0	**736**
Flathead, unspecified	0	0	0	0	0	0	1	1568	0	**1569**
Flounder, greenback	0	0	0	0	225	0	0	10	144	**379**
Flounder, long-snout	0	0	0	0	4	0	0	0	1	**5**
Garfish	0	0	0	0	0	0	3	89	0	**92**
Gurnard	0	0	0	0	18	0	0	331	0	**349**
Harpuka	0	0	0	0	0	0	0	5	0	**5**
Herring cale	0	0	0	0	1	0	0	0	0	**1**
Jack mackerel	0	0	0	0	131	12	0	30	0	**173**
Latchet	0	0	0	0	0	0	0	2	0	**2**
Leatherjacket	0	1	0	0	71	0	0	40	0	**112**
Ling	0	0	0	0	6	0	0	1	0	**7**
Luderick	0	0	0	0	12	0	0	0	0	**12**
Magpie perch	0	1	0	0	2	0	0	0	0	**3**
Marblefish	0	0	0	0	9	0	0	0	0	**9**
Morwong, banded	0	0	2	0	12	0	0	15	0	**29**
Morwong, jackass	0	0	0	0	307	0	0	251	0	**558**
Mullet	0	0	0	0	1	84	24	63	0	**172**
Pike, long-fin	0	0	0	0	0	0	0	2	0	**2**
Pike, short-fin	0	0	0	0	0	0	0	1	0	**1**
Pike, unspecified	0	0	0	0	7	0	0	20	0	**27**
Rays bream	0	0	0	0	0	0	0	1	0	**1**
Rosy perch	0	0	0	0	0	0	0	2	0	**2**
Scalyfin	0	0	0	0	1	0	0	0	0	**1**
Shark, elephant	0	0	0	0	26	0	0	0	0	**26**
Shark, gummy	0	0	0	0	3	1	0	14	0	**18**
Shark, mako	0	0	0	0	0	0	0	5	0	**5**
Shark, Port Jackson	0	0	0	0	0	0	0	2	0	**2**
Shark, saw	0	0	0	0	5	0	0	0	0	**5**
Shark, school	0	0	0	0	0	0	0	1	0	**1**
Shark, spurdog	0	0	0	0	12	0	0	0	0	**12**
Shark, unspecified	0	0	0	0	3	0	0	1	0	**4**
Silver trevally	0	0	0	0	31	0	0	0	0	**31**
Skate/rays	0	0	0	0	2	0	0	1	0	**3**

	Fishing method									
		Dive			Gillnet					
Species	R.Lob. pot	Snork-el	SCUBA	Surf. air	Grab-all	Mullet net	Beach seine	Line	Spear	**Total**
Snapper	0	0	0	0	0	0	0	19	0	**19**
Sweep	0	0	3	8	0	0	0	0	0	**11**
Thetis fish	0	0	0	0	1	0	0	0	0	**1**
Trumpeter, bastard	0	0	0	10	215	0	0	10	0	**235**
Trumpeter, real bastard	0	0	0	0	44	0	0	0	0	**44**
Trumpeter, striped	0	0	0	0	49	0	0	142	0	**191**
Tuna, albacore	0	0	0	0	0	0	0	158	0	**158**
Tuna, southern bluefin	0	0	0	0	0	0	0	90	0	**90**
Tuna, stripey	0	0	0	0	0	0	0	1	0	**1**
Tuna, unspecified	0	0	0	0	0	0	0	50	0	**50**
Unident. species	0	0	0	0	0	0	0	2	0	**2**
Warehou, blue	0	0	0	2	838	1	0	96	0	**937**
Warehou, spotted	0	0	0	0	30	0	0	14	0	**44**
Whiting	0	0	0	0	0	2	109	184	0	**295**
Wrasse, blue throat	0	1	0	0	11	0	0	1	0	**13**
Wrasse, unspecified	0	0	0	0	84	4	0	131	0	**219**
Squid, arrow	0	0	0	0	13	0	0	744	0	**757**
Squid, calamary	0	0	0	0	3	0	0	222	0	**225**
Squid, unspecified	0	0	0	0	1	0	0	139	0	**140**
Octopus	0	0	0	0	0	0	0	1	11	**12**
Grand total	**259**	**93**	**295**	**436**	**2468**	**110**	**137**	**14837**	**181**	**18816**

3.2.1 Rock lobster pot

With the exception of a single conger eel, rock lobster accounted for the entire catch retained in rock lobster pots (Table 2).

3.3.2 Diving

Although only a small number of diving events were monitored, abalone and rock lobster accounted for the vast majority (over 97%) of the catch (Table 2). A small number of scalefish were also taken (by underwater spearfishing), namely sweep, bastard trumpeter, banded morwong, blue warehou, boarfish, magpie perch, leatherjacket and wrasse, all typically reef dwelling species.

3.3.3 Graball net

Graball net catch composition by numbers (Table 2) and percentage (Table 3) indicate that a wide variety of species are taken, representing reef (eg boarfish, morwongs, trumpeters, blue warehou, leatherjacket, wrasse, etc), demersal (eg flounder, flathead, etc) and pelagic species (eg barracouta, jack mackerel, etc). The observed species

diversity is largely a function of targeting, with nets clearly being fished over reefs and soft sediments (mud/sand).

Catch compositions vary considerably when targeting is taken into account (Table 3). It is apparent that for graball net sets in which blue warehou was a nominated target species, the catch was dominated (58%) by that species (Table 3). Species of secondary importance included bastard trumpeter, jackass morwong and Australian salmon.

When either of the trumpeters were targeted, blue warehou remained the dominant species caught, with bastard trumpeter accounting for just 18% of the catch when it was targeted and striped trumpeter only 7% when it was targeted (Table 3). The dominance of blue warehou in trumpeter sets is not surprising since it was usually nominated as a target along with one or other of the trumpeter species. Bastard trumpeter were a relatively common by-catch when fishing for striped trumpeter (12%), with leatherjackets and wrasse of minor importance. These findings should, however, be interpreted with caution given the small sample sizes involved.

Although based on very few events, our data indicate that, when flounder were targeted, there was very limited by-catch of other species (Table 3). This observation is further confirmed if all graball events in which flounder were either targeted or caught are combined (ie including events where flounder were caught but were not a nominated target). In the 17 events that met these criteria, flounder alone accounted for 89% of the total catch number.

The level of species diversity in net sets for which no target species was given (generally reported as fishing for a ‘feed’) indicates that fishing was conducted in a variety of habitats (Table 3). Species of importance include blue warehou, jackass morwong, jack mackerel, bastard trumpeter, flounder, cod, leatherjacket and wrasse.

Table 3 Catch composition (%) by nominated target species for graball net.

	Target species					
Common name	Flounder	Bastard trumpeter	Striped trumpeter	Blue warehou	No target	**Total**
Australian salmon			7.2	4.5	1.9	**4.3**
Barracouta				1.2	0.5	**1.9**
Boarfish		0.9		0.1	0.9	**0.5**
Cod		0.9	4.1	2.0	5.4	**3.3**
Dory			1.0	0.2	0.5	**0.3**
Flathead, sand	1.6			0.2	0.6	**0.6**
Flathead, tiger				0.8	0.3	**0.4**
Flounder	**98.4**			0.6	9.2	**9.3**
Gurnard			1.0	0.4	1.3	**0.7**
Jack mackerel			1.0	2.0	9.6	**5.3**
Leatherjacket		3.4	4.1	1.3	4.8	**2.9**
Ling			1.0	0.2	0.4	**0.2**
Luderick				0.9	0.3	**0.5**
Marblefish		0.9		0.5	0.3	**0.4**
Morwong, banded		0.9		0.3	0.8	**0.5**
Morwong, jackass		2.6		7.1	18.5	**12.4**
Pike				0.7		**0.3**
Shark, dogfish				1.1	0.1	**0.5**
Shark, elephant			2.1	0.9	1.5	**1.1**
Shark, gummy					0.3	**0.1**
Shark, saw		0.9		0.4		**0.2**
Silver trevally					2.7	**1.3**
Trumpeter, bastard		**18.1**	12.4	7.5	9.3	**8.7**
Trumpeter, real bastard				3.4	0.8	**1.8**
Trumpeter, striped			**7.2**	2.0	1.9	**2.0**
Warehou, blue		56.0	44.3	**58.5**	19.9	**34.0**
Warehou, spotted				1.3	1.5	**1.2**
Wrasse		14.7	3.1	1.8	4.8	**3.8**
Squid			1.0	0.2	1.4	**0.6**
Other		0.9	1.0	0.1	0.8	**0.6**
Rock lobster			9.3			**0.4**
Number of events	**6**	**16**	**9**	**101**	**113**	**231**

3.3.4 Mullet net

Despite very few mullet net events being monitored, it is apparent that mullet are an important component of the catch (76%) with jack mackerel of lesser significance (11%) (Table 2).

3.3.5 Beach seine

Only two beach seine events were monitored, with whiting (80%) and mullet (17%) being the dominant species in the catch (Table 2).

3.3.6 Line fishing

Flathead dominated the line catches, accounting for almost two-thirds of the overall numbers (Table 2 and Table 4). Not surprisingly, flathead were nominated as the target in a large proportion (50%) of the monitored line fishing events, contributing over 90% of the total numbers caught. Although around 17% of the flathead caught were not identified to species (mainly because they had been filleted at sea), sand flathead were clearly the dominant species, occurring at a rate of 12:1 when compared with tiger flathead.

In addition to flathead fishing, a substantial number of tuna fishing events were monitored, exclusively at St Helens and the Tasman Peninsula. Where tuna were targeted, they represented less than 20% of the catch, albacore being the most common species followed by southern bluefin tuna (Table 4). Barracouta were clearly the main species caught when tuna fishing, accounting for over 60% of the numbers. As fishing for tuna involves trolling bait or lures it is not surprising that barracouta represent a common by-catch. The relatively low occurrence of tuna is probably a reflection of low abundance and difficulty in catching the species. Being a game fish, it is also possible that some tuna were released, although the frequency of this practice was not ascertained.

Where Australian salmon were targeted (usually by trolling or lure fishing) they accounted for over 80% of the catch, with flathead a minor by-catch (Table 4). Barracouta accounted for 60% of the catch when targeted, with Australian salmon, flathead and squid the main by-catch. When targeted, squid comprised over 80% of the catch with flathead the main by-catch.

For line fishing events that were targeted at striped trumpeter, the species comprised just over 25% of the catch (Table 4). Being fished over inshore and offshore reefs, the catch composition is somewhat different to that for flathead or squid fishing, with gurnard followed by tiger (rather than sand) flathead, barracouta and jackass morwong the main by-catch species.

Table 4 Catch composition (%) by nominated target species for line fishing.

