Survey of the 2005 Tasmanian recreational scallop fishery

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Executive Summary

A recreational scallop fishery was opened in Tasmanian waters between 25th March and 30th June 2005. The season permitted dive collection only with all state waters (apart from marine reserves) open to fishing. A recreational scallop dive licence was required to harvest scallops and a daily bag limit of 40 scallops and possession limit of 200 scallops applied. A total of 3039 scallop dive licences were issued for the season.

The status of scallop populations in the D'Entrecasteaux Channel, Great Oyster Bay and Georges Bay was assessed prior to the opening of the fishery and immediately following the closure of the season. The valuable assistance provided by the Tasmanian Scuba Diving Club volunteers effectively extended the area surveyed by divers to include the southern Channel and North Bay (Tasman Peninsula). A phone survey of recreational fishers with scallop licences was also conducted at the end of the season to gauge information about the fishery, including effort levels and overall fisher satisfaction.

Key findings included:

- Overall, commercial scallops were the dominant species in the D'Entrecasteaux Channel, with a wide range of size classes represented, implying the presence of several age classes as well as some recent settlement. Queen scallops were also abundant, dominating certain areas within the Channel, and with a wide range of sizes was present. Doughboys were only abundant at a single site.

- Post-season surveys indicated that there was still a wide range of sizes for each of the three species. Declines in abundance of commercial scallops were evident, although legal sized scallops (>100 mm) were generally still well represented at most sites, due in part to the growth of sub-legal scallops into the legal size range in the period since the pre-season survey.

- Dive surveys suggested that the largest declines of commercial scallops occurred in the central Channel area; off Kettering, Simpsons Bay and Great Bay, with the largest declines off Satellite Island and off Conningham in depths of less than 20 m.

- There was little evidence for declines in queen and doughboy scallop abundance in the Channel.

- In Great Oyster Bay queen and doughboy scallops were the dominant species on the eastern shore (Coles Bay, Hazards Bay) while a large bed of commercial scallops was located on the western shore. Commercial and queen scallops were primarily represented by large individuals. Only a very small proportion of the doughboy population was of legal size.

- Post-season size distributions of all three species in Great Oyster Bay showed some evidence of growth but otherwise were basically similar to pre-season size compositions.

- There was no strong evidence for declines in abundance between pre- and post-season surveys in Great Oyster Bay.

- A relatively small population of commercial scallops was present in Georges Bay, the post-season survey suggested a slight decline in abundance.

A phone survey of almost 370 recreational scallop licence-holders revealed key information about the fishery and general perceptions about the management.

- It is estimated that recreational fishers dived for a total of almost 16,000 fisher days over the 2005 scallop season, representing an average of just over 6 days per fisher.

- The vast majority (87%) of effort was concentrated in the D'Entrecasteaux Channel, with Great Oyster Bay of secondary importance (7%). Within the northern Channel effort was concentrated off Conningham and in the central Channel off Satellite Island and off Gordon.

- In Great Oyster Bay fishers almost exclusively targeted the eastern shore, particularly Coles Bay and Hazards Bay.

- Using the bag limit as a measure of fishing success, over 80% of all fishing effort resulted in the daily bag limit of 40 scallops being achieved.

- The vast majority of respondents (87%) indicated that they were satisfied with the cautious approach taken by management for the 2005 season, i.e. conservative bag limit, large minimum size limit and a relatively long fishing season.

- More than half of respondents considered that the daily bag limit of 40 was about right, with most of the remainder judging it to be too low. Suggested alternative limits ranged from 50 – 200 per day.

- Almost three-quarters of all respondents were satisfied with the timing and length of the season.

- Over one third 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 responsible for the problem.

Comparison between the phone and dive surveys found corroboration on a number of key points. The phone survey found that fisher effort was concentrated in the D'Entrecasteaux Channel, particularly off Conningham and Satellite Island, and dive surveys found that there was a large drop in abundance off Satellite Island, and that almost no scallops were found off Conningham post-season. Fishers also observed this trend with the majority who reported a decline in scallop abundance noting that it occurred off Conningham. There was also significant fishing effort at Kettering, Great Bay and Simpsons Bay; areas that showed moderate declines in abundance when assessed post-season.

In conclusion, the 2005 recreational scallop season can be considered a success, with a high level of fisher success and satisfaction as well as support for the management strategy. Another encouraging sign was evidence of recent settlement and the continued presence of a wide range of size classes, including legal sized scallops, in the post-season surveys.

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1. General Introduction

A recreational scallop fishery was opened for the first time in over a decade in Tasmanian waters during 2005, the season extending between 25th March and 30th June, with dive collection the only permitted method and all state waters (apart from marine reserves) open to fishing. A recreational scallop dive licence was required to harvest scallops and a daily bag limit of 40 scallops and possession limit of 200 scallops applied. A total of 3039 scallop dive licences were issued for the season.

The status of scallop populations in the D'Entrecasteaux Channel, Great Oyster Bay and Georges Bay was assessed prior to the opening of the fishery and immediately following the closure of the season. A phone survey of recreational fishers with scallop licences was also conducted at the end of the season to gauge information about the fishery, including effort levels and overall fisher satisfaction with the management of the fishery.

2. Dive Surveys

2.1 Introduction

The dive surveys were designed to examine size and species composition of inshore scallop populations prior to, and after the fishing season to determine the impact of the fishery on the stocks.

2.2 Methods

2.2.1 Site selection

The D'Entrecasteaux Channel (DC) was initially surveyed in 2004 (Morton and Lyle, 2004) and from this survey, sites with high scallop densities and sites thought likely to be the focus of recreational fishing activity were selected for the 2005 pre- and post-season surveys. In total 13 sites were sampled pre- and post-season in the DC in a depth range 7-17 m (Fig. 1A).

Great Oyster Bay (GOB) and Georges Bay (GB) were surveyed for the first time in February 2005. As little was known about scallop populations in these areas information about possible beds was obtained from commercial and recreational fishers. Using this information, divers conducted drop point searches on a number of potential beds. When medium or high densities of scallops were encountered the site was surveyed using standard protocol (see section 2.2.2). In GOB over 3 hours dive search time throughout the area in a range of depths (5-22 m) led to a number of medium and high density areas being encountered. A total of five sites were surveyed pre- and post-season (Fig. 1B). In GB over an hour of diver search time throughout the Bay in a range of depths (4-15 m) led to only one moderate density patch of commercial scallops being located, and subsequent dives showed this patch to be limited in extent (Fig. 1C).

