INTERNAL REPORT

SURVEY OF THE 2006 TASMANIAN RECREATIONAL SCALLOP FISHERY

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Survey of the 2006 Tasmanian recreational scallop fishery

Executive Summary

The 2006 recreational scallop season took place between March and June following a successful fishery in 2005. Management arrangements were basically unchanged in 2006; all Tasmanian waters (apart from marine reserves) open, dive collection the only permitted harvest method, and a daily bag limit of 40 and possession limit of 200 scallops.

The number of scallop dive licences issued rose sharply, from just over 3000 in 2005 to almost 5000 in 2006.

The status of scallop populations in the D'Entrecasteaux Channel was assessed by dive surveys prior to the opening of the fishery and immediately following the closure of the season. In addition, a post-season telephone survey of recreational licence-holders was conducted to collect information on fisher success, effort by region and to gauge opinions about the management of the fishery.

Pre-season surveys showed that commercial scallops were the dominant species present, being widespread throughout the central and, to a lesser extent, the southern regions of the Channel. Few commercial scallops were present in the northern Channel, an area that had been the focus of heavy dive activity during 2005.

The post-season dive surveys provided evidence of an impact of the fishery on scallop stocks, with overall numbers down by almost 20% and commercial scallop numbers falling by 25%. This finding implies that most of the recreational effort was directed at commercial rather than queen or doughboy scallops, an observation supported by anecdotal reports. Strong declines in abundance were recorded in Great Bay, near Green Island, Isthmus Bay, east of Gordon, and off Satellite Island. Despite these declines, there were significant numbers still present in the Channel at the end of the season, particularly in central region. The population of commercial scallops in the Channel was primarily comprised of large adults (> 100 mm shell length), with comparatively few juvenile or under-size scallops present.

The telephone survey involved over 350 recreational scallop licence-holders. Almost 35% of scallop licence holders did not fish during 2006, this compared with 17% in 2005, though increased licence sales in 2006 meant that, in absolute terms, there were more active fishers in 2006. Licence-holders dived an estimated 18,800 fisher days for scallops during the 2006 scallop season, representing an average of almost 6 days per fisher. By comparison with 2005, dive effort was higher but the difference was not statistically significant.

As in 2005, the vast majority (88%) of the dive effort was concentrated in the D'Entrecasteaux Channel, with Great Oyster Bay of minor importance (5%). Effort was focussed in the central Channel, in particular Simpsons Bay, Great Bay, off Gordon and around Satellite Island. Using the bag limit as a measure of fishing success, almost 87% of all fishing effort resulted in the daily limit being achieved. Hookah was the primary dive method used, followed by SCUBA and to a lesser extent snorkel.

The majority of respondents (83%) indicated that they were satisfied with the cautious approach taken by management for the 2006 season, i.e. conservative bag limit, large minimum size limit and a relatively long fishing season. Equal proportions of respondents considered that the daily bag limit of 40 was either 'about right' or too low. Suggested alternative limits ranged from 50 – 200 per day, with the modal suggestion being 60.

The vast majority of respondents considered that they were at least adequately informed about the scallop regulations. About three-quarters identified the sea fishing guide produced by DPIW as an important information source about fishing regulations, with other fishers also important.

Almost 40% of respondents considered that compliance was a significant problem and of these, most considered that the problem could be remedied with more police checks. Some believed that the bag limit was overly conservative and contributed to the problem.

While most respondents did other types of recreational fishing in addition to diving for scallops, over half indicated that they did not include other types of fishing activities on a scallop harvesting trip.

Trip related expenditure based on car and boat fuel, tank fills and hire, and compressor fuel costs by persons targeting scallops totalled an estimated $0.86M, with car fuel accounting for almost half of the total cost.

Overall the 2006 recreational scallop season enjoyed a high level of fisher success and satisfaction as well as support for the management strategy. Of concern for the future, however, is the combination of a lack evidence to support the existence of substantial beds of scallops in inshore waters other than the D'Entrecasteaux Channel and the limited recent settlement of commercial scallops in that area. Based on the distribution of fishing effort and fishing success over the past two seasons it is likely that subsequent fisheries will be increasingly reliant on queen or doughboy scallops. In the absence of significant settlement in the next few years there is a risk that stocks may decline to very low levels through the combined effects of fishing and ageing. Together they will have major implications for the quality of the fishery.

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1. General Introduction

The 2006 recreational scallop season took place between 1st March and 30th June following a successful fishery in 2005, the first seasonal opening in over a decade. Management arrangements were basically unchanged in 2006; all Tasmanian waters (apart from marine reserves) open, dive collection the only permitted harvest method, and a daily bag limit of 40 and possession limit of 200 scallops. The number of scallop dive licences issued increased sharply in 2006, from just over 3000 to almost 5000.

The status of scallop populations was assessed by dive survey prior to the opening of the fishery and immediately following the closure of the season. During 2005, the D'Entrecasteaux Channel was the main focus of the recreational scallop fishery, attracting almost 90% of the total dive effort (Lyle & Morton 2005). Given that the Channel was likely to remain prominent in 2006, scallop population surveys were restricted to this area.

A post-season survey of licensed fishers was also conducted to collect information on fisher success, effort by region and to gauge opinions about the management of the fishery.

2. Scallop Population Surveys

2.1 Introduction

Diver based transect surveys were undertaken to examine abundance, size and species composition of scallop populations within the D'Entrecasteaux Channel prior to and after the fishing season.

2.2 Methods

2.2.1 Site selection

The Channel was divided into four areas based on prior knowledge of the distribution and abundance of scallop populations from surveys conducted in 2004 and 2005 (Morton & Lyle, 2004; Lyle & Morton, 2005). For dive sampling purposes, a maximum depth limit of 15 m was applied using known bathymetry of the study area. A grid system was then overlaid, with each grid defined by a half minute of latitude and longitude. Grids were selected randomly from within each area and a sampling site obtained by randomly allocating a latitude and longitude coordinate within the grid boundary (Fig. 1). A total of 39 sites were sampled during the pre-season survey. As many of the sites contained very few scallops it was decided to include only those sites that had at least 70 scallops pre-season (i.e > 3.5 scallops per 10 m^2) in the post-season survey.

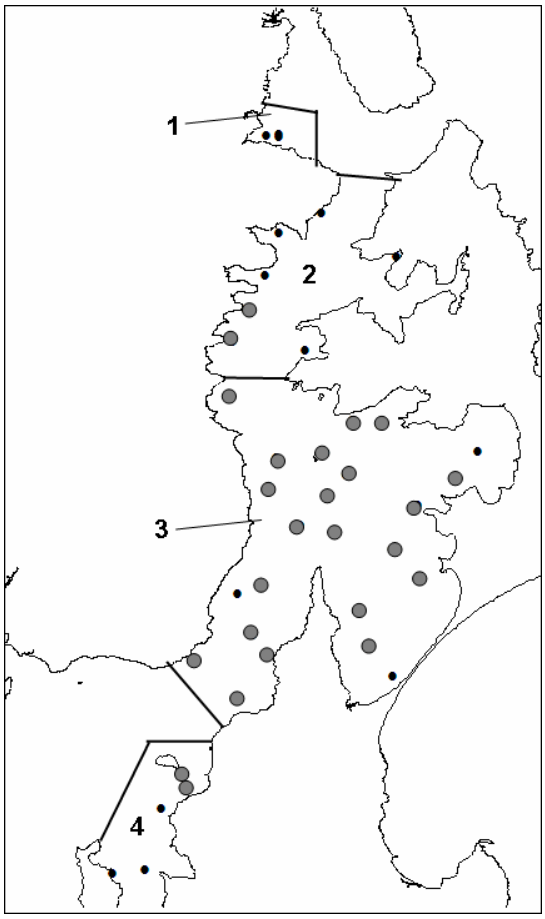

Fig. 1. Map of the D'Entrecasteaux Channel showing the four areas (numbered) and individual sampling sites. Sites marked with a grey circles were sampled during pre- and post-season surveys, sites marked with a black circle were only sampled in the pre-season survey.

