



Department of Fisheries
Government of Western Australia

FISHERIES OCCASSIONAL PUBLICATION

ALLOCATION OF THE WESTERN AUSTRALIAN ABALONE RESOURCE BETWEEN USER GROUPS

SUBMISSION TO IFAAC
(Integrated Fisheries Allocation Advisory Committee)

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CONTENTS

TABLE OF FIGURES	3
LIST OF TABLES.....	3
EXECUTIVE SUMMARY	4
1. INTRODUCTION.....	5
1.1 INDIGENOUS AND CUSTOMARY FISHING	5
2. HISTORIC PROPORTION OF THE ABALONE RESOURCE TAKEN BY THE VARIOUS SECTORS.....	7
2.1 BACKGROUND.....	7
2.2 METHODS.....	7
2.2.1 <i>Commercial Catch</i>	7
2.2.2 <i>Recreational Catch</i>	7
2.2.3 <i>Customary Catch</i>	8
2.3 RESULTS.....	8
2.3.1 <i>Historical Catches of Abalone Outside of the Metropolitan Area</i>	8
2.3.2 <i>Historical Catch of Roes's Abalone (Perth Metropolitan Area)</i>	9
2.3.2.1 Commercial and Recreational.....	9
2.3.2.2 Customary.....	11
3. THE ECONOMIC AND SOCIAL BENEFITS AND COSTS OF EACH SECTOR'S USE OF THE ABALONE RESOURCE.	12
3.1 COMMERCIAL FISHERY PROFILE AND ECONOMIC AND SOCIAL INPUT.....	12
3.1.1 <i>Profile</i>	12
3.1.2 Commercial Economic Input Statewide	13
3.1.3 Commercial Economic Input Metropolitan Area.....	14
3.1.4 Commercial social input.....	14
3.2 <i>Recreational Fishery Profile and Economic and Social Input</i>	15
3.2.1 Profile	15
3.2.2 Recreational Economic Input Statewide.....	16
3.2.3 Recreational Economic Input Metropolitan Area	17
3.2.4 Recreational Social Input.....	17
3.3 <i>Summary of Socio-Economic input for both sectors</i>	18
4. ALLOCATION MODELS.....	19
4.1 <i>GENERAL CONSIDERATIONS</i>	19
4.1.1 Alignment of boundaries	20
4.1.2 Abalone Re-Seeding/Stock Enhancement	22
4.2 <i>Allocation of the Abalone Resource Outside of the Metropolitan Area</i>	22
4.2.1 Spatial Separation	23
4.2.2 Differential Legal Minimum Limits	23
4.2.3 Temporal Separation.....	24
4.3 <i>Allocation of the Abalone Resource within the Perth Metropolitan Area</i>	25
4.3.1 Incidental mortality.....	26
4.3.2 Allocation Models for the Commercial and Recreational Sectors	26
4.3.2.1 Overview of Issues Associated with Allocating Catch Shares Based on a Proportion of a Single Year's SHL Versus an Average Annual Proportion of the SHL over an Extended Period	27
4.3.2.2 Model 1: Establish a Proportion of the SHL that May be Taken Annually by each Sector	28
4.3.2.3 Model 2: Establish an Average Annual Proportion of the SHL that May be Taken by Each Sector Over a Three to Five Year Period.....	29
5. MANAGEMENT ISSUES	31

6. RE-ALLOCATION OF RESOURCE SHARES	31
7. CONCLUSION	32
REFERENCES	33

TABLE OF FIGURES

FIGURE 1: Commercial Roe’s Abalone Fishing Areas	13
FIGURE 2: Recreational Abalone Areas	16
FIGURE 3: Proposed Boundary Alignment Option	21

LIST OF TABLES

TABLE 1: Summary of Commercial and Recreational Catch Estimates for the Perth Metropolitan Roe’s Abalone Fishery	9
TABLE 2: Historical Roe’s Abalone Catches From Recreational and Commercial Fishing in the North Perth Metropolitan Region	10
TABLE 3: Historical Roe’s Abalone Catches From Recreational and Commercial Fishing in the Central Perth Metropolitan Region	10
TABLE 4: Historical Roe’s Abalone Catches From Recreational and Commercial Fishing in the South Perth Metropolitan Region	11

EXECUTIVE SUMMARY

In this submission to the Integrated Fisheries Allocation Advisory Committee (IFAAC), the Department will outline what it believes are the most practical and cost effective ways of managing a system for allocating the abalone resource between the commercial, customary and recreational sectors.

In preparing this submission, it has been noted that because of the limited data on recreational catch outside of the metropolitan area, the Sustainable Harvest Limit (SHL) set for the fishery relates only to the area that is equivalent to Area 7 of the commercial fishery. Further, it is acknowledged that the Minister has approved that proportional catch shares should only be allocated for the area to which the SHL applies and that for parts of the fishery outside of the metropolitan area, IFAAC may make recommendations on other allocation mechanisms (e.g. spatial closures) to address local resource sharing issues.

Accordingly, the Department acknowledges the possible role that spatial closures, differential Legal Minimum Lengths (LMLs) and temporal closures could play in resolving resource sharing issues outside of the metropolitan area. **Within the metropolitan area, the Department recommends establishing an average annual proportion of the SHL for the entire metropolitan area that may be taken by each sector over a five year period.**

The allocation to the commercial and recreational sectors should be specified as a percentage range of the SHL that may be taken rather than as a specific value. Furthermore, it is important that consideration is given to the method used to estimate recreational catch. The Department recognises that the field survey method is the most reliable for estimating catch within the metropolitan area, whereas the phone diary survey is the most reliable for bio-regional estimates of catch.

The Department considers development of a system to facilitate re-allocation of catch shares between sectors, should this be required in the future, as an integral component of the overall allocation strategy.

Finally, the abalone resource allocation for customary fishing is considered by the WA Government to have priority over that to the commercial and recreational sectors.

This submission should be read in conjunction with *Fisheries Management Paper 204 – Integrated Fisheries Management Report: Abalone Resource* (FMP 204).