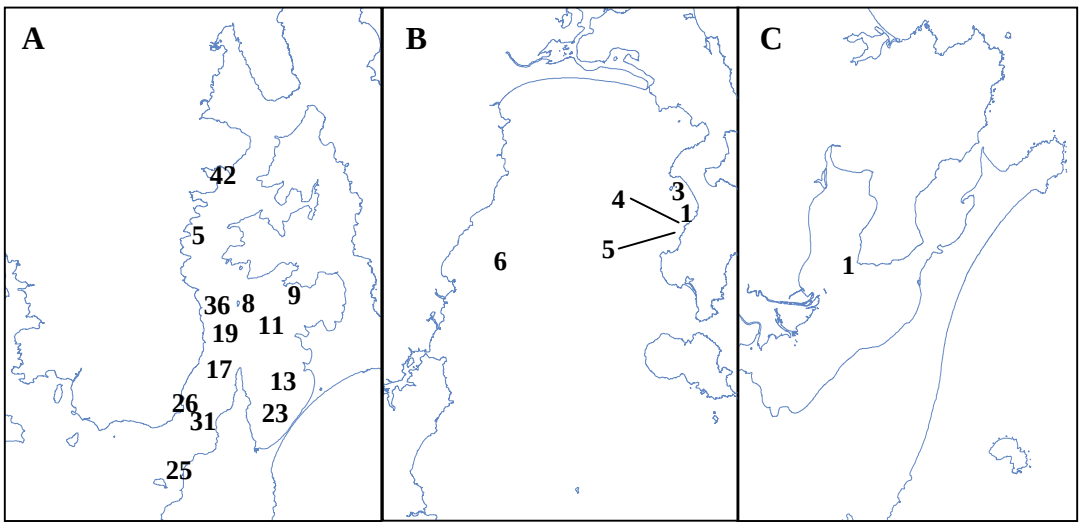

Fig. 1. Map of sampling sites (numbered): A) D'Entrecasteaux Channel (DC); B) Great Oyster Bay (GOB); and C) Georges Bay (GB).

2.2.2 Survey method

All sites were surveyed on SCUBA using timed swims. Divers searched the bottom thoroughly collecting all scallops encountered, and were instructed to carefully search for small scallops (<50 mm), which can be cryptic. Each diver searched until either they had collected a total of 150 scallops or 20 min search time had elapsed. Where 150 scallops were collected, the search time was recorded.

Scallops were brought to the surface, identified to species and measured for shell length (SL). They were then returned to the water. Two divers dived at all sites in GB, DC and four of the five sites in GOB; GOB 6 was surveyed by a single diver on both occasions.

2.2.3 TSDC surveys

In order to provide more extensive spatial coverage of scallop populations, volunteers from the Tasmanian Scuba Diving Club (TSDC) assisted with the pre-season surveys. TAFI staff met with TSDC volunteers in early March and briefed them on the survey method (See section 2.2.2). TSDC volunteers were instructed to target most effort in areas where little was known about scallop populations, i.e. southern DC and North Bay, Tasman Peninsula. Within these areas, specific site location was at the discretion of TSDC volunteers.

The TSDC also surveyed two sites (11 and 13) in the central DC, previously surveyed by TAFI divers, and size and species composition were compared as a means of validating the consistency of the two surveys.

2.3 Results and Discussion

2.3.1 Species Composition

The total numbers of scallops caught at each site in pre- and post-season surveys are shown in Table 1. Almost 4500 scallops were sampled during each survey. Proportionally, commercial scallop numbers declined in the DC from around 59% pre-season, to 53% of the total post-season sample, presumably reflecting heavier fishing pressure applied to the commercial, as opposed to queen or doughboy, scallops. There was little evidence for changes in relative catch composition in GOB and GB between surveys, with queen and commercial scallops, respectively, dominating samples from each region.

Table 1. Total numbers of scallops by species collected by site for pre- and post-season surveys. It was aimed to catch 300 scallops per site, however, there was often a slight over or undercounting by divers, and potentially a minor loss of scallops from catch bags.

Site	Commmercial		Queen		Doughboy		Total	
	pre-	post-	pre-	post-	pre-	post-	pre-	post-
DC 5	262	204	0	1	0	0	262	205
DC 8	14	8	8	24	275	228	297	260
DC 9	295	289	0	1	4	1	299	291
DC 11	205	164	7	3	73	117	285	284
DC 13	291	282	1	2	16	13	308	297
DC 17	50	46	216	196	19	44	285	286
DC 19	63	43	217	258	1	2	281	303
DC 23	260	243	2	1	17	28	279	272
DC 25	112	38	164	237	25	19	301	294
DC 26	13	11	101	99	2	0	116	110
DC 31	20	21	249	220	21	44	290	285
DC 36	313	271	1	5	3	21	317	297
DC 42	152	119	0	0	0	0	152	119
DC Total	**2050**	**1739**	**966**	**1047**	**456**	**517**	**3472**	**3303**
GOB 1	8	10	140	208	24	55	172	273
GOB 3	27	6	196	200	63	87	286	293
GOB 4	30	32	77	126	143	141	250	299
GOB 5	12	2	52	30	29	7	93	39
GOB 6	99	149	0	0	0	1	99	150
GOB Total	**176**	**199**	**465**	**564**	**259**	**291**	**900**	**1054**
GB	109	111	6	6	1	2	116	119
All sites Total	2335	2049	1437	1617	716	810	4488	4476

2.3.2 Size composition

D'Entrecasteaux Channel

Around 2000 commercial, 1000 doughboy and 500 queen scallops were measured in the DC in each of the surveys (Table 1). Commercial scallops ranged from 14-140 mm pre- and 30-132 mm SL post-season, with a median of 102 mm SL for both surveys (Fig. 2A). A strong mode was evident at 90-116 mm SL pre-season and 96-116 mm SL post-season. A smaller mode was also evident at 18-26 mm in the initial survey though this had shifted to 40-55 mm SL by the second survey, presumably as a result of growth during the autumn period.

Queen scallops ranged from 28-142 mm and 12-144 mm SL in the pre- and post-season surveys, respectively, with median lengths steady at 108 mm SL (Fig. 2B). The post-season sample revealed evidence of some recent settlement of queen scallops (< 50 mm).

Doughboy scallops ranged from 26-100 mm SL in the pre-season survey, and 16-102 mm post-season with median size increasing from 78 mm to 84 mm SL (Fig 2C). The strong mode at 76-86 mm present in the pre-season survey had progressed to 78-92 mm SL in the post-season survey. There was also evidence for recent settlement in the latter survey, with a small number of individuals less than 30 mm SL present.