2.2.2 Survey method

At each site (located using predetermined GPS coordinates) a 100 m transect was laid from the boat in a haphazard direction (or following the depth contour on sloping bottom). Two divers swam along either side of the transect line collecting all scallops within one metre of the line (representing a total searched area of 200 m^2) (Zacharin, 1991). Scallops were brought to the surface, identified to species and measured for shell length (SL). Most were returned to the water apart from sub-samples from the northern and southern areas of the Channel which were retained for subsequent examination of shell morphometrics, weight, and gonad condition.

Along each transect abundances of three seastar species (the introduced Pacific seastar *Asterias amurensis*, and the native species *Coscinasterias muricata*, and *Uniophora granifera*) were also recorded.

2.3 Results and Discussion

2.3.1 Species Composition

Out of the 39 sites initially selected, 25 were examined in both pre- and post- season surveys, the majority (21 sites) being located in Area 3 (Table 1). Over 6,000 scallops were collected in the pre-season survey, compared with almost 5,000 in the post-season survey.

No scallops were caught in Area 1 in the pre-season survey, an area heavily targeted by recreational fishers during 2005. This observation indicated that stocks had not recovered and confirmed that recreational divers are capable of depleting localised areas.

Commercial scallops remained the most abundant species in the Channel, accounting for almost 70% of the pre-season sample, compared with 60% of the post-season sample. Although the survey methodology was not designed to provide a quantitative assessment of change, it was clear that commercial scallops experienced the greatest decline, with sampled numbers falling by almost one-quarter between surveys. There was also a decrease in queen scallop numbers (down by 17%) while doughboy scallop numbers increased, although overall numbers were low compared with the other species.

Table 1. Numbers of scallops by area collected during pre- and post-season surveys.
ns denotes not shown due to low numbers

		Commercial			Queen			Doughboy			Total		
Area	**No. of sites**	**Pre-**	**Post-**	**% change**	**Pre-**	**Post-**	**% change**	**Pre-**	**Post-**	**% change**	**Pre-**	**Post-**	**% change**
1	0	-	-	-	-	-	-	-	-	-	-	-	-
2	2	270	244	-10	4	7	ns	0	0	-	274	251	-8
3	21	3282	2555	-22	1455	1298	-11	254	468	84	4991	4321	-13
4	2	361	200	-45	330	185	-44	51	31	-39	742	416	-44
Total	25	3913	2999	-23	1789	1490	-17	305	499	64	6007	4988	-17

2.3.2 Size composition

Commercial scallops in Area 2 ranged from 69-130 mm SL pre-season and 83-126 mm SL post-season, with a median length of around 105 mm SL, and a single mode at 100-110 mm SL in both surveys (Fig. 2A). The proportion of legal-sized commercial scallops in Area 2 was consistent at 80% pre- and post-season.

Commercial scallops in Area 3 ranged from 12-142 mm SL pre-season and 21-143 mm SL post-season, with a median length of around 103 mm SL in both surveys (Fig. 2B). The mode evident between 96-114 mm SL in the pre-season survey had apparently narrowed to 98-110 mm SL by the post-season survey. In addition, the distinct pre-season mode at 14-20 mm SL had shifted to 36-42 mm SL post-season. The proportion of legal-sized commercials in Area 3 increased from over 60% pre-season to 66% post-season.

Commercial scallops in Area 4 ranged from 18-146 mm SL pre-season and 84-143 m post-season, with median length increasing from 111 to 116 mm SL (Fig. 2C). The proportion of legal-sized commercial scallops increased from around 86% pre-season to 95% post-season.

With the exception of Area 3 there was no evidence of recent settlement in our samples, with the D'Entrecasteaux Channel population being dominated increasingly by large scallops (> 100 mm).

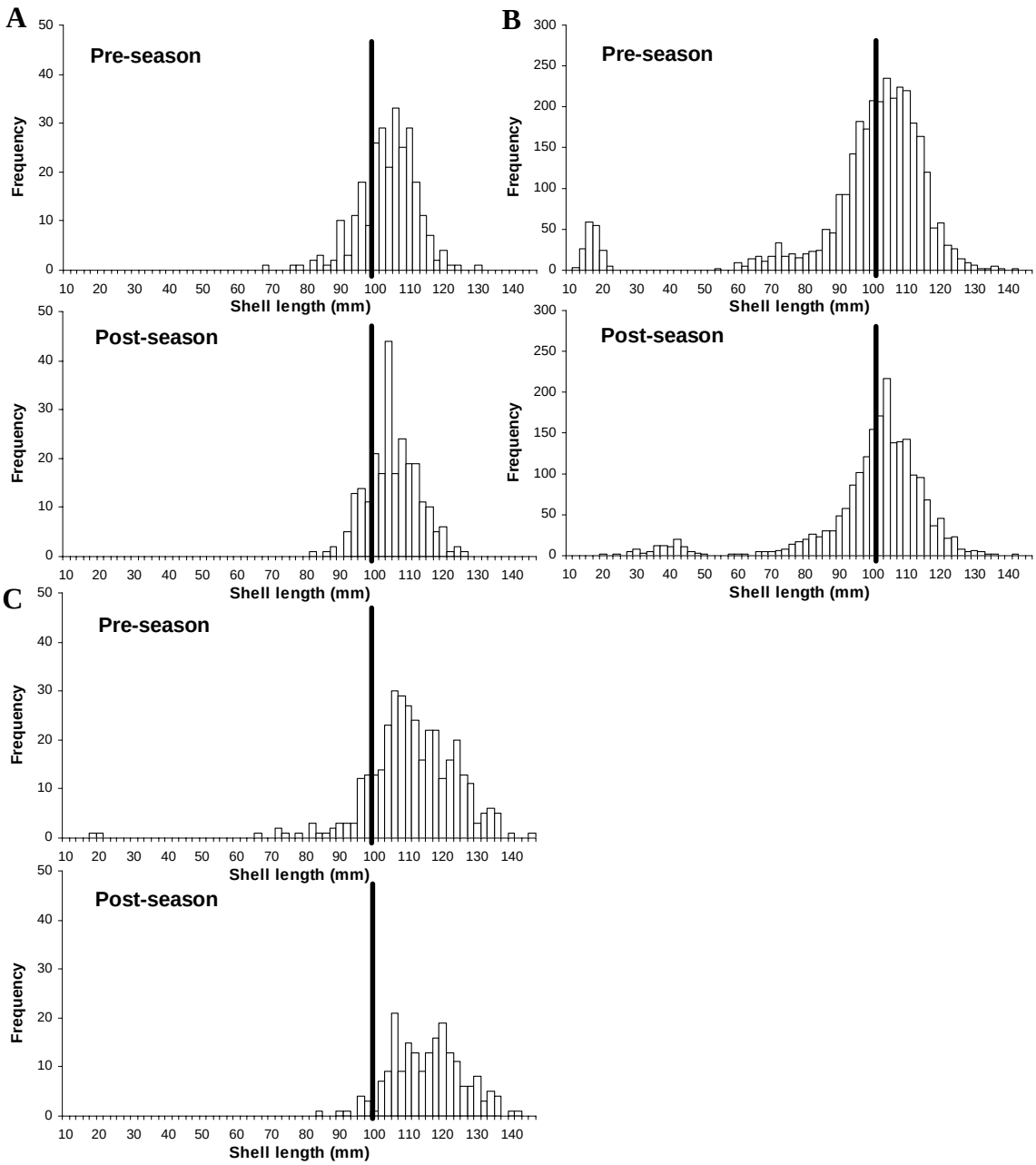

Fig. 2. Pre- and post-season size compositions for commercial scallops sampled from the D'Entrecasteaux Channel in **A.** Area 2; **B.** Area 3; and **C.** Area 4. The bold vertical line indicates the minimum legal size.