1. INTRODUCTION

The Department does not represent any sector with regard to their levels of access to West Australian abalone stocks. It manages the abalone stocks on behalf of the Government for the benefit of all Western Australians. It is not therefore the Department's role to suggest the size of the allocations that should be made to each sector that uses the resource. However, the Department recognises that there should be a fair and equitable mix of customary, recreational and commercial fishing.

The Department is of the view that the following should be taken into account when determining the allocations:

- the historical proportion of the abalone resource taken by the various sectors (recreational, which includes indigenous people who fish recreationally, commercial and customary);
- the economic and social benefits and costs of each sector's use of the abalone resource;
- the practicality and ease of managing the implementation of allocations;
- monitoring requirements and data collection; and
- compliance and cost implications.

The above points will be discussed further throughout the Department's submission to IFAAC.

Allocation must be based on a proportional share of the SHL for each sector and not an explicit tonnage. Therefore, the allocation models considered in this submission are premised on using the historical catch share of each sector. The possible compensation issues that may arise if the ultimate allocations are considered too different by the sectors from the current proportions should be considered in accordance with the *'Integrated Fisheries Management Government Policy – 1 October 2004'* under the section relating to compensation (paragraphs 14 – 17 inclusive).

Given that the Department is responsible for managing the fishery and ensuring compliance with the rules, it clearly has strong preferences regarding the allocation model that should be implemented. Consequently, in addition to providing answers to the specific questions that IFAAC has asked, the Department's submission will also outline the issues that are relevant to the determination of what model should be chosen. Finally, a set of recommendations is provided for IFAAC's consideration.

1.1 Indigenous and customary fishing

For the purposes of this submission, it is important to note that indigenous people partake in both recreational and customary fishing; however, customary fishing is currently unreported and there is a lack of information concerning the level of abalone taken for customary fishing purposes. However, while the ability to quantitatively analyse the extent of the customary take of abalone is low, the Department recognises that this activity is separate from recreational and commercial fishing and accordingly requires its own explicit allocation.

The allocation of the abalone resource for customary fishing is considered by the WA Government to have priority over the commercial and recreational allocations. The Department supports the Government's view that a priority allocation should be made for customary fishing.

2. HISTORIC PROPORTION OF THE ABALONE RESOURCE TAKEN BY THE VARIOUS SECTORS.

- *The estimate of proportional catch shares during the five-year period from 1997 to 2001, drawing on the data presented in the IFM Abalone Resource Report*
- *The data provided in the IFM resource report abalone.*

2.1 Background

Estimation of the abalone catch taken by the recreational and commercial sectors is carried out each fishing season as part of the annual stock assessment process during December to March. Commercial catch is calculated from daily catch and return logbooks and recreational catch is estimated from surveys completed for the metropolitan fishery and the rest of the State.

2.2 Methods

2.2.1 Commercial Catch

For each day's fishing, commercial divers record estimates of catch (in kg), effort (in hours or minutes spent diving for abalone), and location fished within a 10 x 10 mile grid system. The data is stored on a daily Catch and Disposal Record (CDR) and the catch is officially weighed at a licensed processors, and entered into the Abalone Catch and Effort (ACE) database. In the greenlip and brownlip fisheries, the number of abalone caught is also recorded, enabling estimates of mean weight of abalone from each day's fishing, and total abalone catch in numbers, as well as meat weight to be determined.

Secondary, information is collected on a monthly basis by divers submitting compulsory monthly catch returns to the Research Divisions Catch And Effort System (CAES). This system encompasses all fisheries in WA and the data is divided up into larger grid systems (60 x 60 mile). Although it is not as detailed as the ACE database, catch data has been entered in this system since the late 1970s, and it is a good source of historical information.

2.2.2 Recreational Catch

Method 1 – Phone Recall Survey

The annual telephone survey estimates the catch of all three species based on interviews of 400 people stratified by licence type (abalone or umbrella), and respondent location (country or Perth metropolitan (metro) area) randomly sampled from the licensing database. Catch estimates are provided at the bio-regional spatial scale (Perth metropolitan area, west coast (excluding Perth metropolitan area), and south coast).

Method 2 – Field Survey (Perth Metropolitan only)

The field survey estimates the catch and effort from each distinct Roe's abalone stock within the Perth fishery. Field survey estimates are based on average catch (weight and numbers), catch rates (derived from 2,266 interviews in 2004), and fisher counts conducted by Volunteer Fisheries Liaison Officers and research personnel from vantage points and aerial surveys.

Method 3 – Phone Diary Survey (2004-05)

The telephone diary survey also estimates the catch of all three species based on interviews of licence holders, stratified by licence type (abalone or umbrella) and respondent location. Around 500 licence holders were sent a diary to record their fishing activity and were contacted each month by telephone for the duration of the abalone season. Catch estimates are provided at the bio-regional spatial scale (Perth metropolitan area, west coast (excluding Perth metropolitan area), and south coast).

2.2.3 Customary Catch

The Department has no information on the participation of indigenous people in customary fishing for abalone. Until such data are available, a starting point for considering this issue can be obtained by examining the percentage of the total recreational catch which is likely to be taken by indigenous people taking into account their level of representation within the population. An estimate of the customary catch can then be made by assuming that this type of fishing activity accounts for a level of catch which is equivalent to a given percentage of the total estimated indigenous take.

This approach has important limitation however, particularly when applied to the abalone fishery. Firstly, it assumes that rates of recreational fishing in the indigenous community are the same as for the total population. Secondly, it fails to recognize the easy accessibility of abalone to customary fishers relative to many other species.

2.3 Results

2.3.1 Historical Catches of Abalone Outside of the Metropolitan Area

As outlined in FMP 204, the data available on recreational abalone catches outside of the metropolitan area at this time should not be relied upon for resource sharing purposes, consequently and noting that the Minister has instructed IFAAC to provide advice on proportional catch shares only for the metropolitan area, information on catches outside of the metropolitan area is not provided in this submission. Available data on these catches can be found in section 8.2 of FMP 204.