	Target species							
Species	Aust. salmon	Barra-couta	Flathead	Striped trumpeter	Tuna	Squid	None	**Total**
Australian salmon	**82.3**	11.9	0.6		0.1		5.7	**3.8**
Barracouta	4.3	**59.7**	1.2	10.3	62.0	3.0	6.9	**12.3**
Cod		0.1	0.1		0.2	0.1	2.1	**0.4**
Flathead, sand	11.1	7.3	**69.7**	2.2	5.1	13.6	43.4	**48.6**
Flathead, tiger		0.4	**5.8**	18.4	3.8	0.6	4.3	**4.9**
Flathead, unspecified			**16.0**		0.8	0.1	7.5	**10.6**
Gurnard		0.5	0.8	29.7	3.1		6.8	**2.2**
Leatherjacket			0.4		0.1		0.2	**0.3**
Morwong, jackass			0.6	9.7	0.7		7.4	**1.7**
Mullet			0.1				1.3	**0.4**
Trumpeter, striped				**25.9**	3.1		2.2	**1.0**
Tuna, albacore				2.7	**8.9**	0.2	0.6	**1.1**
Tuna, southern bluefin		0.2			**5.6**			**0.6**
Tuna, unspecified					**3.0**		0.1	**0.3**
Warehou, blue			0.1		1.8		0.4	**0.6**
Whiting			1.6				2.4	**1.2**
Wrasse		0.8	0.3		0.6		3.9	**0.9**
Squid, arrow	1.7	12.6	0.4			**59.8**	1.4	**5.0**
Squid, calamary		2.4	1.0			**12.4**	0.1	**1.5**
Squid, unspecified		3.9	0.2		0.1	**10.1**		**0.9**
Other	0.6	0.2	1.2	1.1	1.1		3.1	**1.7**
Number of events	**27**	**19**	**380**	**14**	**152**	**25**	**122**	**764**

3.3.7 Spear

Data on hand spear fishing is limited to a small number events but the prominence of flounder (80%) in the catch is clearly apparent (Table 2). Spear fishing is conducted at night over shallow sand flats, often by wading or from a boat. Fish are located using spot lights and are speared from the surface.

3.4 Catch rates

Catch rates or catch (harvest) per unit effort are defined as the total catch divided by the total effort. The actual units in which effort is measured being determined by the fishing method (refer below).

Given the preliminary nature of the study and the non-random sampling design, data do not warrant detailed statistical analyses. Rather than testing statistically for the effects of region, season and targeting, catch rates are reported as point estimates for the purpose of comparison.

3.4.1 Rock lobster pot

Based on catch and effort data for the south East, catch rates for rock lobster indicate a three-fold decline from almost 0.9 rock lobster to just 0.3 rock lobster per 'pot day' from summer to autumn (Table 5). A similar decline is apparent for an alternative measure of catch rate based on rock lobster per pot hour. However, the reliability of the autumn catch rate estimates are uncertain since they are based on very few events.

Set duration for rock lobster pots was similar in the two seasons, averaging 20.1 hours in summer and 19.0 hours in autumn, reflecting the common practice of leaving pots to fish overnight.

Table 5 Catch, effort and catch rates for rock lobster pot fishing for the South-east region.

			Effort		Catch rate	
Season	No. events	RL catch (no.)	'Pot days'	Pot hours	No. per pot day	No. per pot hour
Summer	118	216	250	5034.9	0.86	0.043
Autumn	36	22	77	1491.2	0.29	0.015
Combined	**154**	**238**	**327**	**6526.1**	**0.73**	**0.036**

3.4.2 Graball

The South-east was the only region in which an adequate sample of graball net events was obtained (Table 1). Based on these data, overall catch rates averaged just over 5 fish per 'net day' or between 0.3-0.7 fish per net[4] hour (Table 6). A feature of these results is that, in terms of number of fish per net, catch rates were very similar for the two seasons but the autumn catch rate based on number of fish per net hour was less than half that for summer.

These findings indicate that fishers effectively maintain catch rates (on a per net basis) in autumn by leaving nets set for longer periods. The average set duration in summer across all graball net events was 6.25 hours compared with 17.1 hours in autumn. The influence of different seasonal targeting and expected catch rates may be contributing factors to this change in fishing practice.

Table 6 Catch, effort and catch rates for graball nets, based on data for the South-east region.

			Effort		Catch rate	
Season	No. events	Catch (no.)	Net 'days'	Net hours	No. per net day	No. per net hour
Summer	150	1594	286	2239.5	5.57	0.71
Autumn	60	643	121	2056.5	5.31	0.31
Combined	**210**	**2237**	**407**	**4296**	**5.50**	**0.52**

[4] By regulation a graball net can not exceed 50 m in length.

Catch rate analysis, taking into account targeting, has been conducted for events targeted at blue warehou. Catch rates (based on the entire catch and for warehou alone) were substantially higher during summer, falling by a factor of at least two in terms of number of fish per net and by a factor at least seven in terms of numbers per net hour (Table 7). Comparison between catch rates for the entire catch and for blue warehou, indicate that, on average, the target species represented slightly more than half of the catch, a finding that is reflected in the analysis of catch composition (Table 3).

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Table 7 Catch, effort and catch rates for graball nets, based on effort targeted at blue warehou.

						Catch rate			
		Catch (no.)		Effort		All species		Warehou	
Season	No. events	All species	Warehou	Net 'days'	Net hours	No. per net day	No. per net hour	No. per net day	No. per net hour
Summer	86	925	570	147	689.3	6.29	1.34	3.88	0.83
Autumn	11	78	31	24	414.0	3.25	0.19	1.29	0.07
Combined	**97**	**1003**	**601**	**171**	**1103.3**	**5.87**	**0.91**	**3.51**	**0.54**

3.4.3 Line fishing

With the exception of the North-west, where monitored effort was low, line fishing catch rates were between 1.2 and up to 2.9 fish per angler hour, depending on region and season (Table 8). Apart from a small number of events, mostly from the North-west, line fishing was primarily based on boat fishing.

Catch rates were generally higher in summer than autumn, though this pattern was reversed in the East region, with the highest overall catch rates reported for the South east in summer (Table 8). The average time spent fishing by each party was slightly higher in autumn (4.1 hours) compared with summer (3.3 hours).

Table 8 Catch, effort and catch rates for line fishing by region and season.

Region	Season	No. events	Catch (no)	Effort (angler hours)	Catch rate (no per hour)
North-west	Summer	5	38	28.5	1.33
	Autumn	17	56	112.5	0.50
North-east	Summer	146	2478	1339.2	1.85
	Autumn	64	918	613.3	1.50
East	Summer	113	1179	1015	1.16
	Autumn	115	2492	1310	1.90
South-east	Summer	120	3261	1123.8	2.90
	Autumn	174	3973	2114.9	1.88
Regions combined	Summer	384	6956	3506.5	1.98
	Autumn	370	7493	4150.7	1.79

Catch rate analysis becomes more meaningful, however, when targeting is taken into account. Catch rates for flathead on the east coast (East and South-east regions) were

consistently higher (generally by a factor of two or more) than for the North-east region (Table 9). The predominance of flathead in the catches (Table 4) is reflected in the similarity between the 'all species' and flathead only catch rates (Table 9).

Table 9 Catch, effort and catch rates for line fishing targeted at flathead, by region and season.

			Catch (no.)		Effort	Catch rate (no. per hour)	
Region	Season	No events	All species	Flathead	(angler hours)	All species	Flathead
North-east	Summer	131	2291	2065	1196. 3	1.92	1.73
	Autumn	49	767	690	413.8	1.85	1.67
East	Summer	41	846	762	282.5	2.99	2.70
	Autumn	43	1559	1495	334.4	4.66	4.47
South-east	Summer	49	1497	1384	312.3	4.79	4.43
	Autumn	64	1690	1634	411.5	4.11	3.97

Given the recreational importance of flathead, an alternative analysis based on events in which flathead were either targeted or caught was conducted. While generally lower than catch rates for targeted fishing, the relative trends by area and season are maintained (Table 10). By comparison, targeted catch rates were about 1.2-1.4 times higher than those based on the more general definition of flathead fishing.

In situations where flathead were either targeted or caught, average fishing time per fishing party ranged from 3.0 hours in summer to 3.35 hours in autumn.

Table 10 Catch, effort and catch rates for line fishing where flathead were a nominated target or flathead were taken as part of the catch, by region and season.

			Catch (no.)		Effort	Catch rate (no. per hour)	
Region	Season	No events	All species	Flathead	(angler hours)	All species	Flathead
North-east	Summer	139	2411	2175	1258.6	1.92	1.73
	Autumn	59	865	788	580.9	1.49	1.36
East	Summer	52	959	912	389.5	2.46	2.34
	Autumn	62	1916	1870	542.6	3.53	3.45
South-east	Summer	61	1660	1455	422.8	3.93	3.44
	Autumn	94	2148	2092	727.9	2.95	2.87

Flathead fishing catch rates determined here for the South-east are generally comparable with those reported by Winter (1985) for a 1984 recreational fishing survey of the Derwent Estuary and Frederick Henry Bay. The survey was conducted between February and May and estimated catch rates for boat fishing of 1.3 and 3.4 fish per angler hour for the Derwent Estuary and Frederick Henry Bay, respectively.

Tuna fishing catch rates (all species and tuna only) were substantially lower (by a factor of 10) than flathead catch rates, with tuna only a minor component of the catches (Table

11). Interestingly, while catch rates (based on all species caught) were substantially lower (by a factor of at least two) for the East, when catch rates for tuna alone are considered, then there is little difference between regions. The higher overall catch rate in the South-east is due to higher levels of by-catch, predominantly barracouta (Table 4).

On average, fishing times were generally greater for tuna than for flathead fishing, averaging 5.6 hours in summer and 6.0 hours in autumn.

Table 11 Catch, effort and catch rates for line fishing targeted at tuna, by region and season.

			Catch (no.)		Effort	Catch rate (no. per hour)	
Region	Season	No events	All species	Tuna	(angler hours)	All species	Tuna
East	Summer	37	105	52	479.3	0.22	0.11
	Autumn	29	168	85	590.4	0.28	0.14
South-east	Summer	22	195	51	437.5	0.45	0.12
	Autumn	64	1136	76	1160	0.98	0.07

3.5 Size composition

3.5.1 General

Length weight relationships used to convert size composition data into weights are presented in Appendix 3. Details of all fish measured, including sample size, size range, average length and weight, by fishing method, are summarised in Appendix 4.

References to size limits are based on those that applied at the time of the survey (old size limits) and those that have been introduced as part of the Scalefish Fishery Management Plan, to take effect generally from November 1998 (refer to Appendix 5). Since most size limits are expressed as total lengths, it has been necessary to convert them into fork lengths, where appropriate, in order to assess the level of adherence to these regulations. Total-fork length relationships are available for the trumpeters (Murphy and Lyle 1998) and were derived for blue warehou in this study. For all other species, a conversion factor was derived from the ratio of fork length to total length measured from taxonomic drawings of the particular species (Last *et al*. 1983).

3.5.2 Australian salmon

Australian salmon ranged in size from 19-57 cm fork length (FL), with a strong mode at 25 cm and smaller modes at 37 and 43 cm (Fig. 2). A broad range of sizes were represented in the line catch, with a large proportion of the catch between about 20 and 32 cm and the bulk of the remainder between 34-47 cm. Graball net catches, by contrast, were more restricted in size range, presumably a function of the mesh selectivity characteristics of the gear. Line and graball size distributions overlapped

mainly in the 40-50 cm size range. On average, line caught fish were smaller (32 cm and 0.7 kg) than graball net caught fish (46 cm and 1.7 kg) (Appendix 4).

All fish measured in this study were larger than the new minimum size limit of 20 cm total length (TL) (equivalent to just over 18 cm FL).