Doughboy scallops ranged from 20-106 mm SL pre-season and 8-112 mm SL post-season, with median length increasing from 73 mm to 82 mm SL (Fig. 3A). A broad mode between 50-100 mm SL and a secondary mode between 38-48 mm SL was evident pre-season whereas in the post-season samples the mode of larger individuals had shifted to the right, with a distinct peak between 84-92 mm SL, and new mode at 12-16 mm SL indicating recent settlement. The proportion of legal-size doughboy scallops increased from 38% pre-season to 57% post-season.

Queen scallops ranged from 21-145 mm SL pre-season and 30-140 mm SL post-season, with median length increasing from 106 mm to 109 mm SL (Fig. 3B). The pre-season size composition was characterised by modes at 50-60 mm, 74-80 mm as well as a broad mode between 94-126 mm SL. By contrast, the post-season size structure was unimodal with a peak between 104-124 mm SL. The proportion of legal-size queen scallops increased from around 65% pre-season to 71% post-season.

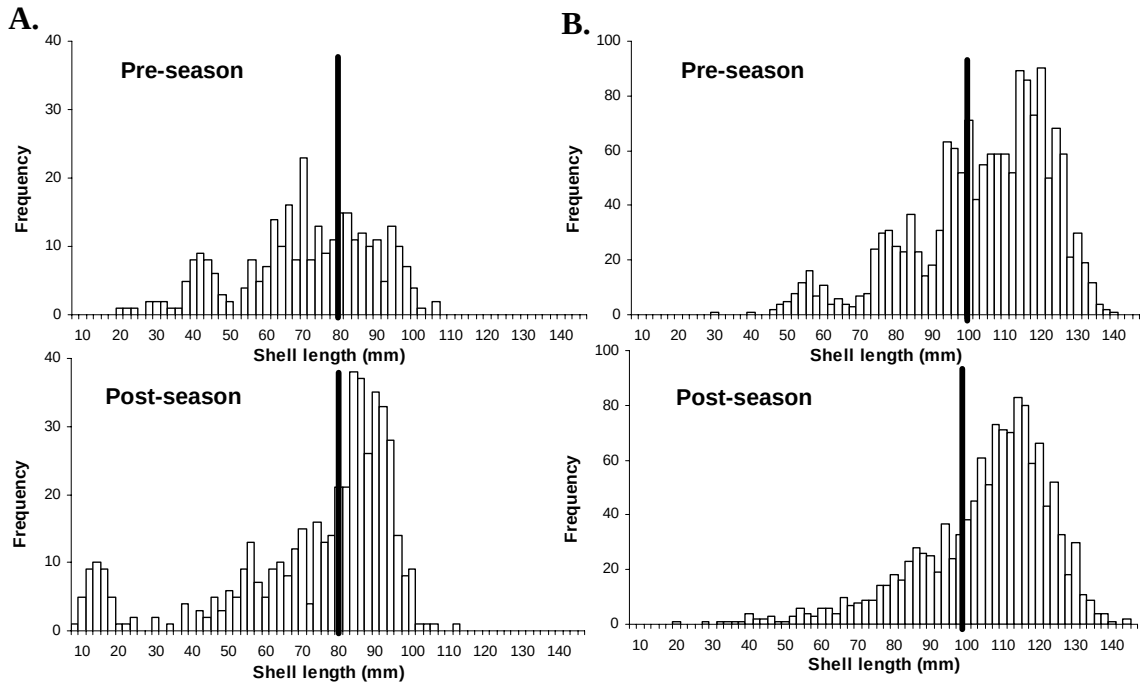

Fig. 3. Pre- and post-season size compositions for **A.** doughboy and **B.** queen scallops sampled from the D'Entrecasteaux Channel. The bold vertical line indicates the minimum legal size.

2.3.3 Changes in abundance

Relative changes in the numbers of commercial scallops between pre- and post- season surveys are shown in Fig. 4A. Sufficient numbers to detect a change (i.e. > 30 commercial scallops pre-season) were recorded at 21 sites. Of these, declines were recorded at 16 sites, seven of which experienced strong declines (i.e. > 50%). Three sites recorded moderate increases (i.e. + 11-50 %), one site a strong increase in

numbers (> 50%), and one site experienced little or no change. The majority (76%) of Area 3 sites recorded reductions in commercial scallop numbers, six of which were strong declines. These sites were located in Great Bay, near Green Island, Isthmus Bay and east of Gordon. One site located in the south of Area 3 experienced a strong increase in commercial scallop numbers. This part of the Channel contained a complex bottom, with changes in depth and habitat structure over small areas. Increased numbers may have been more a reflection of a slight shift in site location rather than a fishery or biological effect. Such an interpretation is supported by an observed change in the relative species composition at the site, with queen scallops dominating pre-season to a dominance of commercial scallops in the post-season sample. Both sites in Area 4 (located off Satellite Island) experienced declines, while in Area 2 numbers declined at one site whereas the other increased slightly.

Relative changes in the numbers of legal-sized commercial scallops between surveys are shown in Fig. 4B. Sufficient numbers (i.e > 30 scallops pre-season) were recorded at 19 sites, of which 14 showed declines (with strong declines at six sites), three sites recorded little or no change while at two sites increases were recorded. Across the areas, Area 2 was mixed with one site recording a moderate increase and the other a moderate decline in numbers. In Area 3, 11 of the 15 sites showed declines (with a strong decline at five sites), mainly in the eastern side of the Channel. Three western shore sites showed little or no change in abundance and one site indicated a strong increase in abundance. Both Area 4 sites recorded declines.

Overall, strong declines in the relative abundance of legal-sized scallops were evident in Great Bay, near Green Island, Isthmus Bay, east of Gordon, and off Satellite Island.