The telephone diary survey initiated in 2004 will enable a greatly improved understanding of recreational abalone fishing outside of the metropolitan area to be gained. However, at least three to five years of data will be required before the results will be sufficiently robust to be used for the purpose of setting proportional allocations.

2.3.2 Historical Catch of Roes's Abalone (Perth Metropolitan Area)

2.3.2.1 Commercial and Recreational

The following tables provide data on commercial and recreational catch estimates for the metropolitan area. Please note that catch figures provided for the recreational fishery differ slightly from those included in FMP 204. These differences are small and do not alter overall trends in recreational catch. The shifts are a normal and expected result of re-running the catch estimation models as additional data are incorporated over time.

Also, estimates of the percentage of the total catch taken by recreational fishers are now being based solely on the data from the field survey (method 2), whereas in FMP 204, these were based on the average catch estimate derived from the field survey and the telephone recall survey. The reason for this change is that results from the phone diary survey confirm the field survey as more accurate than the telephone recall survey.

A comparison of commercial and recreational (3 methods) estimates for the Perth metropolitan area is provided in Table 1.

The telephone recall survey estimated that catch of Roe's abalone varied between 33.7 to 47.8 tonnes during 1999 – 2004, with an average of 42.5 t. (Table 1)

The field survey estimated that catch of Roe's abalone varied between 30.2 to 44.1 t during 1999 – 2004, with an average of 36.9 t. (Table 1)

The phone diary survey estimated that catch range of Roe's abalone was 28 tonnes.

TABLE 1

Summary of commercial and recreational (3 methods) catch (tonnes whole weight) estimates for the Perth metropolitan Roe's abalone fishery.

Year	Commercial		Recreational			%
		%	Phone Recall	Field	Phone Diary	
1997	36.4	51		34.1		48
1998	24.1	44		29.6		54
1999	36.1	50	37.7	35.3		50
2000	36.5	55	33.7	30.2		45
2001	35.4	44	47.8	44.1		55
2002	36.0	50	39.3	36.0		50
2003	36.0	46	47.2	42.6		54
2004	35.9	53	44.4	31.7	28	47

% are derived using recreational catch estimates from the field survey. Where percentages do not total 100%, this is due to rounding error.

Estimated catches for subregions of the metropolitan area

Tables 2-4 provide data on commercial and recreational (from field surveys only) catch estimates for the three subregions of the metropolitan area.

TABLE 2

Historical Roe's abalone catches from recreational and commercial fishing in the North Perth metropolitan region (kg whole weight)

Year	Commercial Catch (kg)	Estimated Recreational Catch (kg)	Total Catch (kg)	Percent Recreational
1997	14,974			
1998	12,249			
1999	13,167	23,235	36,402	64
2000	12,607	12,790	25,397	50
2001	15,687	22,586	38,273	59
2002	16,528	18,580	35,108	53
2003	16,000	24,017	40,017	60
2004	15,763	15,079	30,842	49

Note: Commercial catch estimates obtained from Moore River to Mullaloo Point in Area 7. Recreational catch estimates from field survey data collected by the Mollusc Research Section.

TABLE 3

Historical Roe's abalone catches from recreational and commercial fishing in the Central Perth metropolitan region (kg whole weight)

Year	Commercial Catch (kg)	Estimated Recreational Catch (kg)	Total Catch (kg)	Percent Recreational
1997	9,925			
1998	5,482			
1999	8,773	13,250	22,023	60
2000	3,989	13,178	17,167	77
2001	6,441	18,966	25,407	75
2002	5,066	14,794	19,860	74
2003	7,252	15,698	22,950	68
2004	6,393	14,134	20,527	69

Note: Commercial catch estimates obtained from Mullaloo Pt to Woodman Pt in Area 7. Recreational catch estimates from field survey data collected by the Mollusc Research Section.

TABLE 4

Historical Roe's abalone catches from recreational and commercial fishing in the South Perth metropolitan region (kg whole weight)

Year	Commercial Catch (kg)	Estimated Recreational Catch (kg)	Total Catch (kg)	Percent Recreational
1997	11,045			
1998	6,392			
1999	14,151	961	15,122	6
2000	19,914	760	20,674	4
2001	13,277	2,651	15,928	17
2002	14,370	2,290	16,660	14
2003	12,747	2,920	15,667	19
2004	13,733	2,505	16,238	15

Note: Commercial catch estimates obtained from Woodman Pt to Cape Bouvard in Area 7. Recreational catch estimates from field survey data collected by the Mollusc Research Section.

Determination of the level of bias

There were significant differences between estimates provided by both telephone surveys. As was expected, the phone diary survey estimates of catch and fishing effort were lower than the estimates from the annual phone recall survey. The difference is caused by bias associated with the recall period for each method. The telephone diary survey uses a diary as a memory prompt for the survey participants and respondents are called every month of the season. The annual telephone survey relies on the respondent's ability to recall their abalone fishing activity four to twelve months after it occurred.

Even though the recall period for the Perth metropolitan fishery is about 4 months the discrepancy between the results from these two different methods suggests that the phone recall survey has a problem with recall bias. The telephone diary survey will provide the more accurate estimates. Another year of comparable results from both methods is required to clarify the level of discrepancy.

In summary, the phone diary survey is considered more accurate than the phone recall survey for 2004, and there is general agreement between the phone diary survey and the field surveys for the Perth metropolitan area in 2004. With respect to estimates of non-metropolitan recreational catch (greenlip, brownlip and Roe's) the results from the phone diary survey of 2004 are considered more realistic compared to earlier estimates. This is because they utilise catch data recorded by fishers in a diary on a weekly basis and most only have to recall for the last month.

2.3.2.2 Customary

According to 2001 census data, the weighted percentage of the population of the Perth metropolitan area who are indigenous is 1.5 per cent. Thus, if it assumed that indigenous people take 1.5 per cent of the total metropolitan Roe's abalone catch, the total annual catch by indigenous people is approximately 530 kg. If, because of the

accessibility of abalone to customary fishers, customary fishing is estimated at an amount equal to 25 per cent of the total indigenous take, the customary catch would be approximately 130 kg.