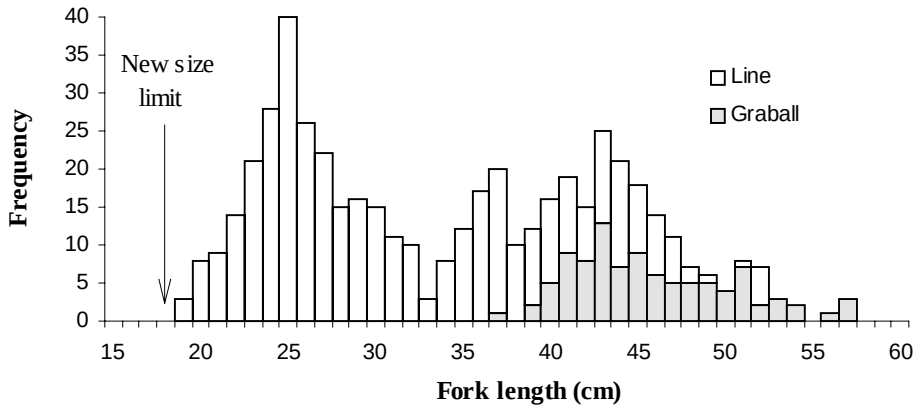

Fig. 2 Australian salmon length frequency distribution, by fishing method.

3.5.3 Barracouta

Barracouta size distribution is characterised by a small mode between about 30-45 cm FL and a strong mode between 60-72 cm, with a small number of fish up to about 100 cm (Fig. 3). The majority (97%) of fish measured were taken by line fishing, the average size being 62 cm or 1.2 kg (Appendix 4).

There is no size limit for barracouta in Tasmania.

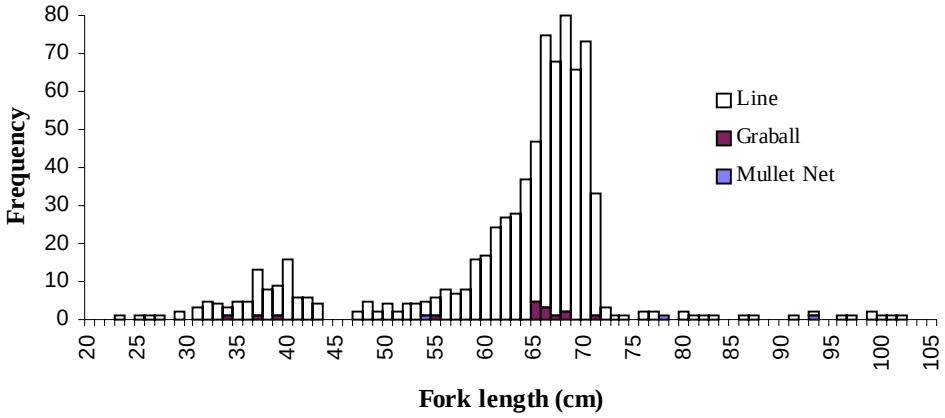

Fig. 3 Barracouta length frequency distribution, by fishing method.

3.5.4 Cod

Cod ranged between 24-49 cm TL, with majority of fish in the 30-45cm size range (Fig. 4). The average size of graball caught fish (38 cm and 0.6 kg) was similar to that for line (40 cm and 0.6kg), the size composition of catches by the two methods generally overlapping (Appendix 4).

There are no limits on the size of cod than can be taken in Tasmania.

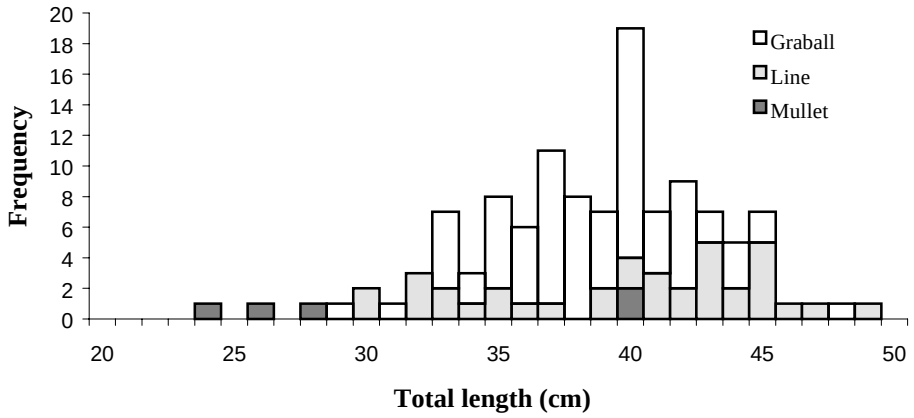

Fig. 4 Cod length frequency distribution, by fishing method.

3.5.5 Flathead

Sand flathead

The sand flathead length frequency distribution is comprised of a single mode, with a peak at 28 cm FL, and is skewed to the right (Fig. 5). Fish ranged between 16-55 cm, though individuals larger than about 45 cm were rare. Approximately 99% of all fish measured were taken by line fishing, averaging 31 cm or 0.25 kg (Appendix 4).

A size limit of 30 cm TL applies to flathead (equivalent to a fork length of about 29.5 cm). Our data clearly indicate than a large proportion (41%) of the retained catch were below the legal minimum size limit. Given the importance of flathead as a recreational species, it is of considerable concern that the size limit is poorly adhered to. This is despite preliminary results from surveys of angler awareness of fisheries regulations which suggest a reasonable awareness of the size limit for flathead (Lyle, unpubl. data).

Sand flathead size composition by fishing locality is summarised in Fig. 6. Size distributions indicate some differences between areas, though some sample sizes (eg Bicheno and Southport) are comparatively small. Bridport, Swansea/Coles Bay and Tasman Peninsula distributions were each characterised by a single mode, skewed to the left. There are, however, differences between these areas, with larger fish on average from Bridport (34 cm), compared with Swansea/Coles Bay (32 cm) and Tasman Peninsula (30 cm). It is unclear whether these differences are a reflection of differences in the size structure of the fish populations in each of the areas, due to

differences in angler behaviour (specifically in terms of the size of fish retained) or due to a combination of these and other factors. It is, nonetheless, apparent that the problem of retaining undersized flathead is widespread.

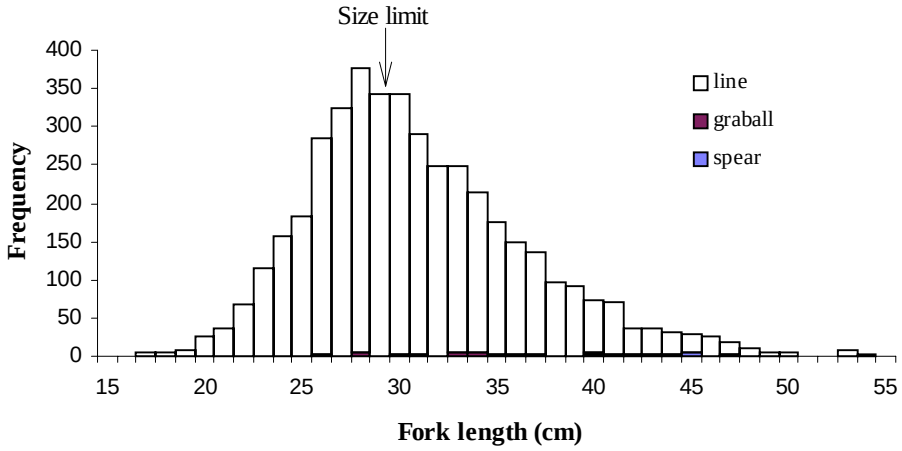

Fig. 5 Sand flathead length frequency distribution, by fishing method.

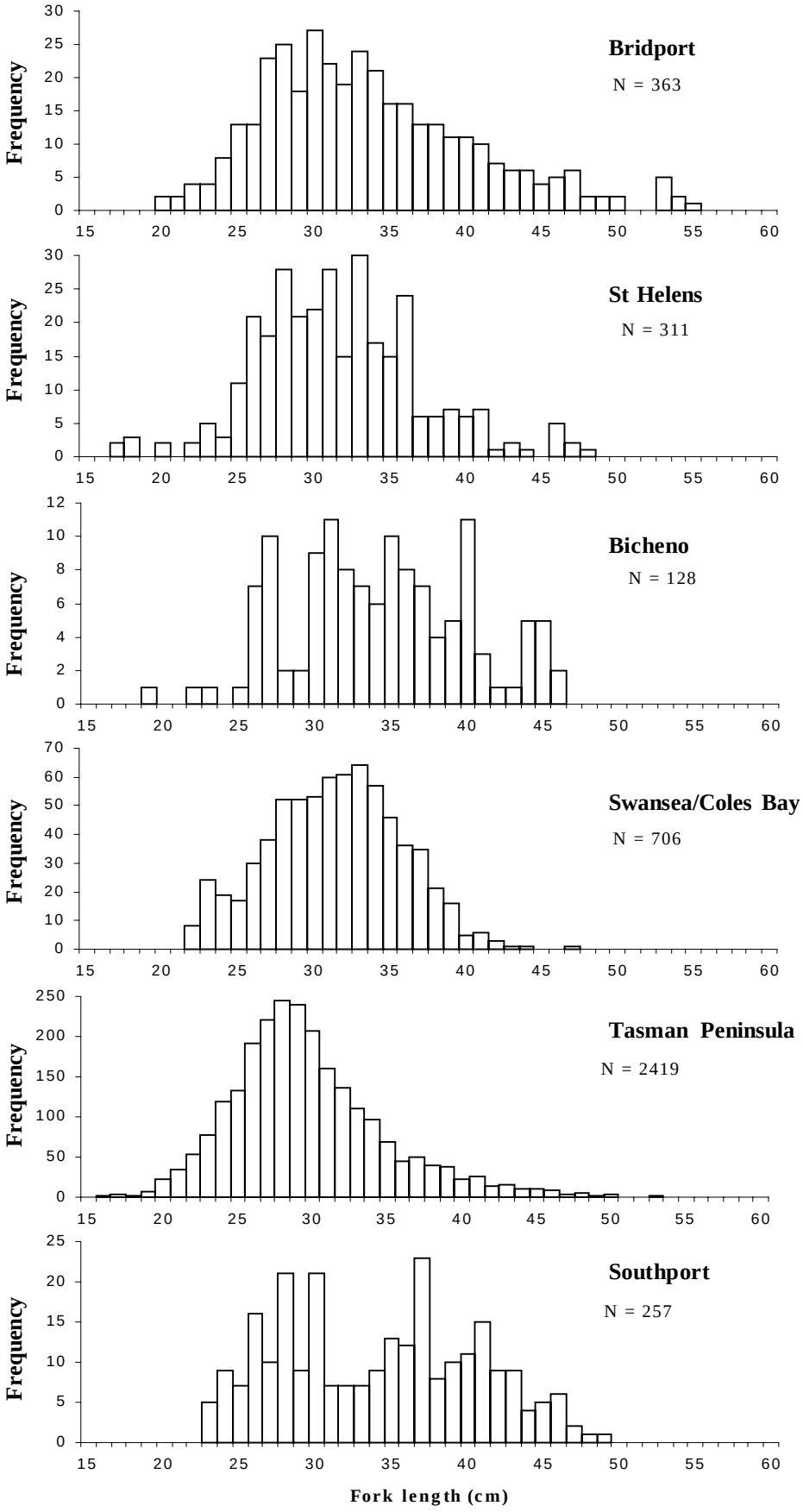

Fig. 6 Sand flathead length frequency distributions, by fishing areas.

Tiger flathead

Tiger flathead were less common than sand flathead in recreational catches and tended to be larger on average, almost 42 cm FL and 0.65 kg for line caught fish (Appendix 4). Fish of between 22-67 cm were recorded, the majority measuring between about 40-50 cm (Fig. 7).

Undersized fish represented just 8% of the catch for this species.