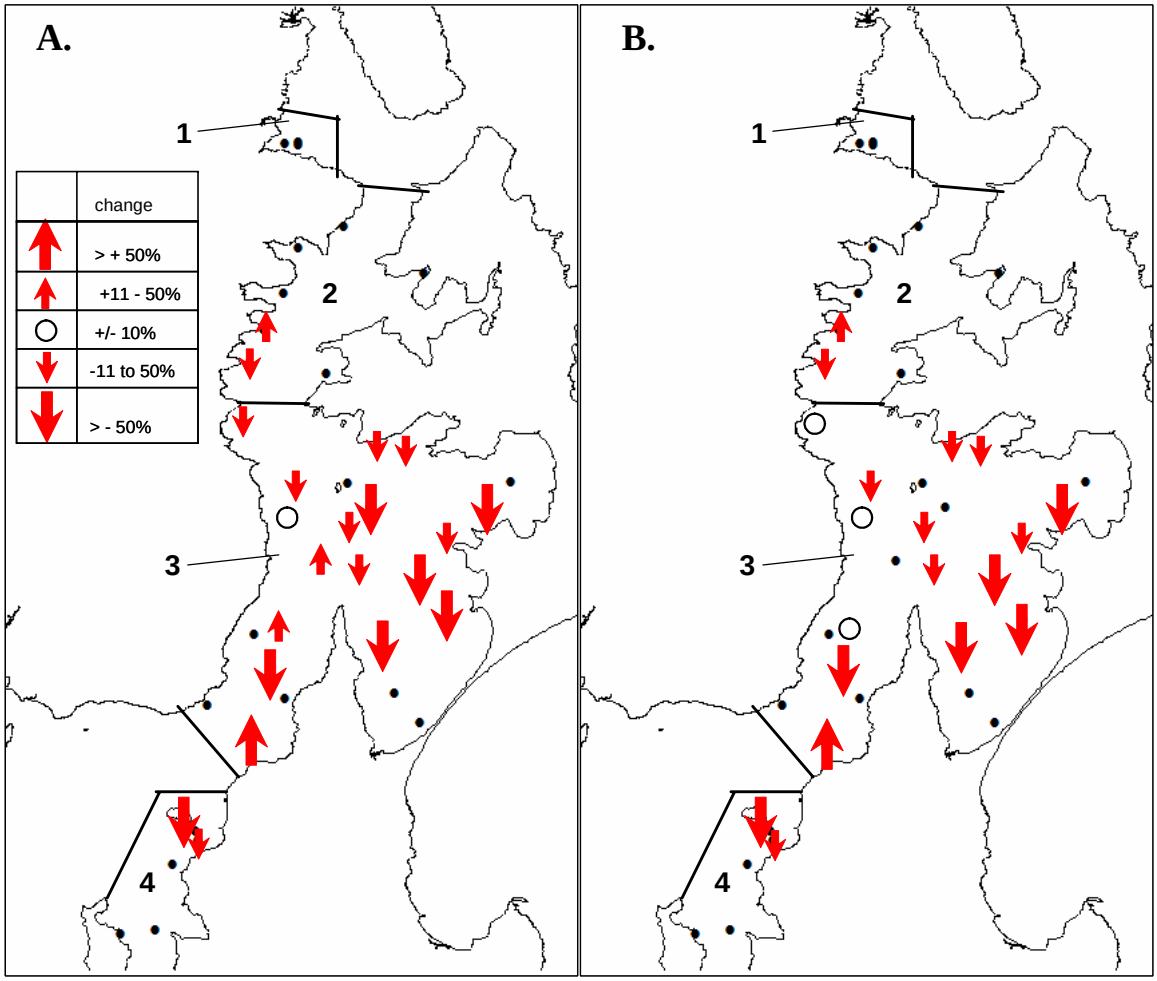

Fig. 4. Relative change in commercial scallop numbers by site, based on **A.** percentage change in abundance between pre- and post-season surveys; and **B.** percentage change in abundance of legal-sized commercial scallops only. Sites marked with small black dots were either only sampled pre-season or had fewer than 30 commercial scallops pre-season.

3. Telephone Survey

3.1 Introduction

A post-season telephone survey of licence-holders was conducted to assess the fishing effort and success of recreational fishers, and gauge opinions about the management of the 2006 scallop season.

3.2 Methods

3.2.1 Survey sample

A random sample of 400 recreational scallop licence holders was drawn from the 2006 recreational licence database. An electronic Whitepages search was conducted for all selected licence holders who did not have a telephone contact listed on the database. Licence holders for whom listings could not be located were replaced by further random selection until a total sample of 400, with telephone contact details, was achieved. While the majority of licence holders are Tasmanian residents, a small number of interstate and overseas residents also take out Tasmanian recreational fishing licences.

3.2.2 Questionnaire

Respondents were contacted by telephone during July 2006 and asked a series of questions based on a structured questionnaire. The questionnaire was divided into three sections, the first dealt with fishing activity, the second part addressed issues relating to the management of the fishery, and the third dealt with other fishing activities and expenditure associated with the fishery.

In relation to fishing activity, respondents were asked to estimate the total number of days, and number of days by area(s), that they had dived for scallops during the 2006 season, regardless of whether they had caught any scallops or not. Fishing locations were grouped according to regions indicated in Fig. 5. While no attempt was made to estimate harvest, respondents were asked to estimate the number of days that they actually took the bag limit (a measure of fishing success). Key factor(s) that influenced the choice of where they dived for scallops were also determined.

In the second part of the questionnaire, general satisfaction with the current management strategy was assessed, along with specific questions about the appropriateness of the daily bag limit, and timing and length of the season. Respondents were asked how they found out about the fishery regulations and whether they considered compliance problems had been a significant issue.

The final section dealt with expenditure directly associated with scallop fishing, namely travel costs related to vehicle fuel, boat fuel and dive related expenditure (air fills, gear hire, compressor fuel). Respondents were also asked about other fishing activities that

they undertook during 2006, including those that were combined with scallop fishing trips.

3.2.3 Data analysis

Total fishing effort (diver days) was reported as expanded estimates with 95% confidence limits calculated after Pollock *et al*. (1994). The expansion factor applied is the inverse of the sample fraction (i.e. number of responding licence-holders divided by the total number of scallop dive licence-holders).