This number is extremely low and may be a significant under-estimate of the actual customary take.

To avoid potential compensation issues once data on customary fishing are available, it is important that the allocation made to this sector is an over-, rather than an under-estimate. Therefore, the Department believes that consideration should be given to making an initial allocation of between 500 kg and one tonne to this sector.

3. THE ECONOMIC AND SOCIAL BENEFITS AND COSTS OF EACH SECTOR'S USE OF THE ABALONE RESOURCE.

- *The proportion of the share of the sustainable harvest level that should be allocated to the sector you represent.*

Most of these are covered in FMP 204, Section 4 - Factors that influence the net benefit from use of the resource. The Department notes that the commercial and recreational sectors each make a contribution to the WA community both economically and socially. A brief summary is provided below.

3.1 Commercial fishery profile and economic and social input

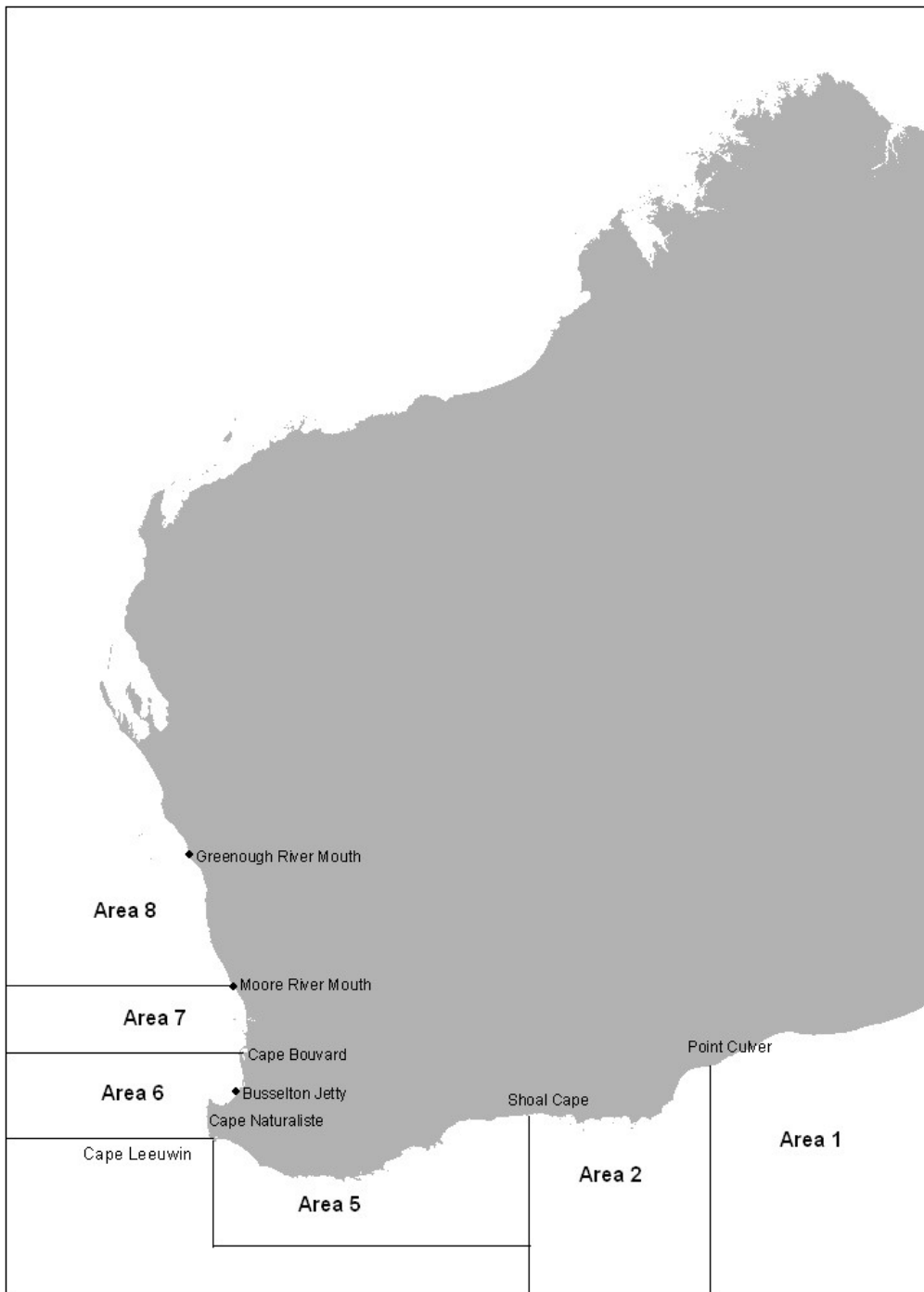
3.1.1 Profile

The effective area of the commercial abalone fishery extends from the Zytdorp cliffs north of Kalbarri to the SA border. The fishing method is collection by hand while diving or wading but is generally by diving from a boat.

The fishery is divided into a number of areas some of which are for greenlip and brownlip abalone while others are for Roe's abalone. The greenlip and brownlip abalone are caught predominantly from Cape Naturaliste to the SA border. Roe's abalone is collected along the south coast from the SA border to north of Kalbarri.

The Area 7 part of the fishery, which encompasses the metropolitan area of Perth is exclusively a Roe's fishery and occurs by diving in the sub-tidal waters outside the coastal reef platforms.

The commercial sector is managed under a quota management system, with Total Allowable Commercial Catches (TACCs) being set on an annual basis and with catch against quota being closely monitored.



Prepared by Department of Fisheries GIS October 2005

FIGURE 1: Commercial Roe's Abalone Fishing Areas

3.1.2 Commercial Economic Input Statewide

The commercial abalone fishery is principally an export fishery with more than 95 per cent of the catch exported to Hong Kong, Singapore and Taiwan. The majority of the

greenlip and brownlip abalone catch is exported as frozen meat while almost all the Roe's abalone catch is canned.

Statewide, the gross value of production (GVP) of the entire commercial fishery over the past five years has ranged between \$12 million and \$19 million.