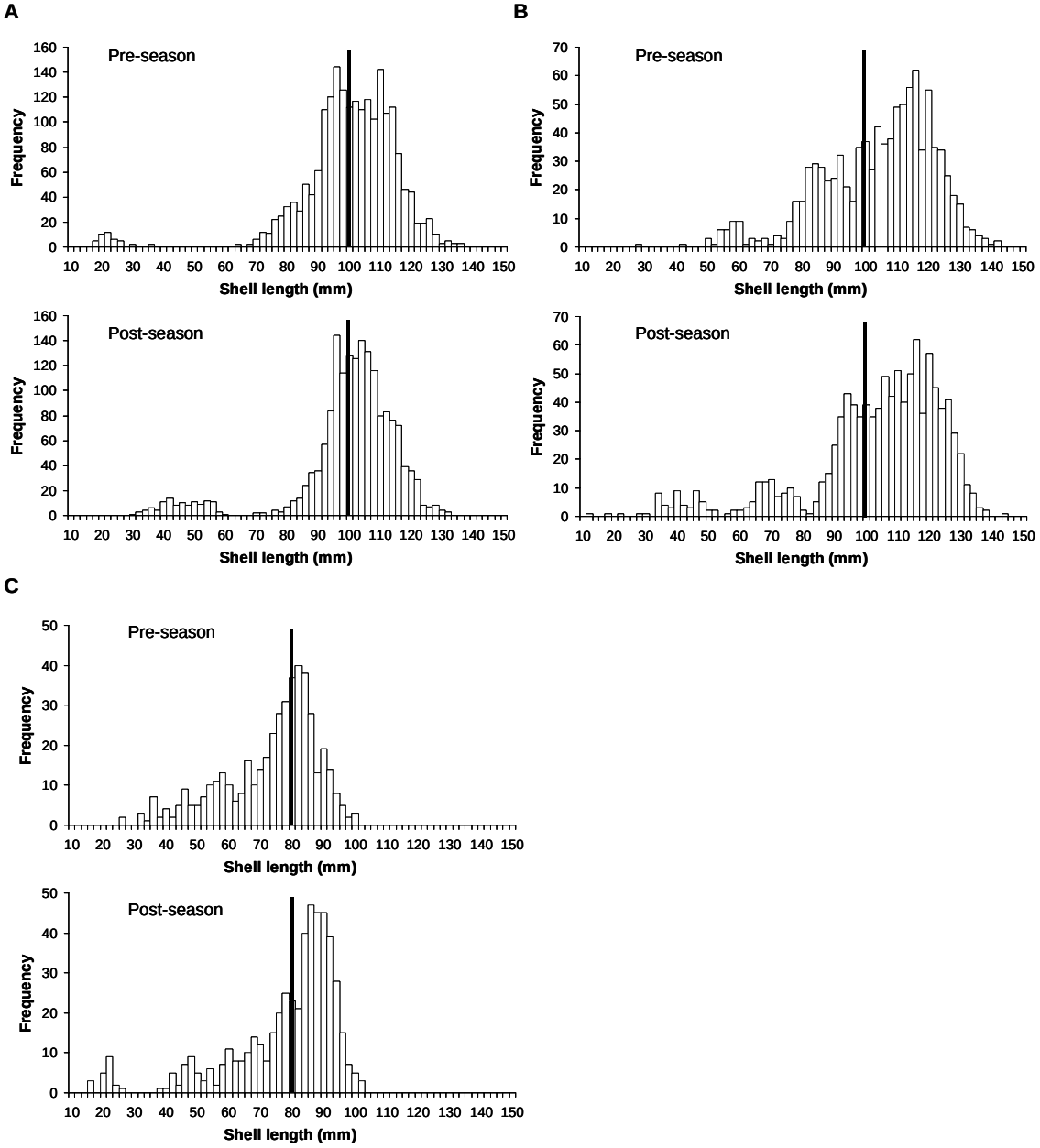

Fig. 2. Pre- and post-season size compositions for scallops sampled from the D'Entrecasteaux Channel: **A)** commercial scallops; **B)** queen scallops; and **C)** doughboy scallops. The bold vertical line indicates the minimum legal size applying to the particular species.

Between the pre- and post-season surveys the proportion of legal sized scallops (≥100 mm for commercial and queen and ≥80 mm for doughboy) in the samples increased for commercial (57 to 62%) and doughboys (45 to 62%) but remained virtually unchanged for queen scallops (66 to 67%).

Conningham

One of the main areas in the DC targeted by recreational scallop fishers was off Conningham in northern Channel region (refer section 3.3.2). While this site was not formally assessed in the pre-season survey, we did conduct a qualitative swim in March 2005, prior to the season opening. A high density (approximately 3-4 scallops/m^2) of large commercial scallops (approximately 110-130mm SL) was observed between 7-11 m depth. Very few undersized scallops were seen.

In April 2005 TAFI staff measured about 100 scallops caught on a recreational dive trip, they were all commercial scallops with median length 115 mm SL (Fig. 3). Conningham was formally sampled as part of the post-season survey, with sites at 8, 12, 16 and 20 m. Despite 20 min search time at each depth, few scallops in the shallow and medium depths were encountered, with 13, 0 and 26 scallops found at the 8, 12 and 16 m sites, respectively. Only the 20 m site still contained a significant number of scallops (Fig. 4).

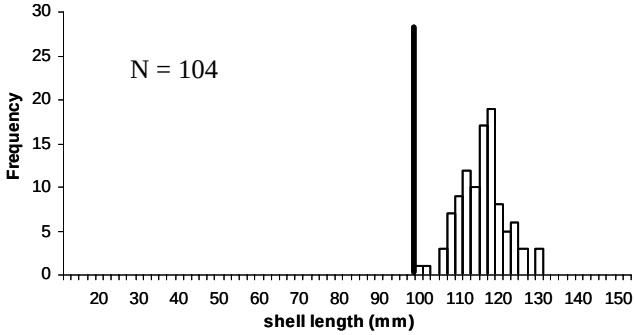

Fig. 3 Size composition of commercial scallops caught off Conningham by TAFI staff. The bold vertical line indicates the minimum legal size applying to commercial scallops.

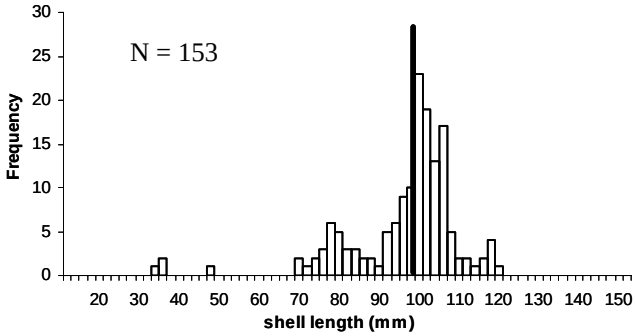

Fig. 4. Size composition of commercial scallops off Conningham in 20 m depth. The vertical line indicates the minimum legal size of 100 mm shell length for commercial scallops.

Great Oyster Bay

Almost 200 commercial, around 500 queen and 300 doughboy and scallops were sampled from GOB in both surveys (Table 1). Commercial scallops ranged between 26-140 mm and 46-134 mm SL in the pre- and post-season surveys respectively, with an increase in median length from 108 mm to 110 mm SL (Fig. 5A). A mode between 104-116 mm SL was evident in both surveys though in the post-season survey a small mode at 50-70 mm SL was also apparent.

Queen scallops ranged between 40-150 mm pre-, and 20-150 mm SL post-season, with median length increasing slightly from 101 mm to 104 mm SL (Fig. 5B). A single mode was evident progressing from 90-110 mm in the initial survey to 100-118 mm SL in the post-season survey.

Doughboy scallops ranged between 10-90 mm pre-, and 20-88 mm SL post-season with median length decreasing from 58 to 52 mm SL (Fig. 5C). Doughboys scallops displayed two strong modes at 42-50 mm and 64-76 mm SL in the pre-season survey, however, by the post-season survey the size composition revealed a broad mode between 26-40 mm, in addition to modes between 52-66 mm and 68-76 mm SL.