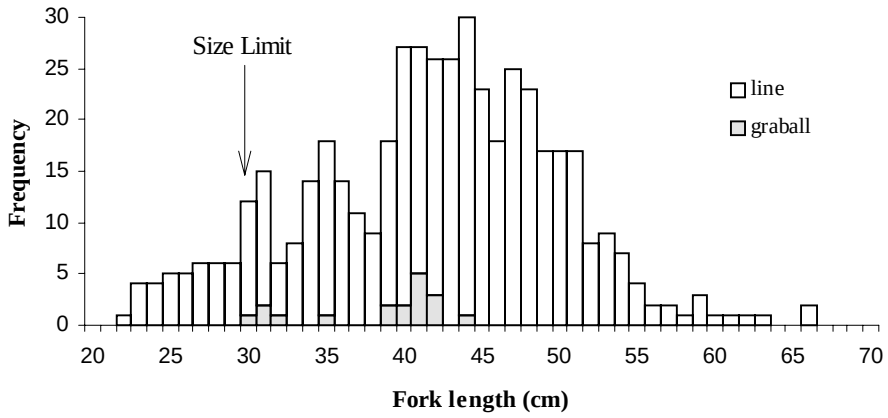

Fig. 7 Tiger flathead length frequency distribution, by fishing method.

3.5.6 Greenback flounder

Greenback flounder ranged between 20-37 cm TL, with a strong mode at 27 cm (Fig. 8). Although based on a small sample size, line caught flounder tended to be larger than either spear or graball caught fish. The average size of flounder in graball catches was about 27 cm (0.3 kg), for spear almost 28 cm (0.3 kg) and 30 cm for line fishing (0.4 kg) (Appendix 4).

Overall, 22% of all flounder measured were undersized. If fishing method is considered, 19% of spear and 28% of graball net caught fish were below 25 cm. These findings suggest that there is a need to increase awareness of size limits for flounder.

The recent definition of a flounder net in the fisheries regulations as a graball with a mesh size exceeding 125 mm is likely, however, to address the issue of undersized flounder in nets to a large extent.

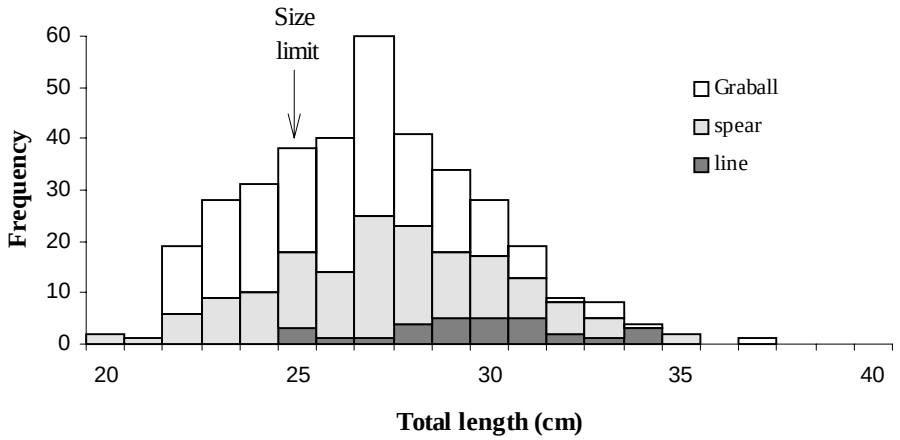

Fig. 8 Flounder length frequency distribution, by fishing method.

3.5.7 Gurnard

It is probable that a number of species, representing at least two families of fish (Scorpaenidae and Triglidae) are represented in the gurnard catches. For this reason, size composition data has limited value beyond indicating the range of sizes retained. Most gurnards measured between about 25-38 cm, with a specimens up to 45 cm and as small as 15 cm (Fig. 9).

No size limits apply for gurnards in Tasmania.

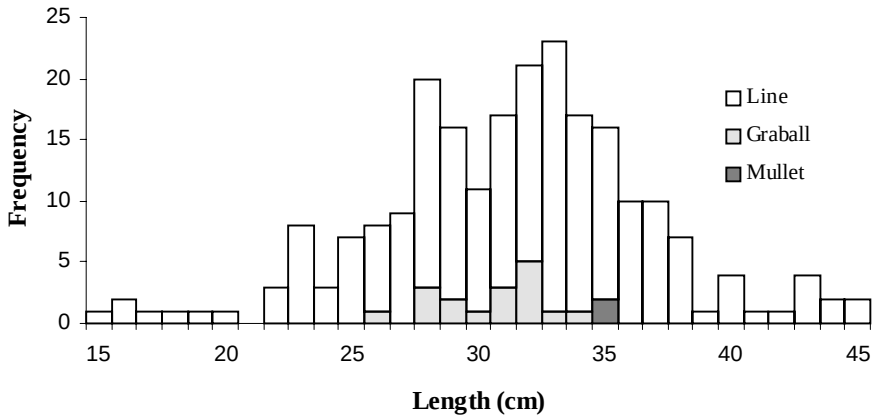

Fig. 9 Gurnard length frequency distribution, by fishing method.

3.5.8 Leatherjacket

The length frequency distribution for leatherjackets is a composite distribution of several species. Fish ranged from 20-46 cm, with the bulk of the sample falling between 25-40 cm (Fig. 10). A large peak (mainly due to graball catches) was evident at 28 cm. Average sizes for graball and line caught leatherjackets were 31 and 29 cm, respectively (Appendix 4).

A minimum size limit of 20 cm TL for leatherjacket is to be introduced in November 1998. All fish examined in this study would have exceeded this limit (Fig. 10).

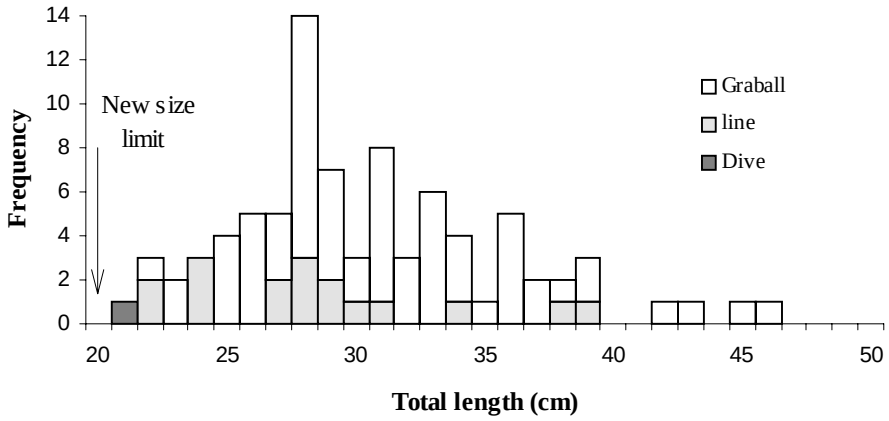

Fig. 10 Leatherjacket length frequency distribution, by fishing method.

3.5.9 Jack mackerel

Jack mackerel generally fell between 20-30 cm, with a small number of specimens up to 39 cm (Fig. 11). The bulk of fish caught in graballs measured between 23-29 cm, with a modal length of 24 cm. Jack mackerel averaged almost 26 cm, equivalent to 0.24 kg, in graball catches. Only small numbers were measured for other fishing methods (Appendix 4).

No size limits apply for jack mackerel in Tasmania.

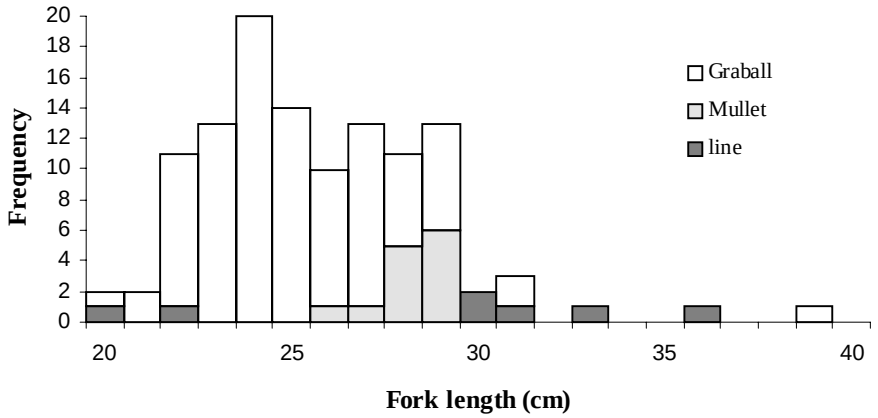

Fig. 11 Jack mackerel length frequency distribution, by fishing method.

3.5.10 Jackass morwong

Jackass morwong size distribution was strongly skewed to the right, featuring with a broad mode between about 20-30 cm FL and fish up to 58 cm (Fig. 12). Graball and line size distributions overlapped between about 20 and 40 cm, with line caught fish comprising the lower and upper extremes of the size distribution. Line caught fish were slightly larger on average (30 cm or 0.7 kg) than fish caught in graball nets (27 cm or 0.4 kg) (Appendix 4).

The old size limit for jackass morwong of 23 cm TL is equivalent to about 20.5 cm FL while the new limit of 25 cm TL equates to about 22 cm FL. Based on the old size limit, 11% of the line and 6% of the graball catches by number were undersized, representing about 8% of the overall catch. If the new size limit had been applicable, almost 20% of the overall catch or 23% of line and 17% of graball catches would have been undersized.

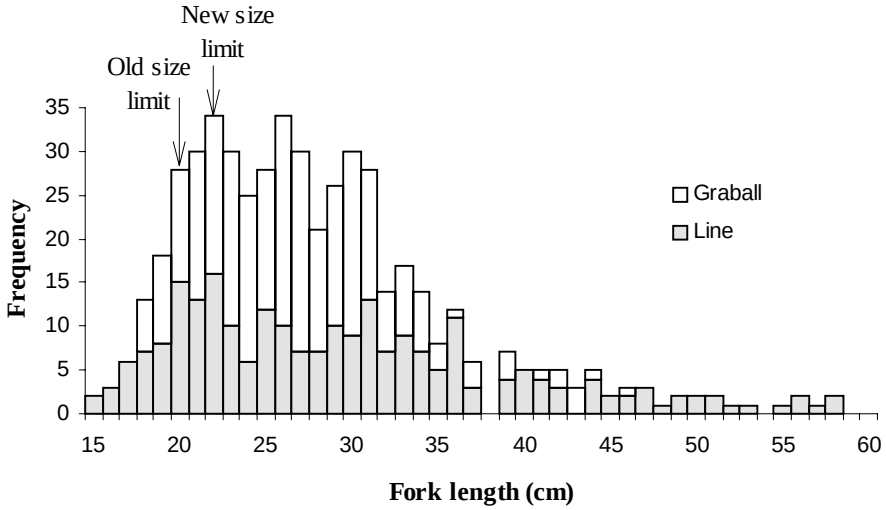

Fig. 12 Jackass morwong length frequency distribution, by fishing method.

3.5.11 Mullet

Mullet ranged from 14-38 cm FL, with a distinct mode at 30 cm (Fig. 13). The majority of fish sampled were taken by mullet net, the size distribution for which was quite narrow, between 25-38 cm, with a mean length of 30 cm and weight of 0.35 kg (Appendix 4). Although represented by fewer numbers, the beach seine distribution was similar to that for mullet net, with a similar mean size. The line catch covered a wider range of sizes, down to 14 cm, without a distinct modal pattern.