As can be seen, the direct value generated by the commercial abalone fishery statewide is a moderately significant injection into the State's economy and will need to be taken into account when considering allocation issues for those areas outside Area 7 (metropolitan area).

3.1.3 Commercial Economic Input Metropolitan Area

Because of the absence of reliable data for the setting of a sustainable harvest level and making allocations outside the metropolitan area, only the relative economic and social value of commercial and recreational fisheries for the metropolitan area (Area 7) are considered here.

Although between 1999 and 2003 the annual value of the catch of the three species of abalone has varied, the relative value of Roe's abalone to greenlip and brownlip abalone has remained at between a half to one third.

The total commercial Roe's abalone GVP ranged between \$5.9 million and \$2.6 million between 1999 and 2003 and when averaged equated to \$4.08 million. The metropolitan component of that value averaged over that period is approximately 34 per cent of the overall GVP (determined based on the proportion of total Roe's catch from Area 7). When this percentage is applied to the averaged GVP for the Roe's abalone fishery, the GVP for Area 7 (metropolitan fishery), was approximately \$1.39 million.

However, the true economic value of this area to the commercial sector is also likely to be influenced by:

- the fact that Roe's abalone from Area 7 are generally considered to be of higher quality than those from other areas;
- proximity to infrastructure (processors, international airport) means reduced transport costs and less time from capture to processing/market; and
- the fact that many divers are resident in Perth means reduced expenditure on travel and accommodation.

3.1.4 Commercial social input

It is clear from the resource report that the commercial abalone fishery provides opportunities for employment and would certainly have a positive input into the communities of regional coastal centres, predominantly on the south coast. This influence may be less marked and harder to quantify in the metropolitan component of the fishery.

3.2 Recreational Fishery Profile and Economic and Social Input

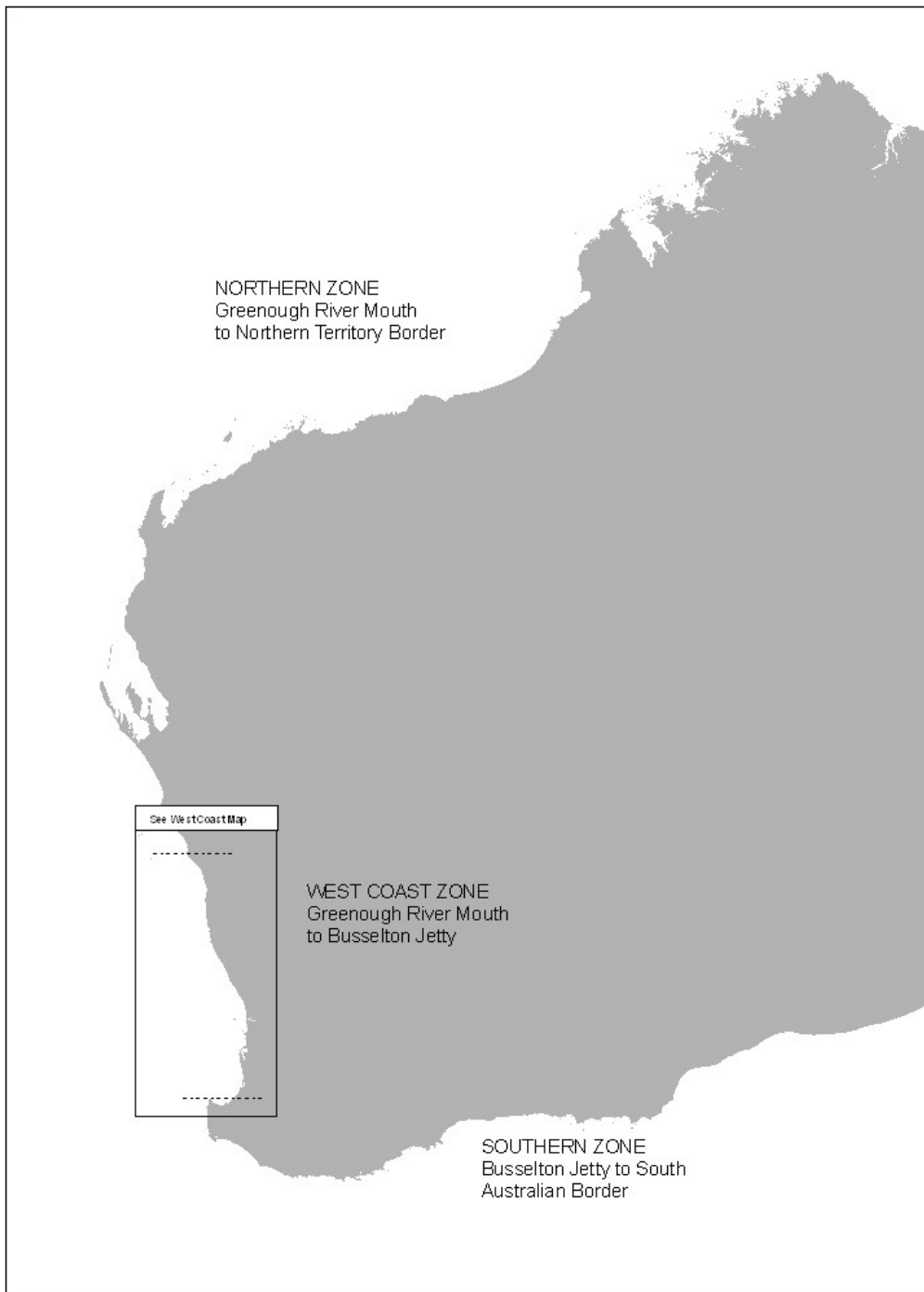
3.2.1 Profile

Recreational fishing for abalone can occur anywhere in the State, but effectively only takes place between Geraldton on the mid-west coast and Israelite Bay on the south coast. Greenlip and brownlip abalone are predominantly caught south of Cape Naturaliste and across to Israelite Bay and are taken by free diving or using compressed air either from shore or more frequently, from boats.

Roe's abalone are predominantly caught by recreational fishers on the west coast between Cape Leeuwin and Geraldton. However, the bulk of recreational Roe's fishing occurs in the metropolitan area between Penguin Island and Burns Beach.