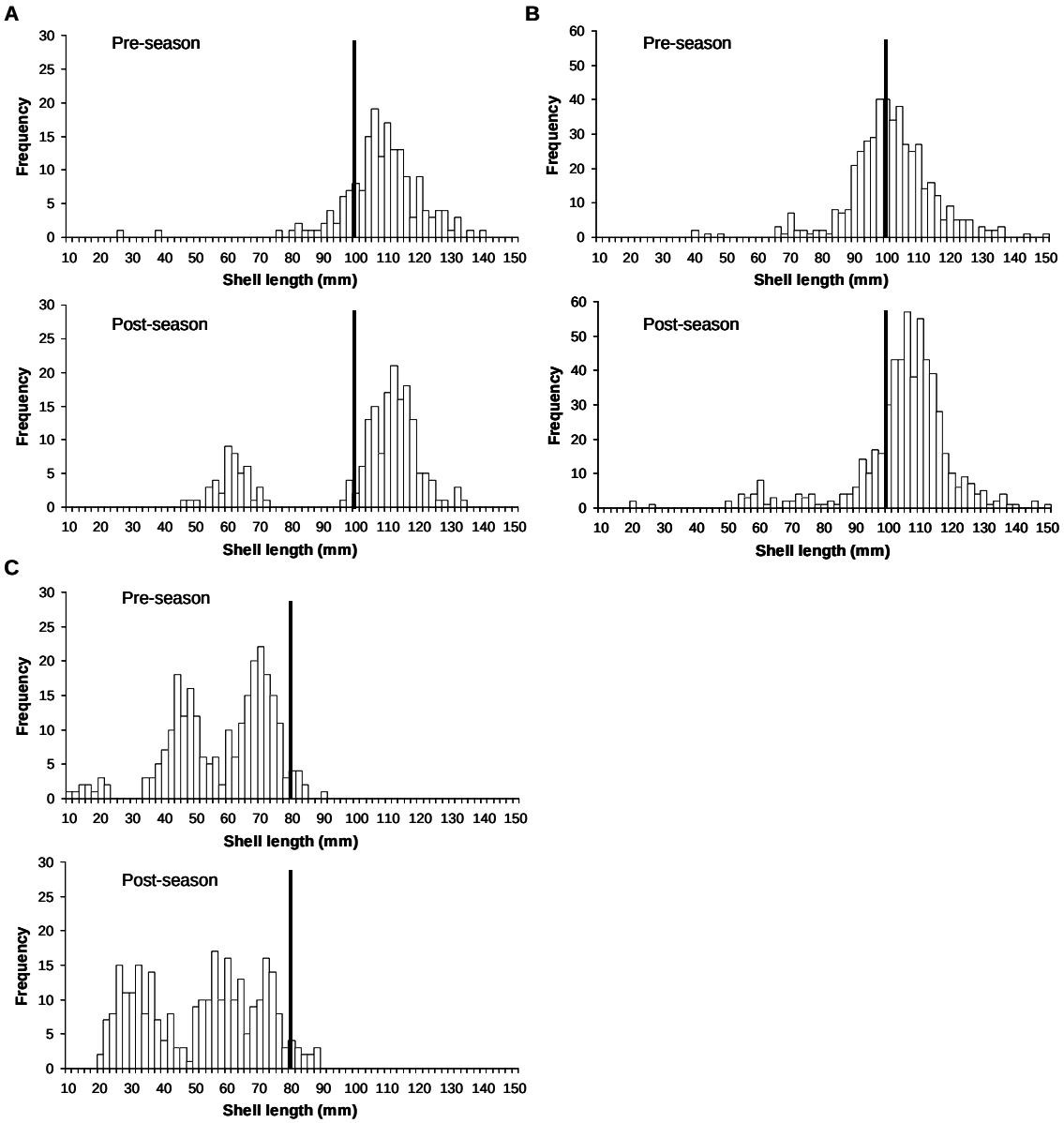

Fig. 5. Pre- and post-season size compositions for scallops sampled from Great Oyster Bay: **A)** commercial scallops; **B)** queen scallops; and **C)** doughboy scallops. The bold vertical line indicates the minimum legal size applying to the particular species.

The percentage of legal sized commercial scallops decreased (83 to 75%) between surveys. Legal sized queen scallops increased (59 to 79%) while doughboys remained steady at very low levels (around 4%).

Georges Bay

Only small sample sizes were derived from the GB surveys, over 90% of which were commercial scallops. Queen and doughboy scallop numbers were insufficient to present size composition information. Commercial scallops ranged between 54-128 mm and 24-120 mm SL in the pre- and post-season surveys, with median length decreasing from 96 mm to 90 mm SL between surveys.

The percentage of legal sized commercial scallops in GB fell from 38% to 23% after the recreational season.

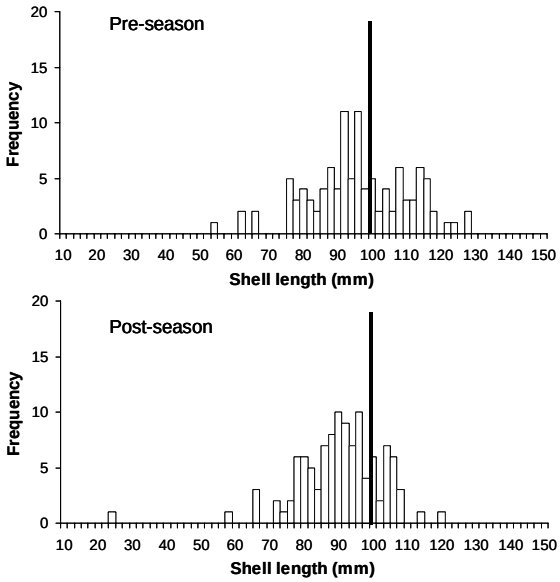

Fig. 6. Pre- and post-season size compositions for commercial scallops sampled from Georges Bay. The bold vertical line indicates the minimum legal size.

2.3.3 Abundance

While this study was not specifically designed to assess scallop abundance, catch rates (numbers of scallops caught per minute) can be used to provide a semi-quantitative measure of changes in relative abundance between surveys. Pre- and post-season catch rates are shown in Table 2. There was a moderate decline in *legal sized* commercial scallops at four sites, two in the central DC, at Great Bay (DC 11) and Simpsons Bay (DC 23), and two near Kettering (DC 5 and 42). Only one site, at Satellite Is. (DC 25) revealed a large decline in catch rates. Catch rates remained steady at DC 13, increased moderately at DC 36 and GOB 6 and had a large increase at DC 9 (largely as a result of undersized fish growing through to legal size between surveys).

There were no large declines in catch rates for legal sized scallops (all species) and only two sites recording a moderate decline (DC 23 and 42). This suggests that most recreational fishers targeted commercial scallops.

Table 2. Catch rate (scallops per min) for pre- and post-season surveys and change in catch rates for all sizes (AS) and legal sized (LS) commercial scallops, and AS and LS all species combined (all spp.)