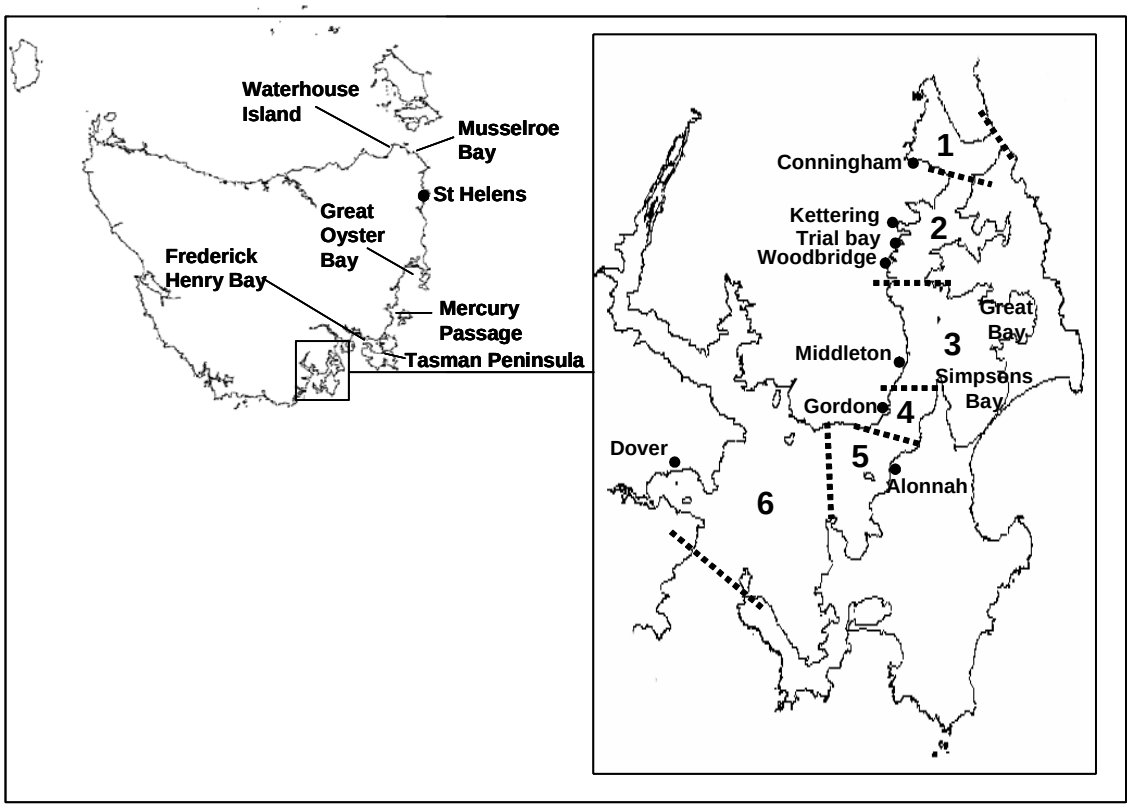

Fig. 5. Map of Tasmania showing the main areas targeted by recreational scallop fishers, including D'Entrecasteaux Channel fishing regions (1-6).

3.3 Results and Discussion

3.3.1 Survey response

The survey response profile is outlined diagrammatically in Fig. 6. From a total population of 4921, a gross sample of 400 licence-holders was selected. Of these, 19 had disconnected numbers and alternative numbers were unable to be found. As such this represented sample loss, reducing the effective sample to 381. Contact was made with 362 licence-holders, of whom 354 responded, representing an overall response rate of 93% (or 98% of contacts), and a sample fraction of 0.08 (i.e. 8% of licence-holders). Non-contacts accounted for 5% and refusals 2% of the net sample. Given the high response rate achieved no adjustments have been made for non-response.

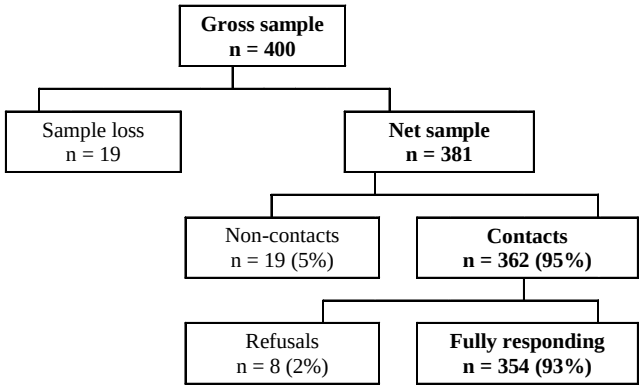

Fig. 6. Diagrammatic representation of the survey response profile (n is sample size).

3.3.2 Fishing effort

Based on response to the number of days dived for scallops it became evident that not all licence-holders used their scallop licences, in fact an estimated 34.7% (SE ±2.4%) or 1707 licence-holders did no diving for scallops during 2006[1]. As a proportion of all licence holders, this was a significant increase from the estimated 17 % that did not fish during 2005. In terms of numbers, an estimated 3214 licence holders dived for scallops in 2006, a 27% increase in participation compared with 2005 (despite more than 60% more licences being issued in 2006).

The total recreational dive effort for the 2006 season was estimated as 18,769 fisher days (95% CI 15,903-21,634). Although higher than in 2005 (15,907 days), this difference was not statistically significant. This represented an average 3.8 days (SE ±0.3) per licence-holder or, considering only those who actually fished in 2006, an average of 5.8 days (SE ±0.4). By comparison during the 2005 season, active licence holders dived an average of 6.3 days for scallops.

3.3.3 Regional distribution of effort

Dive effort was heavily concentrated in the D'Entrecasteaux Channel, accounting for 88% of the overall fishing effort, followed by Great Oyster Bay with just over 5%, St Helens (including Binalong Bay) with almost 2% and Tasman Peninsula, particularly Nubeena, with a further 1.5% of the total effort (Fig. 7). Low levels of fishing activity were reported elsewhere along the east coast, including Waterhouse Island, Musselroe Bay, Mercury Passage, Frederick Henry Bay, and outside of Bruny Island. A similar pattern was evident during the 2005 season, with 87% of the effort concentrated in D'Entrecasteaux Channel, followed by Great Oyster Bay with about 7% and Nubeena attracting a further 3% of the total effort.

[1] Note: it was evident that some respondents who took out a scallop licence did not personally dive but got others to collect scallops on their behalf, this was despite clarification of the rules relating to this practice for the 2006 season.

Effort in 2006 was particularly focussed in regions 2, 3, 4 and 5 of the D'Entrecasteaux Channel, collectively accounting for almost 80% of the total state-wide effort (Fig. 7). In region 2 effort was most intense adjacent to Woodbridge, with areas off Kettering and Trial Bay also important. Effort was reported throughout region 3 but in particular in Simpsons Bay, Great Bay and Missionary Bay. In region 4 dive effort was heaviest off Gordon, while in region 5 beds off Satellite Island (adjacent to Alonnah) attracted significant effort.

By comparison with the 2005 season, the most conspicuous change in the spatial distribution of effort within the D'Entrecasteaux Channel was the sharp fall in the relative importance of region 1, from 27% in 2005 to just 8% of the total effort in 2006. Depletion of beds off Conningham in 2005 and the absence of any recovery in 2006 (refer section 2.3.1) contributed to this trend. Conversely, there was an increase in relative effort levels in regions 4 and 5, from 26% in 2005 to over 37% (combined) in 2006. In both seasons, beds off Gordon and Satellite Island were particularly productive.