Recreational fishing for Roe's abalone in the metropolitan area is done by wading on the reef platforms and levering the abalone off with a flat-bladed instrument such as a screwdriver (without the use of compressed air).

Fishers are required to take out a licence and are bound by bag and size limits, gear restrictions and an extremely short season.



Prepared by Department of Fisheries GIS October 2005

FIGURE 2: Recreational Abalone Areas

3.2.2 Recreational Economic Input Statewide

The economic survey quoted in the FMP 204 putting the aggregate value of all recreational fishing at \$389 million in 1989/90 and \$569 million in 1998, and which also recognised that recreational fishing activities generated considerable

employment, is of interest. However, it is not clear what proportion of that statewide figure is attributable to the recreational abalone fishery.

Recreational fishing licences are required to fish for rock lobster, abalone, marron, fresh water angling and netting. Fishers can either take out one or more recreational licence for any one of those activities or they can obtain an umbrella licence which entitles them to participate in all or any one of the activities.

The cost of a stand-alone abalone licence for the 2004 season was \$36.00 and just over 8,000 fishers purchased them, which provided over \$290,000 in revenue.

The cost of an umbrella licence was \$72.00 and the total number of those taken out for the 2004 season was in excess of 13, 000 which produced over \$900,000 in overall revenue.

The sale of abalone licences equated to approximately 15 per cent of the total number of licences sold (excluding umbrella licences). Based on this proportion, it could be assumed \$149,00 of the revenue raised from umbrella licences could be attributed to abalone fishing. Therefore, when that figures is added to \$290,000 for stand-alone licences the total revenue raised by recreational abalone licence sales is in the order of \$440,000 statewide.

Recreational fishing for greenlip and brownlip abalone which is mainly done on the south coast, usually requires a vessel, wet suits and either free or compressed air diving equipment will consequently generate some direct and indirect economic benefit.

3.2.3 Recreational Economic Input Metropolitan Area

When the same assumptions relating to abalone fishing by umbrella licence holders as were made for the whole state are applied to the metropolitan area, for which 5,000 abalone only licences were taken out, the revenue raised by licences for this component of the recreational abalone fishery is likely to be over \$100,000.

Compared with the recreational abalone fishery outside the metropolitan area, which requires diving gear at a minimum, and in most cases boats and fuel, the metropolitan reef top abalone fishery is probably one of the least expensive recreational fishing activities in which to participate. As a consequence, direct and indirect economic contribution would be minimal.

3.2.4 Recreational Social Input

It should be recognised that management objectives for recreational fisheries may differ from those of commercial fisheries and are not necessarily based solely around maintaining maximum sustainable yield from a fish stock. In addition to sustainability, the quality of fishing, the diversity of opportunities available and the value to the individual and the community are also key goals for recreational fisheries.

In world terms it is likely that Perth is unique in having a sustainable recreational abalone fishery on its doorstep and as such it is a social and natural resource asset not

only to the recreational fishing community, but to the wider WA community and Government.

The metropolitan recreational abalone fishery is largely a family-based activity collecting what more than 5,000 recreational fishers consider to be a seafood delicacy. Apart from it being a recreational activity and providing enjoyment from that perspective, the fishery has special significance because it is the only way members of the public can access fresh Roe's abalone.

The high social value of the metropolitan abalone fishery should underpin the basis of any allocation to that sector.

Although not so much a family activity as in the metropolitan Roe's fishery, the greenlip and brownlip component of the recreational fishery on the lower west and south coasts offers people in the regions enjoyment through shared diving activities while seeking abalone for a meal.

3.3 Summary of Socio-Economic input for both sectors

As mentioned in FMP 204, a socio-economic study was conducted on the metropolitan abalone fishery by McLeod and Nicholls in 2004. Although the study concluded that there may be a net economic benefit if a small reallocation moved some of the combined catch to the recreational sector, one of the assumptions on which the study was based would need to be reevaluated in order to use the study for allocation purposes.

The study itself suggested that if it were to be used for allocation purposes, (after it had been reevaluated), it should only be after recreational intra-sectoral issues had been resolved.

In summary:

Commercial fishing:

- generates export earnings (on a sustainable basis) it also generates import costs associated with its operations (fuel, equipment etc) import costs for metropolitan area are likely to be less than those outside it;
- plays a role in the economic, social and infrastructure aspects of regional coastal communities (predominantly south coast);
- generates employment;
- management, research and compliance for commercial fishery are fully cost recovered.

Recreational fishing:

- is an important lifestyle/leisure activity for over 5,000 Western Australians living in the Perth metropolitan area of the west coast;
- compared to the commercial sector, a relatively small amount of the management and compliance resources go into the recreational fishery for both inside and outside the metropolitan area; and
- revenue from recreational abalone licence fees contribute significantly to the management cost associated with recreational fishing generally.

Customary fishing is considered different from that of recreational fishing in that it is undertaken to meet different objectives (e.g. ceremonial occasions, special events and education purposes). Indigenous people participate in both recreational and customary fishing for abalone.

Customary fishing:

- maintains culture and cultural heritage;
- is important for educational purposes; and
- is a source of food and has associated health benefits.

4. ALLOCATION MODELS

The following section of this submission provides a detailed discussion of three of the points raised by IFAAC for further comment, these are:

- *Areas of resource-sharing conflict such as the proportions of total catch or more localised competition in certain areas or certain times of the year.*
- *Proposals on possible strategies to overcome any localised competition/resource-sharing issues (closed areas, differential size limits etc).*
- *Innovative solutions to resource sharing conflicts consistent with meeting the objective of ensuring allocations are in the best interests of the community.*

4.1 GENERAL CONSIDERATIONS

In discussing proposed allocation models, the Department notes the direction provided by the Minister that at this time, proportional allocations are to be made only for the metropolitan area, but that the Minister is prepared to accept advice on alternative arrangements which arise out of the consultation process, and which are broadly supported by stakeholders, for other parts of the State.