++ large (>50%) increase in catch rate; + moderate (11 to 50%) increase; 0 minimal change (-10 to +10%); - moderate decline (-11 to –50%); -- large decline (> -50%); ud undetermined, ns not shown (where pre-season catch rate was less than 2 scallops/min)

Catch rate (scallops/min)												
	AS commercial			LS commercial			AS all spp.			LS all spp.		
site	pre-	post-	change	pre-	post-	change	pre-	post-	change	pre-	post-	change
DC 5	7.71	5.10	-	2.1	1.9	-	7.7	5.1	-	2.1	1.9	0
DC 8	0.44	0.24	ns	0.1	0.2	ns	9.3	7.6	-	3.8	5.3	+
DC 9	17.35	24.08	+	2.9	16.4	++	17.6	24.3	+	2.9	16.5	++
DC 11	11.39	8.20	-	7.1	4.8	-	15.8	14.2	0	10.6	9.8	0
DC 13	12.13	12.82	0	10.8	11.1	0	12.8	13.5	0	11.2	11.6	0
DC 17	2.08	2.19	0	0.9	1.0	ns	11.9	13.6	+	8.8	9.3	0
DC 19	1.58	1.43	ns	1.2	1.1	ns	7.0	10.1	+	5.8	8.5	+
DC 23	6.50	6.08	0	6.4	4.6	-	7.0	6.8	0	6.4	4.9	-
DC 25	4.67	2.00	--	3.6	1.4	--	12.5	15.5	+	4.8	5.9	+
DC 26	0.33	0.28	ns	0.1	0.1	ns	2.9	2.8	0	0.9	1.2	ns
DC 31	0.95	1.05	ns	0.8	0.7	ns	13.8	14.3	0	11.1	10.1	0
DC 36	17.39	16.94	0	5.3	7.7	+	17.6	18.6	0	5.3	7.9	+
DC 42	7.60	5.95	-	6.0	3.3	-	7.6	6.0	-	6.0	3.3	-
GOB 1	ud	0.25	ud	ud	0.2	ud	ud	6.8	ud	ud	4.5	ud
GOB 3	1.13	0.23	ns	1.0	0.2	ns	11.9	11.3	0	6.7	7.2	0
GOB 4	1.20	0.80	ns	0.8	0.1	ns	10.0	7.5	-	2.6	2.6	0
GOB 5	0.30	0.05	ns	0.2	0.0	ns	2.3	1.0	--	1.1	0.2	ns
GOB 6	4.95	6.71	+	4.5	6.1	+	5.0	6.8	+	4.5	6.1	+
GB	3.11	2.78	-	1.2	0.7	ns	3.3	3.0	0	1.2	0.7	ns

2.3.4 TSDC Results

There was a strong consistency in both species and size composition (results not presented) for sites sampled in the central DC by both TAFI and the TSDC indicating the efficacy of the volunteer data.

No scallops were found in 7 dives in the southern DC (Huon River mouth, Port Esperance and Great Taylors Bay). Four dives in North Bay, Tasman Peninsula yielded just seven scallops indicating very low abundances in that area.

3. Phone Survey of recreational scallop fishers

3.1 Introduction

A post-season phone survey of licence-holders was conducted to assess the fishing effort and success of recreational fishers, and gauge opinions about the management of the 2005 scallop season.

3.2 Methods

3.2.1 Survey sample

A random sample of 420 recreational scallop licence holders was drawn from the recreational licence database that is administered by the Department of Primary Industries, Water and Environment (DPIWE). While the majority of licence holders are Tasmanian residents, a small number of interstate and overseas residents also take out Tasmanian recreational fishing licences. Persons under 10 years of age are not eligible to hold a licence.

3.2.2 Questionnaire

Respondents were contacted by telephone during July 2005 and asked a series of questions based on a structured questionnaire. The questionnaire was divided into two sections, the first dealt with fishing activity and the second part addressed issues relating to the management of the fishery.

In relation to fishing activity, respondents were asked to estimate the total number of days and number of days by area(s) they had personally dived for scallops during the season, regardless of whether they caught any scallops or not. Fishing locations were summarised according to fishing regions indicated in Fig. 7. While no attempt was made to estimate harvest, respondents were asked to estimate the number of days that they actually took the bag limit (fishing success). Fishers were then asked a number of questions regarding the state of the stocks, including whether they had observed beds of undersized scallops and/or whether they had noticed an obvious decline in the abundance of scallops as the season progressed. Key factor(s) that influenced the choice of where they dived for scallops were also determined. Note, respondents under the age of 16 years were only asked those questions that pertained to effort, fishing success and state of the stocks.

In the second part of the questionnaire, general satisfaction with the current management strategy (conservative bag limits, large minimum size limits and relatively long season) was assessed, along with specific questions about the appropriateness of the daily bag limit, and length and timing of the season. Finally respondents were asked how they found out about the fishing regulations for the season, whether they considered compliance problems had been a significant issue, and their likelihood to renew their licence should there be a scallop season in 2005/06.

Total fishing effort (diver days) was reported as expanded estimates with 95% confidence limit 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).