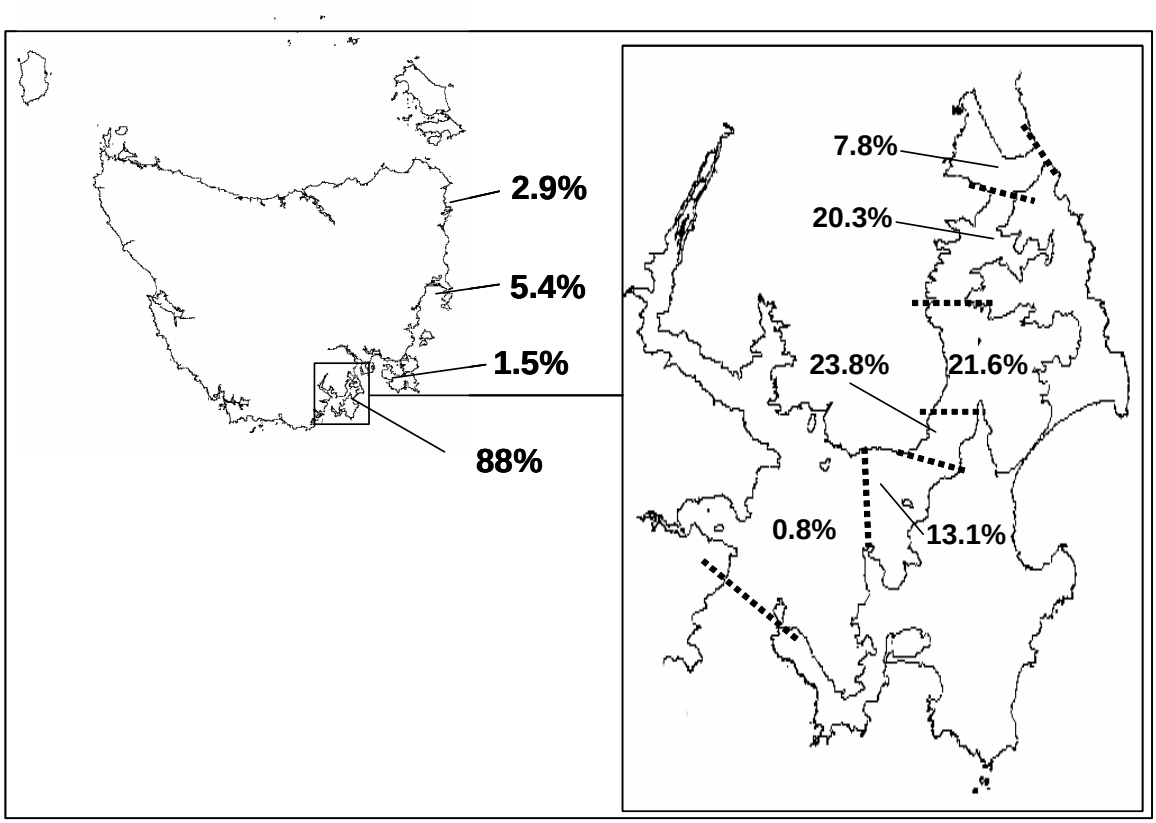

Fig. 7. Map of Tasmania showing the main areas targeted by recreational scallop fishers and % of total days fished**,** including the regional breakdown within the D'Entrecasteaux Channel .

Residents from Greater Hobart and the Huon/Channel regions accounted for the vast majority of the fishing activity in the D'Entrecasteaux Channel (Fig. 8). Licence holders residing in other areas (elsewhere) fished all regions, though Great Oyster Bay and the east coast attracted most of their effort.

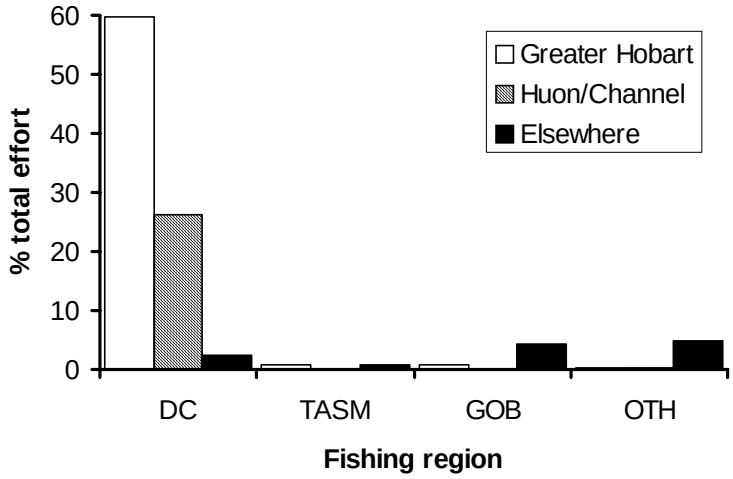

Fig. 8. Distribution of fishing effort based on place of residence. DC D'Entrecasteaux Channel; TASM Tasman Peninsula; GOB Great Oyster Bay; OTH all other regions.

3.3.4 Fishing success

Of those respondents who reported diving for scallops, 69% indicated that they took the bag limit on each day fished, this compares with 80% of active divers during 2005. When converted to a proportion of the total days fished, it became evident that about 87% of the 2006 dive effort (representing 16,431 diver-days) resulted in the bag limit being taken. The majority of reports of nil or low catches came from Conningham (region 1, D'Entrecasteaux Channel) and the east coast in general, including Great Oyster Bay and St Helens areas. As observed during 2005, the D'Entrecasteaux Channel not only attracted the vast majority of the dive effort it represented the main productive region.

3.3.5 Dive methods

Over half of the active licence holders used surface air (hookah), followed by about one third who used scuba and less than 10% who dived on snorkel to harvest scallops (Fig. 9). In terms of relative contribution to the total days fished, two-thirds of the effort was undertaken using surface air, about 29% scuba and less that 5% snorkel. This indicates that, on average, licence holders using surface air dived more frequently for scallops than those on scuba.

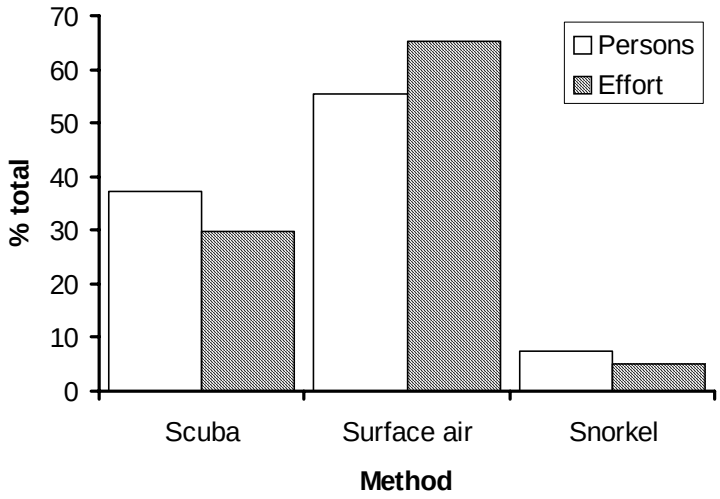

Fig. 9 Dive methods used in the 2006 scallop fishery by proportion of active divers and estimated effort.

3.3.6 Factors influencing the choice of where to fish

Respondents who reported fishing for scallops were asked to identify, from a list of options, which factor(s) influenced their decision about where they actually went diving for scallops. Almost 60% of respondents indicated that prior knowledge of the location of scallop beds was an important factor in determining where they fished (Table 2). Advice from other fishers, proximity to place of residence or holiday location and ease of access to the area were next in importance. Trial and error (searching), environmental factors such as depth and water visibility and observed activity by other fishers were relatively minor factors. When compared with responses to the same question asked at the end of the 2005 season, the most conspicuous changes in 2006 were the substantially lower responses to factors relating to access, trial and error and observed activity of other fishers. Shifts in the latter two factors presumably reflect increased experience in the fishery, noting that the 2005 fishery represented the first open season in over a decade.

Table 2 Response to factors mentioned as having influenced the decision of where to fish for scallops in 2006. Response profile from the 2005 survey (% in 2005) is also indicated.
Sample size equals 231; percentages do not sum to 100 since multiple responses were possible.

Factors	No. respondents	%	% in 2005
Prior knowledge of likely scallop beds	136	58.9	51.6
Advice from other fishers	109	47.2	54.6
Close to where you reside/holiday	89	38.7	37.2
Easy access (boat ramps/shore dives)	64	27.7	45.7
Trial and error (result of searching)	20	8.7	23.0
Other factors (water clarity, depth)	13	5.7	3.6
Observed activity from other fishers	10	4.3	15.8

3.3.7 Management of the fishery

Respondents were asked a series of questions that related to the management of the fishery.

Satisfaction with management

Respondents were advised that scallops have had a history of being over-fished in Tasmania and in opening the fishery a cautious approach was taken by management; conservative bag limits, large minimum size limits and a relatively long fishing season, intended to reduce the rush to take the catch that had characterised the fishery in the past. Respondents were asked how satisfied they were with this management approach and the majority (83%) indicated that they were at least quite satisfied (Table 3). Only around 13% of respondents indicated dissatisfaction with the management strategy. Dissatisfaction was strongly linked with the bag limit and season length.