The Department believes that this approach is entirely appropriate given that despite the difficulty of allocating proportional catch shares outside of the metropolitan area, there is likely to be an expectation on the part of the recreational sector that action will be taken to preserve their level of access to the resource and the value of the recreational fishing experience in these areas. This expectation may be particularly strong given the tightening of rules for recreational abalone fishing outside of the metropolitan area that occurred in 2003. These changes included:

- a halving of the greenlip and brownlip bag limit (from 10 to 5);
- the introduction of a closed season north of Greenough and on the south coast; and
- the expansion of fishing restrictions previously in force only in the metropolitan area to cover the entire west coast south of the Greenough River mouth.

Given the time it is likely to take to satisfactorily overcome the data limitations which exist in relation to recreational abalone fishing outside of the metropolitan area, together with the annual fluctuations which have traditionally occurred in the recreational catch in the metropolitan area, the Department believes that the life of the allocation decisions for both the metropolitan area and other areas of the State, made as a result of the Integrated Fisheries Management process, should be approximately five to six years.

4.1.1 Alignment of boundaries

Considering the resource allocation issue in the above manner has implications for zoning of the recreational fishery. Currently, the recreational fishery is managed in three zones:

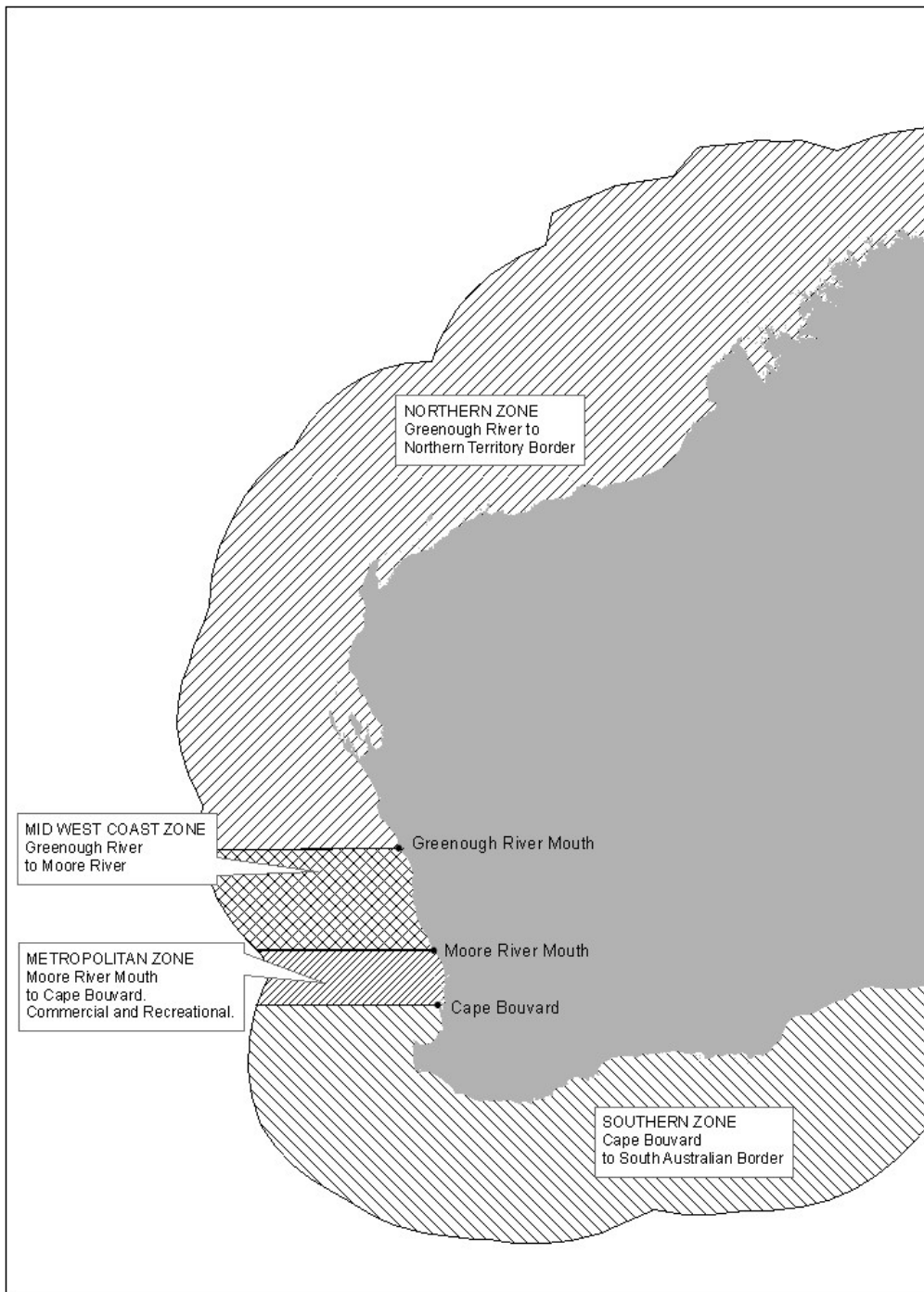
Southern Zone:	WA/SA border to Busselton Jetty; ¹
West Coast Zone:	Busselton Jetty to Greenough River moth; and
Northern Zone:	Greenough River moth to WA/NT border (N.B. this is effectively only the area between Greenough and Shark Bay).

However, for the purposes of allocation and future management based on these allocations, it may be useful to consider the recreational fishery in the following broad zones:

Southern Zone:	WA/SA border to Cape Bouvard;
Metropolitan Zone:	Cape Bouvard to Moore River ;
Central West Coast Zone:	Moore River to Greenough River moth; and
Northern Zone:	Greenough River moth to WA/NT border.

Figure 3 illustrates the proposed modified recreational fishery boundaries.

¹ Legislation to modify the boundary between the Southern and West Coast zones is currently being drafted. This will ensure that as was intended, Cape Naturaliste is included within the Southern Zone.