The old size limit for mullet of 20 cm TL is equivalent to about 19 cm FL while the new limit of 25 cm TL equates to about 23.5 cm FL. Overall 6% of all fish measured were undersized, with 25% of line catch below the old size limit. Based on the new size limit, 8% overall and 32% of line catch would have been below this level. The size distribution for mullet net catches suggests that few, if any mullet, taken by gillnet will be undersized.

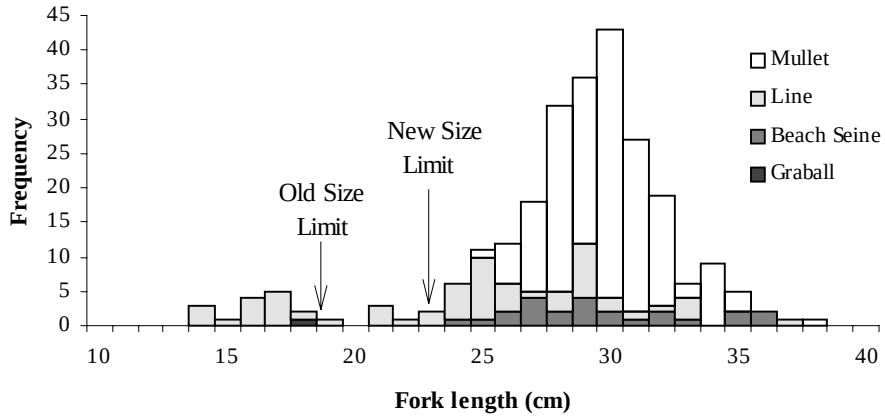

Fig. 13 Mullet length frequency distribution, by fishing method.

3.5.12 Trumpeter

Bastard trumpeter

Bastard trumpeter between 21-52 cm FL were retained, with the overall distribution broad and dominated by 24-43 cm fish (Fig. 14). Individuals above 44 cm were rare. Graball net caught fish averaged 30 cm or 0.6 kg, line and dive caught fish were few in number so size distributions may not be representative (Appendix 4).

The size limit for bastard trumpeter is to be raised from 33 cm TL (approximately 29 cm FL) to 35 cm TL (30.5 cm FL) in November 1998. Based on the old and new size limits, 17% and 28% of the graball catch numbers, respectively, were undersized. The significant proportion of undersized fish at the new size limit suggests that graball mesh sizes may be inappropriate for bastard trumpeter.

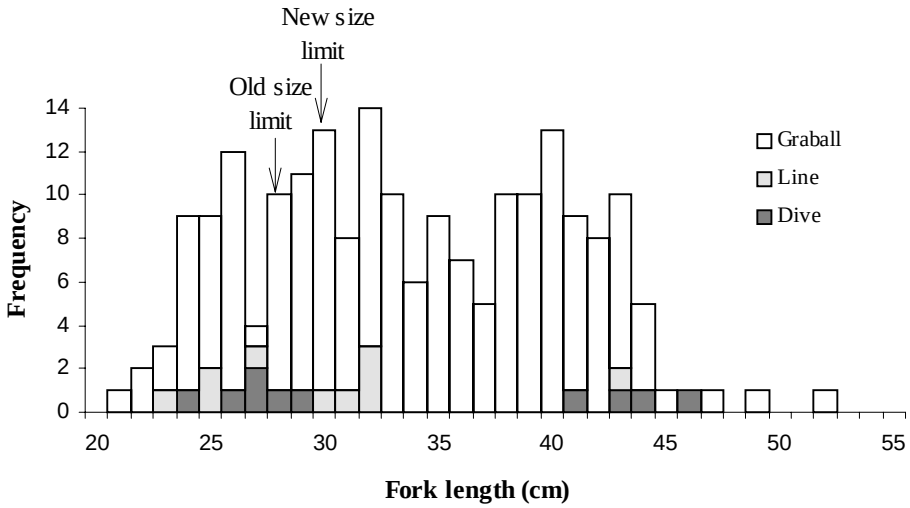

Fig. 14 Bastard trumpeter length frequency distribution, by fishing method.

Striped trumpeter

A wide size range of striped trumpeter was represented in the catches, measuring 33 to 82 cm FL (Fig. 15). The overall distribution indicates the presence of a number of modes, the main ones being between 40-45 and around 60 cm. Graball fish were more restricted in size than line caught fish, ranging between 34-62 cm, with an average of 48 cm and 1.7 kg (Appendix 4). Line caught fish were slightly larger, averaging 52 cm and 2.2 kg.

The same size limits apply to striped as bastard trumpeter, though the equivalent fork lengths differ, that is about 30 cm for the old and 32 cm for the new size limits. Our data indicate that all striped trumpeter would have exceeded the new minimum size limit. In practice, however, striped trumpeter are known to show strong recruitment variability, with fish growing rapidly in the first few years (Murphy and Lyle 1998). At the time of this survey the smallest cohort of fish present in the fishery (spawned in 1994), would have grown to an size of about 38 cm by December 1997 and therefore 'undersized' fish were effectively unavailable for capture. Had the survey been conducted in 1995/96, undersized fish would have undoubtedly been caught. In fact mesh selectivity trails conducted between 1995-97 demonstrated that, when abundant, fish between 24-30 cm are retained in a mesh size of 105 mm (Murphy and Lyle 1998).

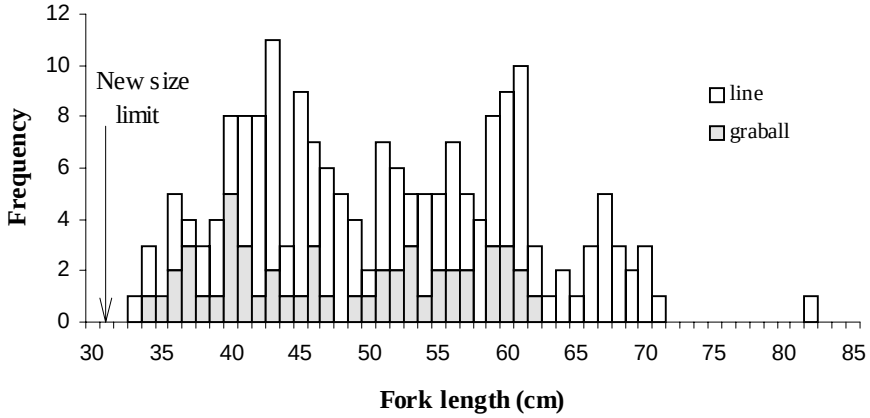

Fig. 15 Striped trumpeter length frequency distribution, by fishing method.

3.5.13 Tuna

Albacore

The bulk of the albacore catch was between 40-75 cm FL, with a small number of larger fish, up to 99 cm, recorded (Fig. 16). The distribution is characterised by a strong mode at 50 cm. The mean length of albacore was 60 cm, weighing about 4.5 kg (Appendix 4).

No size limits apply for albacore in Tasmania.

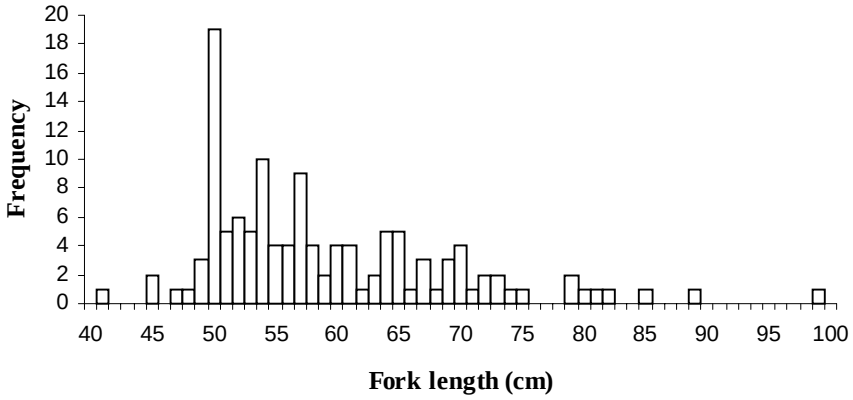

Fig. 16 Albacore length frequency distribution for line fishing.

Southern bluefin tuna

The majority of southern bluefin tuna sampled ranged between about 90-130 cm FL (Fig. 17), for an average of length of 109 cm, weighing about 28 kg.

No size limits apply for southern bluefin tuna in Tasmania.

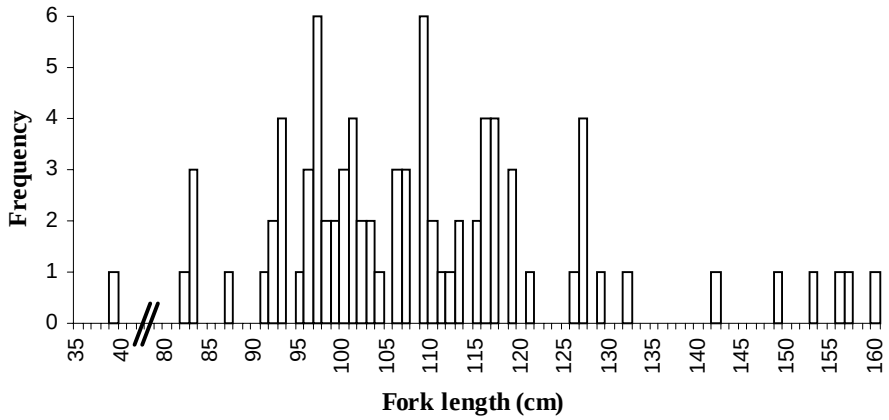

Fig. 17 Southern bluefin tuna length frequency distribution for line fishing.

3.5.14 Blue warehou

The size structure of blue warehou caught in graball nets has a strong mode at 38-40 cm FL and is comprised primarily of 30-55 cm fish (Fig. 18). The average size of graball fish was 41 cm and 1.4 kg while line caught fish were generally smaller, averaging 34 cm and 0.9 kg (Appendix 4). Few line caught specimens exceeded 40 cm, with most measuring between 32-38 cm. Fish as small as 16 cm were taken by line fishers.

A minimum size limit of 25 cm TL (23 cm FL) for blue warehou will take effect in November 1998. Our data suggest that graball catches will include few, if any, undersized fish. Line fishers, on the other hand, do take smaller fish, with about 7% of the line caught fish being smaller than the proposed size limit.

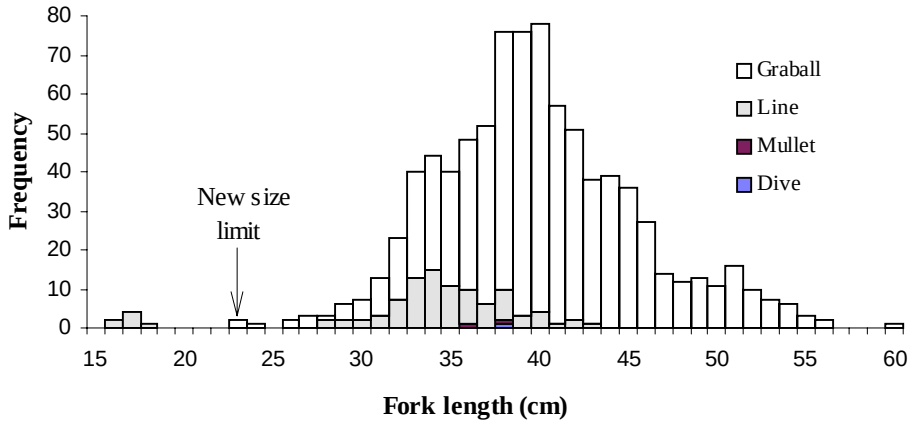

Fig. 18 Blue warehou length frequency distribution, by fishing method.