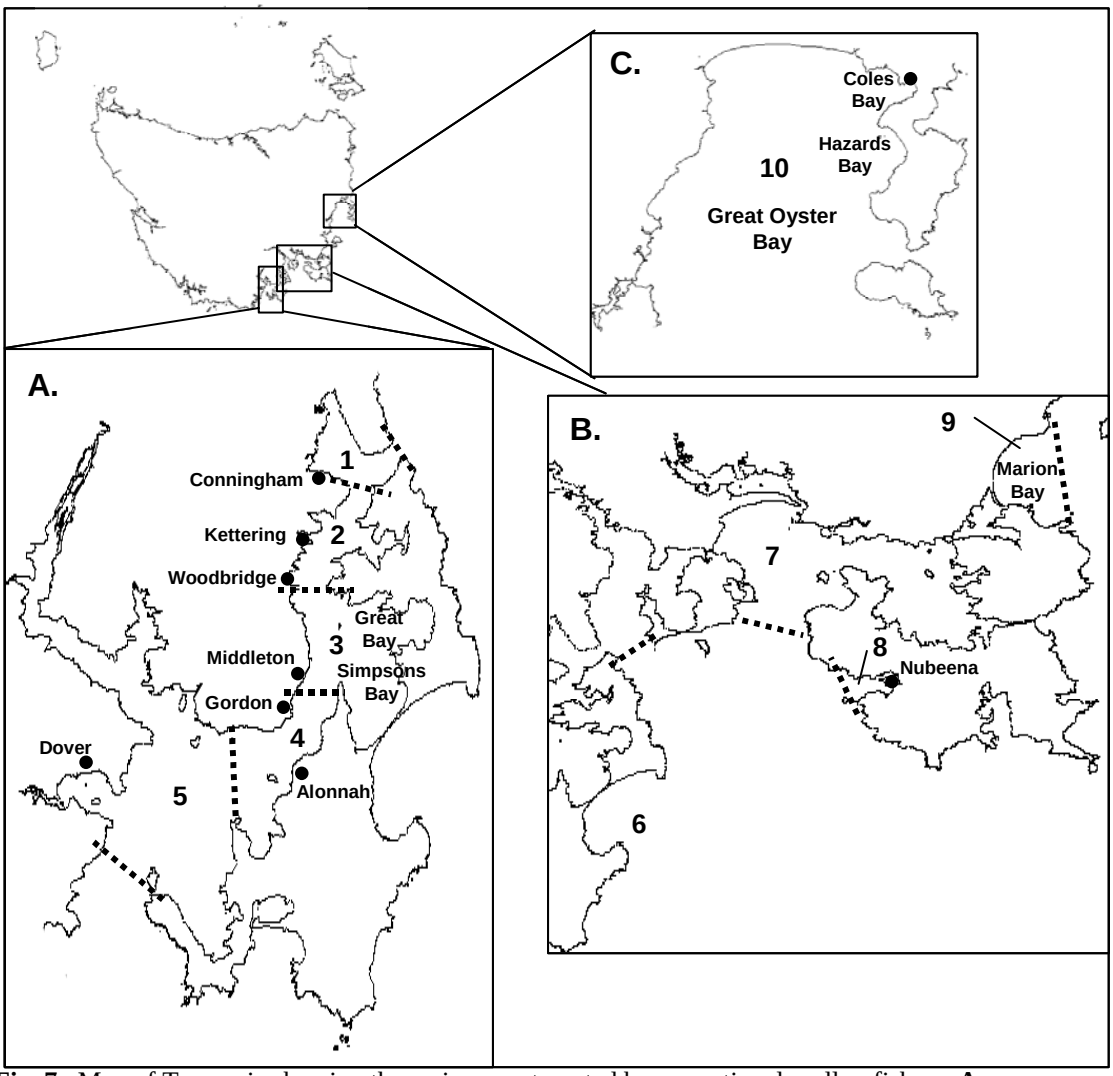

Fig. 7. Map of Tasmania showing the main areas targeted by recreational scallop fishers: **A.** D'Entrecasteaux Channel and fishing regions 1-5; **B.** South-east Tasmania including fishing regions 6-9; and **C.** Great Oyster Bay, fishing region 10**.**

3.3 Results and Discussion

3.3.1 Survey response

The survey response profile is outlined diagrammatically in Fig. 8. Out of a gross sample of 420 licence-holders, 22 either had no telephone listing or the number was disconnected, and as such this represented sample loss, reducing the effective sample to 398. Contact was made with 369 licence-holders, of whom 367 responded to the questionnaire, representing an overall response rate of 92% (or 99% of contacts) and a sample fraction of 0.12 (i.e. 12% of licence-holders). Non-contacts (despite at least ten attempts by telephone over a period of several weeks) accounted for 7% and refusals

less than 0.5% of the net sample. Given the high response rate achieved no adjustments have been made for non-response.

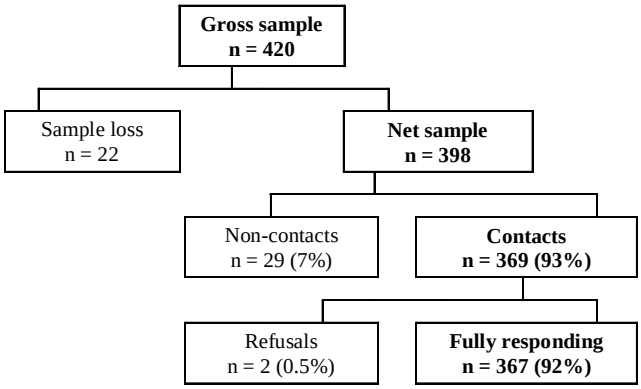

Fig. 8. Diagrammatic representation of the survey response profile (n is sample size).

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 17.2% (SE ±1.8%) or 522 licence-holders did no diving for scallops[1].

The total recreational dive effort for the 2005 scallop season was estimated as 15,907 fisher days (95% CL 13,731 – 18,083); representing an average 5.2 days (SE ±0.39) per licence-holder or, considering only those who actually fished, the average was 6.3 days (SE±0.44).

3.3.3 Regional distribution of effort

Dive effort was heavily concentrated in the D'Entrecasteaux Channel, accounting for about 87% of the overall fishing effort, followed by Great Oyster Bay with just over 7% and the area around Nubeena, on the western shore of the Tasman Peninsula, with a further 3% of the total effort (Fig. 9). Low levels of fishing activity were reported elsewhere in the south-east, including Norfolk Bay, Bruny Island and Marion Bay (collectively accounting for just over 1% of the total effort). Very limited effort was also reported from several other areas off the east (Mercury Passage, Bicheno, The Gardens) and north coasts.

In the D'Entrecasteaux Channel effort was particularly intense in regions 1 and 4, these regions collectively accounting for over half of the total state-wide effort (Fig. 9). The vast majority of the fishing activity within region 1 was directed at scallop beds off Conningham, while in region 4 effort was more or less evenly distributed between Satellite Island (adjacent to Alonnah, Bruny Island) and off Gordon. Region 3 attracted 19% of the total effort, with effort reported throughout this region but in particular from

[1] Note: it was evident that some respondents took out scallop licences but did not personally dive (or expect to dive), rather allowed others to collect scallops on their behalf. The issue of whether this practice was legal or not was an area of confusion noted by a number of respondents.

Green Island, Simpsons Bay and Great Bay. Barnes Bay (Bruny Island) and adjacent to Kettering and Woodbridge were the main areas fished in region 2, representing almost 13% of the total effort. By comparison, effort in the southern Channel, was relatively light, with most activity around Dover and Huon Island.

In Great Oyster Bay, almost 99% of the effort was focussed on the eastern shore, in particular Coles Bay and Hazards Bay. The survey revealed very limited activity from the western side of Great Oyster Bay, implying very little fishing activity on the large bed of commercial scallops identified off Lisdillon (dive site GOB6).