By comparison, the same question asked at the end of the 2005 season elicited effectively the same response profile in terms of overall satisfaction, with the exception that there was a significantly higher 'very satisfied' response in 2005.

Table 3 Response to satisfaction with the management of the scallop fishery. Response profile from the 2005 survey (% in 2005) is indicated.

Sample size equals 354

Answer	No. Respondents	%	% in 2005
Very satisfied	92	26.1	52.5
Quite satisfied	200	56.8	34.4
Not very satisfied	35	9.9	8.1
Not at all satisfied	10	2.8	2.2
Unsure	15	4.3	2.8

Daily bag limit

Respondents were asked whether they considered that the daily bag limit of 40 scallops was about right, too high or too low, and if too high or too low what they considered it should be and why. Respondents were evenly divided between those who considered the bag limit too low and those who considered it about right (Table 4). Very few respondents considered the bag limit to be too high. A similar split was noted in 2005, though at that time slightly more respondents considered the bag limit to be about right rather than too low.

Respondents who considered that the bag limit was too low suggested alternative limits ranging between 50 – 200, with a mode of 60 scallops per day (cf mode of 100 scallops in 2005). Of those who provided reasons for a higher bag limit (35 respondents), the majority (70%) indicated that the expense of catching the scallops was an issue. Other reasons cited in support of higher bag limits included reduced necessity to go fishing as often (14% of respondents), and that current stock levels could support a higher bag limit (11% of respondents).

Table 4. Response to daily bag limit with suggested alternative limits. Response profile from the

2005 survey (% in 2005) is indicated.
Sample size equals 354

Answer	No. Respondents	%	Suggested bag limit Range	Mode	% in 2005
About right	166	46.9			51.5
Too high	13	3.7	20-30	30	2.2
Too low	166	46.9	50-200	60	45.7
Unsure	9	2.5			0.6

Timing and length of the season

Respondents were asked whether they considered that the timing and length of the season was about right and, if not, what changes they would recommend and why. While the majority (62%) affirmed that the timing and duration of the season was about right, almost one-third considered that is was not right (up from 26% in 2005) (Table 5).

Overall, more respondents who identified season length as an issue considered that the season should be shorter (49 respondents) compared with those who considered a longer season was more appropriate (9 respondents). In relation to the timing of the season, most respondents preferred that the season was later (32 respondents) rather than earlier (14 respondents). The main reasons given in support of an earlier season related to warmer weather and water temperatures whereas those opting for a later season recognised that roe condition in the scallops was better later in the year.

Table 5. Response to timing and length of season being "about right". Response profile from the 2005 survey (% in 2005) is indicated.
Sample size equals 354

Answer	No. respondents	%	% in 2005
Yes	221	62.4	71.2
No	113	31.9	26.0
Unsure	20	5.6	2.8

Fishing regulations

Respondents were asked about the sources of information they had used to find out about the fishing regulations and other aspects of the scallop fishery. The single main source of information about the fishery was the sea fishing guide (61%), with other fishers (22%) and the Government internet website (8%) also identified as important (Table 6). For sources that received any mention, the sea fishing guide (76%) and other fishers (56%) were the most important, with the Government internet website (23%) and print media (21%) also important. Government shows and displays, radio, clubs and associations, tackle and dive shops and Fishcare volunteers were not rated highly as sources of information (all less than 5% of mentions).

Table 6. Response to information sources about scallop fishing regulations
Sample size equals 353

Source	Main source No. respondents	%	Any mention No. respondents	%
Sea fishing guide	206	61.3	269	76.2
Other fishers	74	22.0	198	56.1
Govt. internet web site	27	8.0	80	22.7
Print media (newspapers)	9	2.7	74	21.0
Television	1	0.3	22	6.2
Recreational fishing magazines	3	0.9	19	5.4
Govt. show/displays	8	2.4	13	3.7
Radio	0	0.0	8	2.3
Clubs/associations	3	0.9	8	2.3
Tackle/Dive shop	0	0.0	10	2.8
Fishcare volunteers	0	0.0	3	0.8
None	5	1.5		

Respondents were asked about how well informed they considered themselves to be with regard to the scallop fishery regulations. The vast majority (95%) regarded themselves as being either well or adequately informed, with just 5% considering that they were poorly informed (Table 7).

Table 7. Response to how well informed respondents considered themselves of scallop regulations.
Sample size equals 349

Answer	No. respondents	%
Well informed	185	53.0
Adequately informed	147	42.1
Poorly informed	17	4.9

Plastic scallop measurer

A plastic scallop measurer was sent to individuals upon renewal of their licence by the Department of Primary Industry and Water (DPIW) and respondents were asked several questions relating to it. Firstly, respondents were asked whether they had received the measurer. Almost 70% indicated that they had received the measurer, while around 30% had not (Table 8).

Table 8. Response to whether respondents received the plastic scallop measurer upon renewing their licence
Sample size equals 347

Answer	No. respondents	%
Yes	237	68.3
No	105	30.3
Unsure	5	1.4

The vast majority (88%) of respondents who had received the measurer and had reported scallop fishing during the season indicated that they had found it useful (Table 9). Less than 10% had not found it useful, with several of these respondents suggesting that the measurer was too flexible to measure scallops accurately.

Table 9. Response to whether active divers who had received the plastic scallop measurer had found it useful

Sample size equals 179

Answer	No. respondents	%
Yes	158	88.3
No	16	8.9
Unsure	5	2.8

All respondents who had received the scallop measurer were also asked if they thought that a measurer of similar design would be useful for rock lobster and abalone. The vast majority (82%) indicated that they thought it would be useful, 12% thought it would not be, and 5% were unsure (Table 10).

Table 10. Response to whether fishers that received the plastic scallop measurer thought it would be useful for rock lobster and abalone

Sample size equals 211

Answer	No. respondents	%
Yes	175	82.9
No	25	11.8
Unsure	11	5.2

Compliance issues

Respondents were advised that there had been concerns expressed about general compliance in the fishery and were asked whether, in their opinion, compliance had been a significant problem. Slightly more than half of all respondents indicated that they did not consider compliance to have been a major problem whereas almost 40% indicated that they thought that it was a significant issue (slightly up on 2005) (Table 11). Based on suggestions from respondents (n=105) as to how the issue might be addressed, just over half (54%) identified the need for greater policing, 27% suggested that higher bag limits would reduce illegal activity, and 6% said that a shorter season would allow for better coverage by police.

Table 11. Response to whether general compliance was perceived to have been a significant problem in the fishery

Sample size equals 353

Answer	No. respondents	%	% in 2005
Yes	138	39.1	35.9
No	185	52.4	54.6
Unsure	30	8.5	9.5

3.3.8 Other fishing activities

Respondents were asked to identify the types of saltwater fishing activities (other than scallop diving) they had undertaken during 2006. Line fishing was the most common fishing activity undertaken (almost 80% of respondents), followed by diving for abalone and rock lobster (each about 60%) and potting for rock lobster (40%) (Table 12).

Table 12. Response to what fishing activities other than scallop fishing respondents undertook during 2006.

Sample size equals 345; percentages do not sum to 100 since multiple responses were possible.