3.5.15 Whiting

Line catches were comprised of fish between 17 and 47 cm FL, although fish larger than 30 cm were rare (Fig. 19). The beach seine sample reveals a more restricted size distribution of 22-27 cm, with most fish being 24-25 cm. Despite these differences, the average size of line and beach seine caught fish was basically the same, at 24 cm and 0.2 kg (Appendix 4).

No size limit applies for whiting in Tasmania.

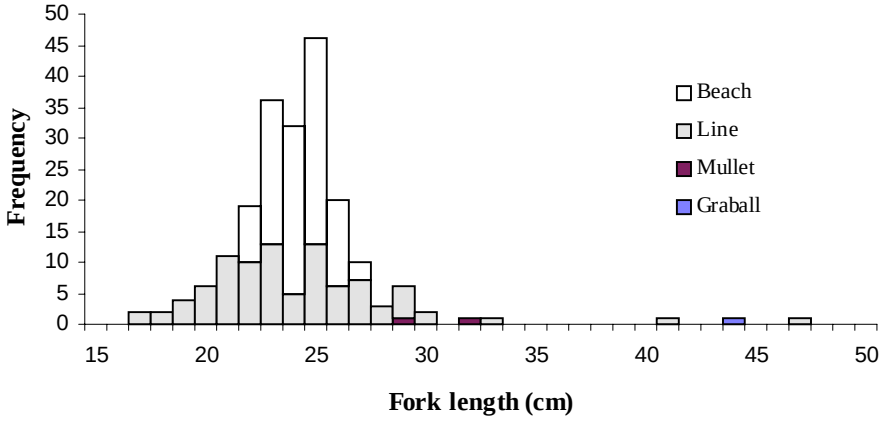

Fig. 19 Whiting length frequency distribution, by fishing method.

3.5.16 Wrasse

At least two species of wrasse have been combined in the catches. Fish were recorded from 18-48 cm TL, with a mode at 28 cm (Fig. 20). The size distribution for wrasse taken in mullet nets includes the full size range examined, whereas line caught fish ranged between 22-42 cm. On average, however, mullet net and line caught fish were about the same size, 29 cm or 0.6 kg (Appendix 4).

With wrasse, upper and lower size limits apply, that is a minimum size limit of 28 cm TL and an maximum size limit of 43 cm TL. Overall, 46% of fish sampled were outside of the legal size range, 38% of the line and 49% of mullet net catches. The primary problem is the retention of undersized rather than oversized fish. On the basis of this analysis there is an obvious lack of understanding of the size limits for wrasse.

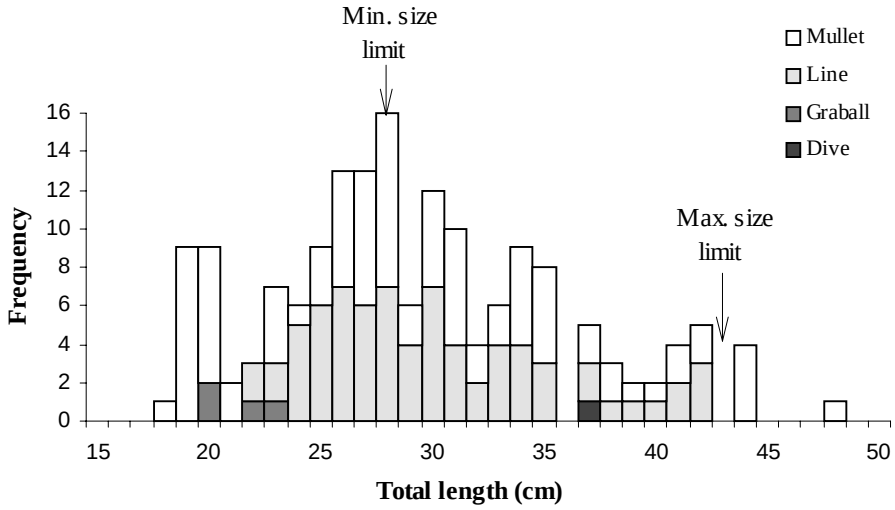

Fig. 20 Wrasse length frequency distribution, by fishing method.

3.5.17 Squid

Arrow squid

While some arrow squid smaller than about 20 cm were caught, the vast majority were between 20-35 cm mantle length (ML) (Fig. 21). The size structure suggests than there were two modes, one at 25-26 cm and the other at 29 cm. However, as squid are fast growing and very short lived (less than a year), it is more likely that the length frequency in fact reflects the growth of a single cohort throughout the duration of the survey. Line caught squid averaged 28 cm, weighing about 0.7 kg (Appendix 4).

No size limit applies for arrow squid in Tasmania.

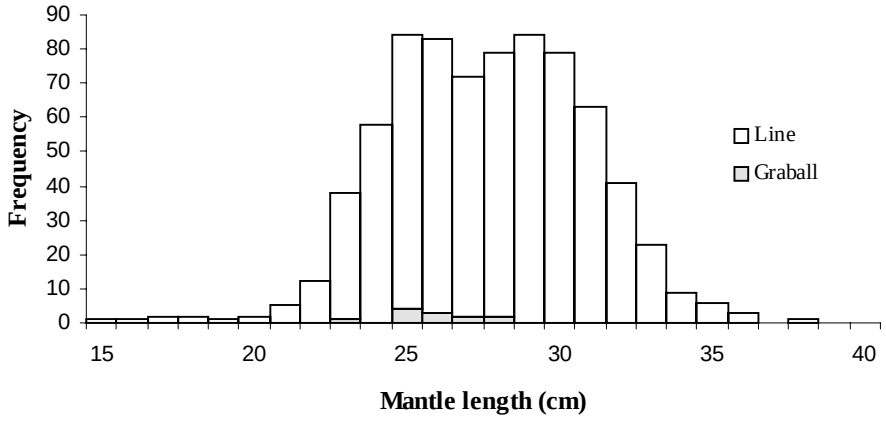

Fig. 21 Arrow squid length frequency distribution, by fishing method.

Calamary

Calamary were generally larger than arrow squid, with most of the catch measuring between 25-40 cm ML (Fig. 22). The largest specimen recorded was 56 cm, taken in a graball net. Almost all of the calamary examined were caught on lines and the mean size was 31 cm and 1.1 kg (Appendix 4).

No size limit applies for calamary in Tasmania.

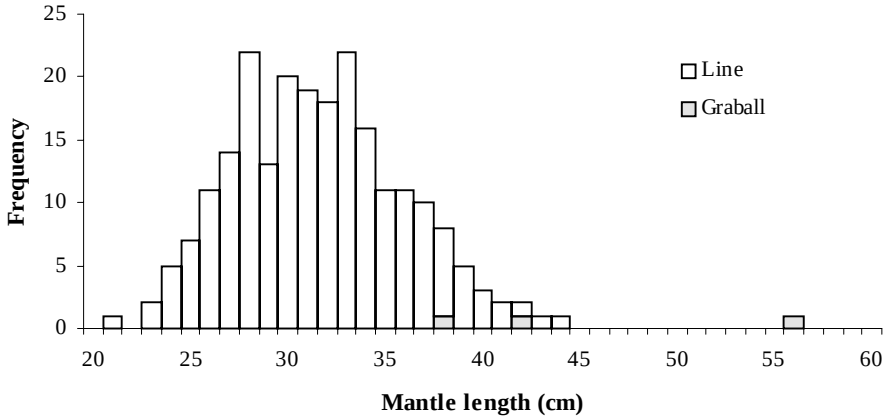

Fig. 22 Calamary length frequency distribution, by fishing method.

3.6 Fish identification

The ability of anglers to correctly identify species or species groups was assessed by interviewers and, as indicated in Table 12, most of the common species were correctly identified with a high degree of accuracy. Incorrect identifications were infrequent and generally related to minor species. These data support a high level of species recognition amongst recreational anglers in Tasmania.

Table 12 Assessment of fish identification skills by recreational anglers, based on recognition of species retained in their catches. Incorrect identification refers to species names suggested by anglers.

Correct identification	No. records	% correct	Incorrect identification
Australian salmon	55	96.4	Atlantic salmon
Barracouta	114	100	
Blue eye trevalla	1	100	
Boarfish	11	90.9	Species not known
Bream	2	100	
Cod	58	98.3	Species not known
Dory	5	100	
Eel	1	100	
Flathead	81	100	

Correct identification	No. records	% correct	Incorrect identification

Flathead, sand	312	100	
Flathead, tiger	72	100	
Flounder, greenback	23	100	
Flounder, long snout	2	100	
Garfish	6	100	
Gurnard	53	100	
Harpuka	2	100	
Herring cale	1	100	
Jack mackerel	29	100	
Latchet	2	100	
Leatherjacket	55	100	
Ling	6	100	
Luderick	3	33.3	Black bream
Magpie perch	2	100	
Marblefish	4	75	Species not known
Morwong, banded	8	100	
Morwong, jackass	63	98.4	Silver trevally
Mullet	14	92.9	Whiting
Octopus	2	100	
Pike	8	100	
Pike, long fin	3	100	
Pike, short-fin	1	100	
Rays bream	1	100	
Rosy perch	1	100	
Scalyfin	1	100	
Shark, elephant	5	100	
Shark, gummy	13	100	
Shark, mako	4	100	
Shark , Port Jackson	3	100	
Shark, saw	1	100	
Shark, school	1	100	
Shark, spurdog	2	100	
Silver trevally	5	100	
Snapper	6	100	
Skate/rays	3	100	
Sweep	3	100	
Trumpeter, bastard	63	96.8	Warehou
Trumpeter, real bastard	3	66.7	Species not known
Trumpeter, striped	40	100	
Tuna, albacore	68	100	
Tuna, southern bluefin	34	100	
Tuna, stripey	1	100	
Warehou, blue	106	100	
Warehou, spotted	4	75	Species not known
Whiting	51	94.1	Species not known
Wrasse	48	100	
Wrasse, blue throat	10	90	Species not known
Squid	14	100	
Squid, arrow	37	94.6	‘Squid’
Squid, calamary	5	80	‘Squid’
Total	**1532**	**98.6**	

4 Implications for Management

The size structure of recreational catches are reported for the first time in Tasmania with information on a wide variety of species collated on the basis of fishing method. Of particular relevance to management are the levels of undersized fish in the catch.

The importance of flathead as a recreational species has been reinforced by this study. The high proportion of undersized flathead, principally sand flathead, is however of considerable concern. Our data indicate that around 40% of all flathead sampled were less than the legal minimum size of 30 cm. Although this finding is heavily influenced by samples from the South-east (mainly around the Tasman Peninsula), it is clear that when fishing locality was taken into consideration the problem was widespread throughout the State. Since flathead are mainly taken by line fishing, the problem is not a gear selectivity issue but rather an awareness/compliance one.

Other species for which undersized fish represent a significant component of the retained catch include flounder, jackass morwong, bastard trumpeter and wrasse. Each of these species are taken by gillnet and, since nets are highly selective for size, our data suggest that the mesh sizes currently used by recreational fishers may be inappropriate in relation to the minimum size limits. Jackass morwong are also commonly taken by line fishing and catches include reasonable numbers of undersized fish. Since minimum sizes for several of these species are set to increase during 1998, there is real potential for this problem to increase.