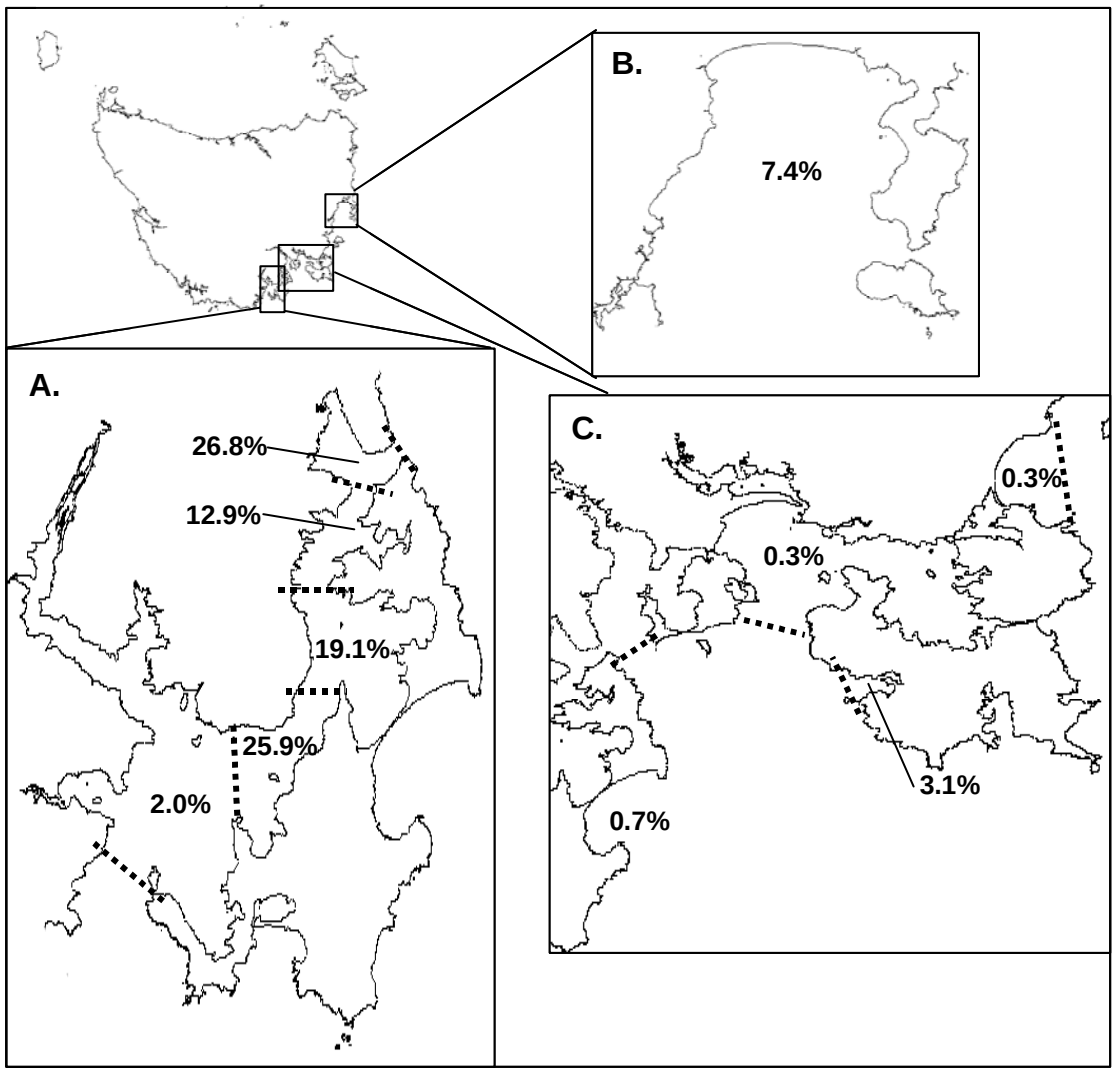

Fig. 9. Map of Tasmania showing the main areas targeted by recreational scallop fishers **A.** D'Entrecasteaux Channel (DC), **B.** Great Oyster Bay, and **C.** South-east Tasmania and the effort (% of total days fished) for each area.

Based on area of residence, the vast majority of the fishing activity by residents of the Greater Hobart area was in the D'Entrecasteaux Channel, followed by Great Oyster Bay and Nubeena (Fig. 10). Residents of the Huon/Channel region also tended to concentrate their fishing activity locally, in the D'Entrecasteaux Channel, with only a small amount of fishing reported from Great Oyster Bay. Residents from other areas (including interstate) fished in all regions. While fishers tended to fish locally in the main, there was clear evidence that some fishers were prepared to travel to other areas to access scallops.

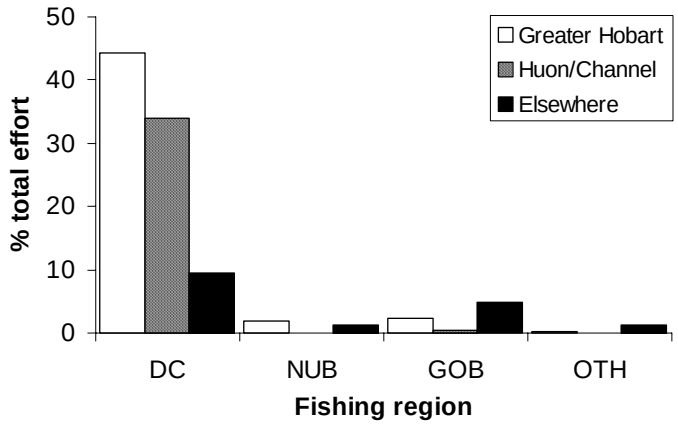

Fig. 10. Distribution of fishing effort based on place of residence. DC D'Entrecasteaux Channel. NUB Nubeena; GOB Great Oyster Bay; OTH all other regions.

While the focus of the fishery was legal sized scallops, 43.8% of active divers reported observing undersized scallops on the beds, the remainder reported not noticing undersized scallops. Undersized scallops were reported from all areas fished, an observation that is consistent with the dive survey results.

3.3.4 Fishing success

Of those respondents who reported diving for scallops (n=304), 79.9% (n=243) indicated that they took the bag limit on each day fished. Based on the number of days on which the bag limit was taken by all fishers, it was estimated that 82.7% of the total effort (expanded estimate of over 13,000 diver days) resulted in the bag limit being achieved.

Of those respondents who fished for more than one day (n=274), 40.9% (n=112) noted that as the season progressed they had to search for longer periods to take their catch. Additional information about where obvious declines had occurred was provided by some respondents (n=65); with 63.1% (n=41) reporting declines in the area off Conningham (region 1).

3.3.5 Factors influencing the choice of where to fish

Respondents aged 16 years and older 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. Just over half of all respondents indicated that advice from other fishers, and prior knowledge of the location of scallop beds were important factors in determining where they fished (Table 3). Easy or ready access to fishing sites, and proximity to place of residence or holiday location were next in importance. Trial and error (searching) was identified as important by less than one quarter of respondents while observed activity by other fishers was a relatively minor factor.

Table 3 Response to factors identified as having influenced the decision of where to fish for scallops

Sample size equals 304

Response	Number	%
Advice from other fishers	166	54.6
Prior knowledge of likely scallop beds	157	51.6
Easy access (boat ramps/shore dives)	139	45.7
Close to where you reside/holiday	113	37.2
Trial and error (result of searching)	70	23.0
Observed activity of other fishers	48	15.8
Other factors	11	3.6

3.3.6 Management of the fishery

All respondents 16 years or older were asked a series of questions that related to the management of the fishery.

Satisfaction with management

It was noted that scallops have had a history of being over-fished in Tasmania and in opening the fishery a cautious management 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 previous years. Respondents were asked how satisfied they were with this management approach and the vast majority (87%) indicated that they were at least quite satisfied (Table 4). Only 10% of respondents indicated dissatisfaction, with the bag limit being too low and the season being too long as the two main reasons given for dissatisfaction.

Table 4 Response to satisfaction with the management of the scallop fishery.

Sample size equals 360.

Response	Number	%
Very satisfied	189	52.5
Quite satisfied	124	34.4
Not very satisfied	29	8.1
Not at all satisfied	8	2.2
Unsure	10	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. Just over half all respondents indicated that they considered the bag limit was about right, whereas most other respondents (46%) considered it to be too low (Table 5). Only a very small number of respondents considered the bag limit to be too high. Those respondents who considered that the bag limit was too low suggested alternative limits ranging between 50 – 200, with a mode of 100 scallops per day. Interestingly, just over half (55%) of the respondents in this group nominated bag limits of 80 or less scallops per day. Of those who provided reasons for a higher bag limit (n=105), over half (56%) indicated that the expense of catching the scallops was an issue while only 7% indicated that the current bag limit was "insufficient for a feed". Other reasons cited in support of higher bag limits included reduced necessity to go fishing as often (16% of respondents) and less abuse of the rules (10%).