Activity	No. respondents	%
Line fishing	268	77.7
Abalone dive	202	58.6
Rock lobster dive	195	56.5
Rock lobster pot	137	39.7
Rock lobster ring	32	9.3
Net	67	19.4
Spear	25	7.2
None	22	6.4

Respondents who had dived for scallops during 2006 were also asked to identify which fishing activities, if any, they had combined with scallop fishing trips. The majority indicated that when diving for scallops they did not participate in any other fishing activities. Approximately one fifth included one or more of the following activities, diving for rock lobster, abalone and/or line fishing (Fig. 13).

Table 13. Response to the types of fishing activities respondents combined whilst on a scallop fishing trip during 2006.

Sample size equals 228; percentages do not sum to 100 since multiple responses were possible.

Activity	No. respondents	%
Scallop dive only	130	57.0
Line fishing	50	21.9
Abalone dive	35	15.3
Rock lobster dive	45	19.7
Other	16	7.1

3.3.9 Trip related expenditure

Out of the 231 respondents who reported some scallop fishing during 2006, 218 provided information on their average out of pocket per trip expenditure on scallop fishing trips. Expenditure items specified included car fuel, boat fuel, compressor fuel and/or tank fills or hire of dive gear. When scaled to represent the total number of trips reported by these responding licence-holders, their combined trip related expenditure was estimated at just over $57,000, with car fuel accounting almost half, followed by boat fuel at around 40%, and tank fills and/or compressor fuel at just 10% of the total (Table 14). Trip related expenditure on car and boat fuel, tank fills/hire and compressor fuel expanded to account for all recreational scallop fishers was estimated at $0.86M for the 2006 season.

Table 14. Estimated trip related expenditure by respondents for the 2006 scallop season
Sample size equals 218

Item	Per trip range	Total reported expenditure	%
Car fuel	$0 - $150	$27,951	48.7
Boat fuel	$0 - $150	$22,816	39.8
Tank fills/compressor fuel	$0 - $70	$5,615	9.8
Items combined	na	$956	1.7
Total		$57,339	

3.3.10 Licensing next season

The vast majority of respondents (94%) indicated that they were at least quite likely to take out a scallop licence should there be a season in 2007 (Table 15). In many respects this represents an important measure of the underlying satisfaction in the fishery and the high level of interest of recreational divers in harvesting scallops.

Table 15. Response to likelihood to take out a scallop licence should there be a scallop season in 2007
Sample size equals 353

Response	Number	%
Very likely	262	74.2
Quite likely	69	19.5
Not very likely	12	3.4
Not at all likely	9	2.5
Unsure	1	0.3

4. Summary

The 2006 dive surveys provided evidence for an impact of the recreational fishery on scallop stocks in the D'Entrecasteaux Channel. Overall scallop abundances (numbers) decreased by almost 20%, with commercial scallop numbers decreasing by a quarter, implying that most recreational effort was targeted at this species (supported anecdotal evidence). Despite this, significant numbers of scallops remained in the Channel, particularly in Area 3 and it is likely that these stocks would be sufficient to justify the opening of the recreational scallop fishery in 2007. Other important findings are listed below.

- Commercial scallops remained the most abundant species in the D'Entrecasteaux Channel despite a decline in abundance between pre- and post-season surveys. Numbers of queen scallops remained relatively steady whereas numbers of doughboy scallops increased, largely as a result of recent settlement

- Commercial scallops were found in Areas 2, 3 and 4 of the Channel, being particularly widespread in Area 3. Queen scallops were only abundant in Areas 3 and 4, while doughboy scallops were found in low numbers in Areas 3 and 4.

- No scallops were recorded in pre-season surveys in Area 1 (off Conningham). This area was fished particularly heavily in 2005, with scallop numbers severely reduced by the end of that season. There were no signs of recovery in 2006, confirming the ability of recreational fishing pressure to locally deplete scallop beds.

- Abundance of legal-sized commercial scallops declined at the majority of survey sites, with one-third recording strong declines (greater than 50%). Strong declines were recorded at Great Bay, near Green Island, Isthmus Bay, east of Gordon, and off Satellite Island, areas that were subjected to high levels of fishing pressure during the 2006 season.

- Area 3 size compositions provided some evidence for recent settlement of commercial scallops, whereas in Areas 2 and 4 there were few under-sized scallops present (20% and 5% respectively). Should significant recruitment fail to occur prior to the 2007 season the vast majority of scallops will be legal sized, with little evidence for short-term stock replenishment.

- Post-season surveys indicated that small, medium and large doughboys and medium and large queen scallops were present in the Channel.

A telephone survey of over 350 recreational scallop licence-holders revealed key information about the fishery and general perceptions about the management.

- Almost 35% of scallop licence holders did not fish during 2006, this compared with 17% in 2005, though increased licence sales in 2006 meant that there were more active fishers in 2006.

- Recreational fishers dived an estimated 18,800 fisher days for scallops during the 2006 scallop season, representing an average of almost 6 days per fisher. By comparison with 2005, dive effort was higher but the difference was not statistically significant.

- The vast majority (88%) of the dive effort was concentrated in the D'Entrecasteaux Channel, with Great Oyster Bay of minor importance (5%). Effort was focussed in the central Channel, in particular Simpsons Bay, Great Bay, off Gordon and around Satellite Island.

- By comparison with 2005, effort directed in the northern part of the Channel fell markedly, due mainly to the scarcity of scallops in that area (fished-out during 2005).

- Residents of Greater Hobart and Huon/Channel areas accounted for the vast majority of the scallop dive effort, targeting the D'Entrecasteaux Channel.

- Using the bag limit as a measure of fishing success, almost 87% of all fishing effort resulted in the daily bag limit of 40 scallops being achieved.

- Surface air was the primary dive method used, followed by scuba and snorkel.

- The majority of respondents (83%) indicated that they were satisfied with the cautious approach taken by management for the 2006 season, i.e. conservative bag limit, large minimum size limit and a relatively long fishing season.

- Equal proportions of respondents considered that the daily bag limit of 40 was either 'about right' or too low. Suggested alternative limits ranged from 50 – 200 per day, with the modal suggestion being 60.

- Almost two-thirds of all respondents were satisfied with the timing and length of the season.

- The vast majority of respondents considered that they were at least adequately informed about the scallop regulations. About three-quarters of respondents identified the sea fishing guide produced by DPIW as an important information source about fishing regulations, with other fishers also representing an important source of information.

- The plastic scallop measurer supplied by DPIW was considered useful by the majority of active divers, some respondents did, however, note that it was too flexible to measure scallops accurately.

- Almost 40% of respondents considered that compliance was a significant problem and of these, most considered that the problem could be remedied with more police checks. Some believed that the bag limit was overly conservative and contributed to the problem.

- While most respondents did other types of recreational fishing in addition to diving for scallops, over half of all respondents indicated that they did not include other types of fishing activities whilst on a scallop harvesting trip.

- Trip related expenditure based on car and boat fuel, tank fills and hire, and compressor fuel costs by persons targeting scallops totalled an estimated $0.86M, with car fuel accounting for almost half of the total cost.

The 2006 recreational scallop season enjoyed a high level of fisher success and satisfaction as well as support for the management strategy. Of concern for the future, however, is the limited evidence for recent settlement of commercial scallops. Should this situation persist it is likely that subsequent fisheries will be increasingly characterised by a switch to queen or doughboy scallops. Furthermore, based on the distribution of fishing effort and fishing success over the past two seasons, there is no evidence to support the existence of substantial beds of scallops in inshore waters outside of the D'Entrecasteaux Channel.

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