The recently introduced Scalefish Fishery Management Plan includes provisions to raise the minimum mesh size of graballs from 100 to 108 mm and also defines a flounder net as a graball with a mesh size of at least 125 mm. To some extent these changes may assist in reducing the number of undersized fish in gillnet catches. Notwithstanding this, a major challenge for management remains to improve the awareness and ultimately adherence to the size limit regulations by recreational fishers.

5 Acknowledgments

This study was funded in part through a grant from the Recreational Licensing Trust Fund.

Mike Copping along with Lance Collier, Bill Pegus, Bill White, Damian Heran and Scott Abbott conducted the bulk of the creel survey interviews. Their dedication and commitment to completing the survey is greatly appreciated. In addition, Marcus Henry, Francis Bright, Tim Debnam and Michael Kent willingly provided size composition information from their own fishing activities.

Finally, the co-operation and assistance of the recreational anglers of Tasmania is gratefully acknowledged.

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Appendix 1 Field data collection form

Creel survey form - 1997/98

Inverview date: ☐☐☐☐☐☐ Site: ..... Interviewer ID: ☐☐

Event No.: ☐☐ No. fishers: ☐☐ Postcode: ☐☐☐☐ Vmark: .....

Date start ☐☐☐☐

End (if diff, plus..) ☐

Region type Tick

Estuary/encl. bay ☐
Coastal (<2km) ☐
Offshore (>2km) ☐

Method(s) Circle

Cray pot: 1
(No.) ☐

Dive: - snorkel 2
- scuba 3
- surf. air 4

Graball: 5
(No.) ☐

Mullet net: 7
(No.) ☐

Beach seine: 8
No. hauls ☐☐

Line 12
Other 13
.....

Platform Tick

Boat ☐
Shore ☐
Both ☐

Times (24hr clock)

Start time ☐☐☐☐
End time ☐☐☐☐
Breaks ☐☐☐☐

Target spp: .....
.....

Gear specs recorded on back ☐

Species	ID correct	No. caught	LFs
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐

COMMENTS: .....
.....

Event No.: ☐☐ No. fishers: ☐☐ Postcode: ☐☐☐☐ Vmark: .....

Date start ☐☐☐☐

End (if diff, plus..) ☐

Region type Tick

Estuary/encl. bay ☐
Coastal (<2km) ☐
Offshore (>2km) ☐

Method(s) Circle

Cray pot: 1
(No.) ☐

Dive: - snorkel 2
- scuba 3
- surf. air 4

Graball: 5
(No.) ☐

Mullet net: 7
(No.) ☐

Beach seine: 8
No. hauls ☐☐

Line 12
Other 13
.....

Platform Tick

Boat ☐
Shore ☐
Both ☐

Times (24hr clock)

Start time ☐☐☐☐
End time ☐☐☐☐
Breaks ☐☐☐☐

Target spp: .....
.....

Gear specs recorded on back ☐

Species	ID correct	No. caught	LFs
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐
.....	☐	☐☐☐	☐

COMMENTS: .....
.....

Marine Research Laboratories (03) 6227 7277

Appendix 2 Common and scientific names for species caught by recreational anglers

Common name	Alternative common names	Scientific name
Rock lobster		*Jasus edwardsii*
Abalone		*Haliotis ruba & H. laevigata*
Australian salmon	Cockie or black-back salmon	*Arripis trutta & A. truttaceus*
Barracouta	Couta, snoek	*Thyrsites atun*
Black bream		*Acanthopagrus butcheri*
Blue eye trevalla	Deep sea trevalla	*Hyperoglyphe antartica*
Boarfish	Duck fish	*Pentaceropsis recurvirostris*
Cod	Red cod or rock cod	*Pseudophycis bachus & P. barbata*
Dory		Zeidae
Eel, conger		*Conger verreauxi*
Flathead, rock	Grassy or smooth flathead	*Platycephalus laevigatus*
Flathead, sand	Slimy, common or bay flathead	*Platycephalus bassensis*
Flathead, tiger	King flathead	*Neoplatycephalus richardsoni*
Flounder, greenback		*Rhomosolea tapirina*
Flounder, long-snout	Sole	*Ammotretis rostratus*
Garfish		*Hyporhamphus melanochir*
Gurnard	Gurnard perch	Scorpaenidae & Triglidae
Harpuka		*Polprion. oxygeneios*
Herring cale		*Odax cyanomelas*
Jack mackerel		*Trachurus declivis*
Latchet		*Pterygotrigla polyommata*
Leatherjacket	Butterfish, triggerfish	Monacanthidae
Ling		*Genypterus blacodes & G. tigerinus*
Luderick	Blackfish or nigger	*Girella tricuspidata*
Magpie perch	Magpie morwong	*Cheilodactylus nigripes*
Marblefish	Grouper	*Dactylosargus arctiden*
Morwong, banded	Carp	*Cheilodactylus spectabilis*
Morwong, jackass	Perch or silver perch	*Nemadactylus macropterus*
Mullet		Mugilidae, esp *Aldrichetta forsteri*
Pike, long-fin	Jack pike or sea pike	*Dinolestes lewini*
Pike, short-fin	Snook	*Sphyraena novaehollandiae*
Rays bream	Pomfret	*Brama brama*
Rosy perch		*Callanthias allporti*
Scalyfin		*Parma victoriae*
Shark, elephant	Ghost shark	*Callorhynchus milii*
Shark, gummy		*Mustelus antarcticus*
Shark, mako	Blue shark	*Isurus oxyrinchus*
Shark, Port Jackson		*Heterodontus portusjacksoni*
Shark, saw		*Pristiophorus spp*
Shark, school	Snapper shark	*Galeorhinus galeus*
Shark, spurdog	Dogfish	*Squalus acanthias & S. megalops*
Silver trevally	Silver bream	*Pseudocaranx dentex*
Skates/rays		Rajiformes
Snapper	Cockney or red bream	*Pagrus auratus*
Common name	Alternative common names	Scientific name

Sweep		*Scorpis* spp
Thetis fish		*Neosebastes thetidis*
Trumpeter, bastard	Silver trumpeter	*Latridopsis forsteri*
Trumpeter, real bastard		*Mendsoma allporti*
Trumpeter, striped	Stripey or Tassie trumpeter	*Latris lineata*
Tuna, albacore		*Thunnus alalunga*
Tuna, southern bluefin		*Thunnus maccoyii*
Tuna, stripey	Skipjack tuna	*Katsuwonus pelamis*
Warehou, blue	Snotty or black trevally	*Seriolla brama*
Warehou, spotted	Spotted trevally	*Seriolella punctata*
Whiting		Sillaginidae, esp *Sillago flindersi*
Wrasse, blue throat	Bluehead	*Pseudolabrus tetricus*
Wrasse, unspecified	Kelpie or parrot fish	Labridae, incl *Pseudolabrus tetricus and P. fucicola*
Squid, arrow		*Nototodarus gouldi*
Squid, calamary		*Sepioteuthis autralis*
Octopus		*Octopus* spp.

Appendix 3 Length-weight relationships used to convert size composition data into weights.

Lengths are fork lengths except for total length[1] and mantle length[2].

Species	Length-weight relationship	Source
Australian salmon (*Arripis trutta*)	$W(g) = 1.17x10^{-2}*L\ (cm)^{3.09}$	MRL, unpub data
Barraouta (*Thyrsites atun*)	$W(g) = 1.06x10^{-1}*L(cm)^{2.238}$	Blackburn.(1960).
Cod (*Pseudophycis bachus*)	$W(g) = 7.4x10^{-3}*L(cm)^{3.06}$	Annala and Sullivan (1997)
Flathead, sand (*Platycephalus bassensis)*	$W(g) = 1.89x10^{-3}*L(cm)^{3.381}$	Jordan (1997)
Flathead, tiger (*Neoplatycephalus richardsoni*)	$W(g) = 4.1x10^{-3}*L(cm)^{3.163}$	Jordan (1997)
Flounder, greenback[1] (*Rhomosolea tapirina*)	$W(g) = 8.75x10^{-3}*L(cm)^{3.147}$	MRL, unpub data
Jack mackerel (*Trachurus declivis*)	$W(g) = 1.15x10^{-2}*L(cm)^{3.061}$	Williams *et al.* (1986)
Leatherjacket (Monocanthidae)	$W(g) = 1.65x10^{-2}*\ L(cm)^{3.014}$	Steffe *et al.* (1996)
Morwong, banded (*Nemadactylus spectabilis*)	$W(g) = 3.49x10^{-2}*L(cm)^{2.881}$	Murphy and Lyle (1998)
Morwong, jackass (*Nemadactylus macropterus*)	$W(g) = 1.4x10^{-2}*L(cm)^{3.086}$	Jordan (1997)
Mullet, yellow eye (*Aldrichetta foresteri*)	$W(g) = 3.78x10^{-3}*\ L(cm)^{3.34}$	MRL, unpub. data
Silver trevally (*Pseudocaranx dentax*)	$W(g) = 3.35x10^{-2}*\ L(cm)^{2.846}$	Steffe *et al.* (1996)
Snapper (*Pagurus auratus*)	$W(g) = 4.47x10^{-2}*L(cm)^{2.790}$	Ferrell and Sumpton (1997)
Trumpeter, bastard (*Latridopsis forsteri*)	$W(g) = 1.12x10^{-2}*L(cm)^{3.14}$	Murphy and Lyle (1998)
Trumpeter, striped (*Latris lineata*)	$W(g) = 3.41x10^{-2}*L(cm)^{2.77}$	Murphy and Lyle (1998)
Tuna, albacore (*Thunnus alalunga*)	$W(kg) = 1.09x10^{-5}\ *\ L(cm)^{3.14}$	AFMA
Tuna, southern bluefin (*Thunnus maccoyii*)	$W(kg) = 3.13x10^{-5}*L(cm)^{2.91}$	AFMA
Warehou, blue (*Seriolla brama*)	$W(g) = 1.7x10^{-2}*L(cm)^{3.037}$	Lyle and Ford (1993)
Warehou, spotted (*Seriolla punctata*)	$W(g) = 0.4x10^{-2}*L(cm)^{3.4}$	Smith (1994)
Whiting, eastern school (*Sillago flindersi*)	$W(g) = 6.2x10^{-3}*L(cm)^{3.15}$	Jordan (1997)
Wrasse[1] (Labridae)	$W(g) = 5.35\ x10^{-2}*\ L(cm)^{2.71}$	MRL, unpub data
Squid, arrow[2] (*Nototodarus gouldi*)	Calamary used	
Squid, calamary[2] (*Sepioteuthis autralis*)	$W(g) = 8.9x10^{-2}*L(cm)^{2.7}$	McGlennon and Kinloch (1997)

Appendix 4 Sample size, size range and average length and weight by fishing method for species measured during the survey.

nd not determined

	Fishing method					
	Dive	Graball net	Mullet net	Beach seine	Line	Spear
Australian salmon						
Min. length (cm)		37			19	
Max. length (cm)		57			52	
Av. length (cm)		46.3			32.2	
Av. weight (kg)		1.71			0.66	
No. of fish		97			403	
Barracouta						
Min. length (cm)		34	54		23	
Max. length (cm)		71	93		102	
Av. length (cm)		60.1	75.0		62.6	
Av. weight (kg)		1.09	1.81		1.19	
No. of fish		16	3		752	
Black bream						
Min. length (cm)						
Max. length (cm)						
Av. length (cm)					30	
Av. weight (kg)					nd	
No. of fish					1	
Boarfish						
Min. length (cm)		24				
Max. length (cm)		58				
Av. length (cm)	34.0	38.5			34.0	
Av. weight (kg)	nd	nd			nd	
No. of fish	1	14			1	
Cod						
Min. length (cm)		29	24		30	
Max. length (cm)		48	40		49	
Av. length (cm)		38.5	31.6		39.8	
Av. weight (kg)		0.56	0.35		0.64	
No. of fish		77	5		36	
Dory						
Min. length (cm)		23				
Max. length (cm)		43				
Av. length (cm)		31.0				
Av. weight (kg)		nd				
No. of fish		7				
Flathead, Rock						
Min. length (cm)			42			
Max. length (cm)			46			
Av. length (cm)			44.0			
Av. weight (kg)			nd			
No. of fish			2			