Table 5. Response to daily bag limit with suggested alternative limits.
Sample size equals 361

			Suggested bag limit	
Response	**Number**	**%**	**Range**	**Mode**
About right	186	51.5		
Too high	8	2.2	20-35	30
Too low	165	45.7	50-200	100
Unsure	2	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 of respondents (71%) affirmed that the timing and duration of the season was about right, about one quarter considered that is was not right (Table 6). Overall, more respondents who identified season length as an issue considered that the season should be longer (33 respondents) compared with those who considered a shorter season was more appropriate (8 respondents). The most frequently cited reason in support of a shorter season related to stock conservation. In relation to the timing of the season, opinions were evenly split between an earlier (20 respondents) rather than later season (19 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 6. Response to timing and length of season being "about right"
Sample size equals 361

Response	**Number**	**%**
Yes	257	71.2
No	94	26.0
Unsure	10	2.8

Fishing regulations

Respondents were asked about the sources of information they had used to find out about the fishing regulations and other aspect of the scallop fishery. As the single main source of information about the fishery, other fishers (46%) and print media but not fishing magazines (26%) were identified as the most important (Table 7). In terms of the two main sources of information used, other fishers were clearly the most important (70% of mentions), followed by print media (41%), government brochures (26%), television (13%) and the government internet site (12%). Clubs/associations, radio, fishing magazines, tackle shops and government shows or displays were not rated highly as a sources of information (all less than 5% of mentions).

Table 7. Response to information sources about scallop fishing regulations
Sample size equals 360

	Main source		Any mention	
Information source	**Number**	**%**	**Number**	**%**
Other fishers	164	45.6	255	70.8
Print media (newspapers)	94	26.1	148	41.1
Govt. brochures/publications	38	10.6	95	26.4
Television	28	7.8	48	13.3
Govt. internet web site	8	2.2	42	11.7
Other	11	3.1	28	7.8
Clubs/associations	7	1.9	13	3.6
Radio	4	1.1	10	2.8
Fishing Magazine	2	0.6	4	1.1
Tackle shop	1	0.3	4	1.1
Govt. show/displays	1	0.3	1	0.3
None	2	0.6	2	0.6

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 36% indicated that they thought that it was a significant issue (Table 8). Based on suggestions from respondents (n=84) as to how the issue might be addressed, just over half (54%) identified the need for greater policing, 15% suggested that higher bag limits would reduce illegal activity, 14% identified the need to improve the information provided in the fishing brochure produced by the government, and 8% suggested that fewer open areas and/or more restricted openings (e.g. weekends only) might address the situation.

Table 8. Response to whether general compliance was perceived to have been a significant problem in the fishery
Sample size equals 359

Response	**Number**	**%**
Yes	129	35.9
No	196	54.6
Unsure	34	9.5

Next season

The vast majority of respondents (95%) indicated that they were at least quite likely to take out a scallop licence should there be a scallop season next year (2005/06). 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 9. Response to likelihood to take out a scallop licence should there be a scallop season in 2005/06

Sample size equals 360

Response	Number	%
Very likely	318	88.3
Quite likely	25	6.9
Not very likely	7	1.9
Not at all likely	4	1.1
Unsure	6	1.7

4. Summary

Scallop populations in the D'Entrecasteaux Channel, Great Oyster Bay and Georges Bay were surveyed by divers prior to and following the 2005 recreational scallop season.

- Overall commercial scallops were the dominant species in the D'Entrecasteaux Channel, with a wide range of size classes represented, implying the presence of several age classes as well as some recent settlement. Queen scallops were also abundant, dominating certain areas within the Channel, and with a wide range of sizes was present. Doughboys were only abundant at a single site.

- Post-season surveys indicated that there was still a wide range of sizes for each of the three species. Declines in abundance of commercial scallops were evident, although legal sized scallops (>100 mm) were generally still well represented at most sites, due in part to the growth of sub-legal scallops into the legal size range in the period since the pre-season survey.

- Dive surveys suggested that the largest declines of commercial scallops occurred in the central Channel area; off Kettering, Simpsons Bay and Great Bay, with the largest declines off Satellite Island and off Conningham in depths of less than 20 m.

- There was little evidence for declines in queen and doughboy scallop abundance in the Channel.

- TSDC volunteers effectively extended the area surveyed by divers to include the southern Channel and North Bay (Tasman Peninsula), very low densities of scallops were located in these areas.

- In Great Oyster Bay queen and doughboy scallops were the dominant species on the eastern shore (Coles Bay, Hazards Bay) while a large bed of commercial scallops was located on the western shore. Commercial and queen scallops were primarily represented by large individuals. Only a very small proportion of the doughboy population was of legal size.

- Post-season size distributions of all three species in Great Oyster Bay showed some evidence of growth but otherwise were basically similar to pre-season size compositions.

- There was no strong evidence for declines in abundance between pre- and post-season surveys in Great Oyster Bay.

- A relatively small population of commercial scallops was present in Georges Bay, the post-season survey suggested a slight decline in abundance.

A phone survey of almost 370 recreational scallop licence-holders revealed key information about the fishery and general perceptions about the management.

- It is estimated that recreational fishers dived for a total of almost 16,000 fisher days over the 2005 scallop season, representing an average of just over 6 days per fisher.

- The vast majority (87%) of effort was concentrated in the D'Entrecasteaux Channel, with Great Oyster Bay of secondary importance (7%). Within the northern Channel effort was concentrated off Conningham and in the central Channel off Satellite Island and off Gordon.

- In Great Oyster Bay fishers almost exclusively targeted the eastern shore, particularly Coles Bay and Hazards Bay.

- Using the bag limit as a measure of fishing success, over 80% of all fishing effort resulted in the daily bag limit of 40 scallops being achieved.

- The vast majority of respondents (87%) indicated that they were satisfied with the cautious approach taken by management for the 2005 season, i.e. conservative bag limit, large minimum size limit and a relatively long fishing season.

- More than half of respondents considered that the daily bag limit of 40 was about right, with most of the remainder judging it to be too low. Suggested alternative limits ranged from 50 – 200 per day.

- Almost three-quarters of all respondents were satisfied with the timing and length of the season.

- Over one third 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 responsible for the problem.

- There was some confusion over whether non-divers could legally get divers to collect scallops on their behalf, and that this and some other issues were not adequately covered in the brochure providing information to fishers.

Comparison between the phone and dive surveys found corroboration on a number of key points. The phone survey found that fisher effort was concentrated in the D'Entrecasteaux Channel, particularly off Conningham and Satellite Island, and dive surveys found that there was a large drop in abundance off Satellite Island, and that almost no scallops were found off Conningham post-season. Fishers also observed this trend with the majority who reported a decline in scallop abundance noting that it occurred at Conningham. There was also significant fishing effort at Kettering, Great Bay and Simpsons Bay; areas that showed a moderate declines in abundance when assessed post-season.

It should be noted that a decline in the number of legal-sized commercial scallops was observed at Georges Bay, despite the fact that no phone survey respondents reported fishing in the area. In effect this implies that effort was likely to have been very low (insignificant when compared to the main areas). Since the numbers of scallops were low pre-season it would not have taken much fishing effort for a noticeable decline to occur.

In conclusion, the 2005 recreational scallop season can be considered a success, with a high level of fisher success and satisfaction as well as support for the management strategy. Another encouraging sign was evidence of recent settlement and the continued presence of a wide range of size classes, including legal sized scallops, in the post season surveys.

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