	Fishing method					
	Dive	Graball net	Mullet net	Beach seine	Line	Spear
Flathead, sand						
Min. length (cm)		26			16	33
Max. length (cm)		44			55	49
Av. length (cm)		33.2	51.0		31.4	41.6
Av. weight (kg)		0.28			0.25	0.61
No. of fish		28	1		4225	25
Flathead, tiger						
Min. length (cm)		30			22	
Max. length (cm)		44			66	
Av. length (cm)		39.0			41.9	
Av. weight (kg)		0.46			0.65	
No. of fish		18			462	
Flounder, greenback						
Min. length (cm)		22			25	20
Max. length (cm)		37			34	35
Av. length (cm)		26.9			30.1	27.7
Av. weight (kg)		0.28			0.40	0.31
No. of fish		191			30	144
Flounder, long snout						
Min. length (cm)		24				
Max. length (cm)		27				
Av. length (cm)		25.5			28	
Av. weight (kg)		nd			nd	
No. of fish		4			1	
Garfish						
Min. length (cm)				33	30	
Max. length (cm)				36	43	
Av. length (cm)		24.0		35.0	35.0	
Av. weight (kg)		nd		nd	nd	
No. of fish		1		3	9	
Gurnard						
Min. length (cm)		26	35		15	
Max. length (cm)		34	35		45	
Av. length (cm)		30.9	35.5		31. 9	
Av. weight (kg)		nd	nd		nd	
No. of fish		17	2		209	
Harpuka						
Min. length (cm)					68	
Max. length (cm)					71	
Av. length (cm)					69	
Av. weight (kg)					nd	
No. of fish					4	
Herring cale						
Min. length (cm)						
Max. length (cm)						
Av. length (cm)		41				
Av. weight (kg)		nd				
No. of fish		1				

	Fishing method					
	Dive	Graball net	Mullet net	Beach seine	Line	Spear
Jack mackerel						
Min. length (cm)		26	20		20	
Max. length (cm)		29	38		39	
Av. length (cm)		25.7	28.7		29.4	
Av. weight (kg)		0.24	0.33		0.39	
No. of fish		97	13		7	
Latchet						
Min. length (cm)						
Max. length (cm)						
Av. length (cm)					41	
Av. weight (kg)					nd	
No. of fish					1	
Leatherjacket						
Min. length (cm)		22			19	
Max. length (cm)		46			39	
Av. length (cm)	21.5	31.6			29.0	
Av. weight (kg)	0.17	0.55			0.46	
No. of fish	1	67			18	
Ling						
Min. length (cm)		51				
Max. length (cm)		70				
Av. length (cm)		63.5			63	
Av. weight (kg)		nd			nd	
No. of fish		6			1	
Luderick						
Min. length (cm)		35				
Max. length (cm)		48				
Av. length (cm)		40.5				
Av. weight (kg)		nd				
No. of fish		12				
Magpie perch						
Min. length (cm)		26				
Max. length (cm)		29				
Av. length (cm)	29	27.5				
Av. weight (kg)	nd	nd				
No. of fish	1	2				
Marblefish						
Min. length (cm)		33				
Max. length (cm)		37				
Av. length (cm)		35				
Av. weight (kg)		nd				
No. of fish		4				
Morwong, banded						
Min. length (cm)	33	22			31	
Max. length (cm)	48	47			51	
Av. length (cm)	40.5	35.7			40.6	
Av. weight (kg)	1.67	1.23			1.73	
No. of fish	2	11			3	

	Fishing method					
	Dive	Graball net	Mullet net	Beach seine	Line	Spear
Morwong, jackass						
Min. length (cm)		18			15	
Max. length (cm)		46			57	
Av. length (cm)		26.7			29.6	
Av. weight (kg)		0.42			0.70	
No. of fish		272			238	
Mullet						
Min. length (cm)			25	24	14	
Max. length (cm)			38	36	33	
Av. length (cm)		18	30.4	30.1	24.7	
Av. weight (kg)		nd	0.35	0.35	0.20	
No. of fish		1	166	24	59	
Pike, long-finned						
Min. length (cm)					38	
Max. length (cm)					60	
Av. length (cm)		38			49	
Av. weight (kg)		nd			nd	
No. of fish		1			2	
Pike, short-finned						
Min. length (cm)		63				
Max. length (cm)		66				
Av. length (cm)		64.6	36		57	
Av. weight (kg)		nd	nd		nd	
No. of fish		3	1		1	
Pike, unspecified						
Min. length (cm)		26			33	
Max. length (cm)		30			64	
Av. length (cm)		27.7			51.6	
Av. weight (kg)		nd			nd	
No. of fish		7			3	
Rosy perch						
Min. length (cm)					25	
Max. length (cm)					26	
Av. length (cm)					25.5	
Av. weight (kg)					nd	
No. of fish					2	
Scalyfin						
Min. length (cm)						
Max. length (cm)						
Av. length (cm)		17				
Av. weight (kg)		nd				
No. of fish		1				
Shark, elephant						
Min. length (cm)		47				
Max. length (cm)		61				
Av. length (cm)		54.8				
Av. weight (kg)		nd				
No. of fish		25				

	Fishing method					
	Dive	Graball net	Mullet net	Beach seine	Line	Spear
Shark, gummy						
Min. length (cm)		69			49	
Max. length (cm)		120			69	
Av. length (cm)		89.6	49		61.4	
Av. weight (kg)		nd	nd		nd	
No. of fish		3	1		5	
Shark, mako						
Min. length (cm)					147	
Max. length (cm)					189	
Av. length (cm)					172.3	
Av. weight (kg)					nd	
No. of fish					3	
Shark, saw						
Min. length (cm)		67	93			
Max. length (cm)		67	99			
Av. length (cm)		67	96			
Av. weight (kg)		nd	nd			
No. of fish		1	2			
Shark, spurdog						
Min. length (cm)		48				
Max. length (cm)		71				
Av. length (cm)		61				
Av. weight (kg)		nd				
No. of fish		12				
Shark, unspecified						
Min. length (cm)						
Max. length (cm)						
Av. length (cm)		68			100	
Av. weight (kg)		nd			nd	
No. of fish		1			1	
Silver trevally						
Min. length (cm)		20	28			
Max. length (cm)		58	28			
Av. length (cm)		41.2	28			
Av. weight (kg)		1.65	0.46			
No. of fish		24	2			
Snapper						
Min. length (cm)					32	
Max. length (cm)					72	
Av. length (cm)					49	
Av. weight (kg)					2.73	
No. of fish					11	
Sweep						
Min. length (cm)	30					
Max. length (cm)	46					
Av. length (cm)	39.9					
Av. weight (kg)	nd					
No. of fish	11					

	Fishing method					
	Dive	Graball net	Mullet net	Beach seine	Line	Spear
Trumpeter, bastard						
Min. length (cm)	24	21			23	
Max. length (cm)	46	52			43	
Av. length (cm)	33.5	30.0			34.0	
Av. weight (kg)	0.88	0.57			0.85	
No. of fish	10	183			10	
Trumpeter, real bastard						
Min. length (cm)		23				
Max. length (cm)		38				
Av. length (cm)		29.7				
Av. weight (kg)		nd				
No. of fish		44				
Trumpeter, striped						
Min. length (cm)		34			33	
Max. length (cm)		62			82	
Av. length (cm)		48.0			52.1	
Av. weight (kg)		1.73			2.20	
No. of fish		51			137	
Tuna, albacore						
Min. length (cm)					45	
Max. length (cm)					89	
Av. length (cm)					59.6	
Av. weight (kg)					4.51	
No. of fish					120	
Tuna, southern bluefin						
Min. length (cm)					39	
Max. length (cm)					160	
Av. length (cm)					108.8	
Av. weight (kg)					28.0	
No. of fish					84	
Tuna, stripey						
Min. length (cm)						
Max. length (cm)						
Av. length (cm)					86	
Av. weight (kg)					nd	
No. of fish					1	
Tuna, unspecified						
Min. length (cm)					49	
Max. length (cm)					62	
Av. length (cm)					52	
Av. weight (kg)					nd	
No. of fish					7	
Tuna, yellowfin						
Min. length (cm)					103	
Max. length (cm)					110	
Av. length (cm)					105.6	
Av. weight (kg)					nd	
No. of fish					3	

	Fishing method					
	Dive	Graball net	Mullet net	Beach seine	Line	Spear
Warehou, blue						
Min. length (cm)	38	23	35		16	
Max. length (cm)	38	56	38		43	
Av. length (cm)	38.0	40.9	37.5		34.1	
Av. weight (kg)	1.15	1.43	1.06		0.86	
No. of fish	1	765	2		96	
Warehou, spotted						
Min. length (cm)		32			17	
Max. length (cm)		45			20	
Av. length (cm)		40			18	
Av. weight (kg)		1.20			0.09	
No. of fish		30			14	
Whiting						
Min. length (cm)			29	16	22	
Max. length (cm)			32	47	27	
Av. length (cm)		44.0	30.5	24.3	24.1	
Av. weight (kg)		0.95	0.31	0.15	0.16	
No. of fish		1	2	92	109	
Wrasse						
Min. length (cm)		20	18		22	
Max. length (cm)		23	48		42	
Av. length (cm)	37.5	21.3	29.5		29.9	
Av. weight (kg)	0.98	0.23	0.61		0.59	
No. of fish	1	4	102		73	
Octopus						
Min. length (cm)						19
Max. length (cm)						28
Av. length (cm)						23.4
Av. weight (kg)						nd
No. of fish						11
Squid, arrow						
Min. length (cm)		23			15	
Max. length (cm)		28			38	
Av. length (cm)		25.9			27.7	
Av. weight (kg)		0.62			0.75	
No. of fish		12			737	
Squid, calamari						
Min. length (cm)		38			21	
Max. length (cm)		56			44	
Av. length (cm)		45.3			31.5	
Av. weight (kg)		2.90			1.08	
No. of fish		3			222	
Squid, unspecified						
Min. length (cm)					14	
Max. length (cm)					38	
Av. length (cm)					30.7	
Av. weight (kg)					nd	
No. of fish					54	

Appendix 5 Fish size limits (mm) that apply in Tasmania, based on total lengths, unless specified otherwise.

Old size limits applied at the time of the survey, new size limits generally take effect in November 1998.

	Old size limits		New size limits	
Species	Min.	Max.	Min.	Max.
Australian salmon			200	
Silver trevally			200	
Leatherjacket			200	
Blue warehou			250	
Mullet	200		250	
Bream	230		250	
Garfish	230		250	
Jackass morwong (perch)	230		250	
Flounder	250		250	
Wrasse	280	430	280	430
Flathead	300		300	
Bastard trumpeter	330		350	
Striped trumpeter	330		350	
Banded morwong*	330	430	360	460
Long snouted boarfish			450	
School shark	710		750	
Gummy shark	750		750	

* Based on fork length