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FIGURE 3: Proposed Boundary Alignment Option

This framework would align the boundaries of the metropolitan area for the commercial and recreational fisheries thus making the allocation of proportional catch shares and their management more practical. The above zones reflect the fact that there is very little abalone fishing activity between Cape Bouvard and Busselton Jetty, and therefore this area could easily be incorporated into the Southern Zone. They also recognise that although Greenough is outside of the area for which proportional

allocations are to be made, it is a region of relatively high recreational activity which requires more stringent management than areas further to the north.

However, it should be noted that if these boundaries were adopted, this will have implications for data collection and assessment processes with respect to recreational catch on the lower west and south coasts.

4.1.2 Abalone Re-Seeding/Stock Enhancement

During the last two years, the commercial sector has shown ongoing interest in seeding reefs with hatchery-reared spat and juvenile abalone. A small scale trial using greenlip abalone is currently underway off Augusta and east of Albany. A second trial is likely to commence in mid-2006.

While the current and upcoming trials can be considered stock enhancement activities – that is, stock is seeded without expectation of exclusive access by those who released it – it is possible that if the encouraging results of the current trial continue, there may be moves towards ranching or re-seeding (i.e. seeding of stock with the intention of it being harvested only by the party who released it).

It is not considered that seeding of reefs with hatchery-reared stock will have a significant impact on allocation questions in the short to medium term because:

- a SHL has been set only for Roe's abalone in the metropolitan area, and proportional catch shares are to be allocated only for this area;
- Roe's abalone are highly fecund and undersized abalone occur in such densities that re-seeding/stock enhancement is unlikely that be economically viable; and
- it is likely that in the short to medium term, regardless of whether future ventures take the form of stock enhancement or re-seeding, they will involve seeding greenlip abalone onto reefs outside of the metropolitan area and those reefs are likely to be relatively remote in terms of recreational access.

In the longer term, the impact that re-seeding/stock enhancement has on allocation issues will depend upon:

- whether SHLs and proportional catch allocations are made for areas and species other than Roe's abalone in the metropolitan area;
- whether there are moves to re-seed Roe's abalone;
- whether this practice has a real impact on the SHL; and
- the nature of the tenure held over seeded stocks and reefs and whether this advantages or disadvantages any one sector over another.

4.2 Allocation of the Abalone Resource Outside of the Metropolitan Area

There is little evidence of current resource-sharing conflict between commercial, recreational and customary fishers outside of the metropolitan area. However, as the population in coastal areas, and particularly within the Capes region grows, pressure on abalone stocks close to towns and boat launching facilities is also likely to increase. This raises the possibility of local depletion issues and associated impacts on

the way in which the commercial fishery operates, the quality of the recreational fishing experience and the ability for customary users to access the resource.

The possible mechanisms for allocating resource shares outside of the metropolitan area include:

- spatial closures;
- differential Legal Minimum Limits; and
- temporal closures.

4.2.1 Spatial Separation

Recreational abalone fishing activity outside of the metropolitan area primarily occurs close to major towns such as Geraldton, the Augusta to Dunsborough region, Albany and Esperance. While commercial divers can and do operate in remote locations, there are reefs of importance to this sector close to major towns and boat ramps. These reefs are also likely to be important to recreational divers because of their relative ease of access.

The use of spatial separation is likely to be the most relevant mechanism for addressing customary fishing allocation issues outside of the metropolitan area. If this option is adopted, it will be essential for customary fishers to be involved in the consultation process from the outset.

The Department believes that spatial separation has a role to play in resolving local resource sharing conflicts or potential resource sharing conflicts. However, the solution which is most appropriate needs to be determined on a case-by-case basis in consultation with all stakeholders.

4.2.2 Differential Legal Minimum Limits

LMLs for greenlip and brownlip abalone are the same for both commercial and recreational divers (140 mm). However, in the case of non-stunted greenlip abalone and brownlip abalone, commercial divers generally prefer to target animals which are above the LML. The minimum size targeted varies according to location, but tends to start at 145 mm.

It should be noted that the commercial sector also takes some greenlip abalone which are well below the LML. These abalone are taken from stocks that are recognised by both industry and the Department as being "stunted" – i.e. very slow growing abalone populations in which animals attain sexual maturity but almost never reach the LML. Stunted stocks are currently taken under the authority of a Ministerial exemption, but in the medium to long-term it is planned to formally legislate to allow this fishing practice.

Stunted stocks are low productivity stocks and hence the frequency with which they are fished and the level of catch during each fishing event must be carefully monitored. This, together with compliance issues, means that it may not be practical to allow stunted stocks to be fished recreationally.

Outside of the metropolitan area, LMLs for Roe's abalone are the same for both commercial and recreational fishers, with the exception of in Area 1 of the commercial fishery (Nullarbor), where the LML for commercial divers is 75 mm as opposed to 60 mm for recreational fishers. The latter circumstance is not relevant as the area concerned is rarely fished recreationally.

Similarly to greenlip and brownlip abalone, industry prefers to target larger Roe's abalone, but the difference between the minimum length taken and the LML is less clear cut than for greenlip and brownlip abalone.

Taking into account the above, expanding legislated differences in LMLs for the commercial and recreational sectors may be an option for addressing resource sharing issues, particularly in the greenlip and brownlip fishery. In contrast to spatial separation, which needs to operate on a finer scale and be determined on a case-by-case basis, the Department does not support expanding differentiation of size limits by area beyond that which is already in place.

4.2.3 Temporal Separation

There is a degree of separation between the times when commercial and recreational divers fish for greenlip and brownlip abalone.

In 2004, a closed season for recreational abalone fishing was introduced for the Southern Zone. As a result, recreational fishers may only take abalone between 1 October and 15 May of the following year.

The commercial licensing period runs from 1 April until 31 March of the following year. Most greenlip and brownlip quota is taken between the commencement of the licensing period and the end of September. In recent months, industry has approached the Department to discuss the possibility of legislating a closure to commercial greenlip diving during the summer months (October to March).

The situation for Roe's abalone is more complex.

Between Moore River and Greenough, the recreational sector is restricted to the same fishing season as in the metropolitan area, whereas in the Northern and Southern zones, fishing is permitted between 1 October and 15 May of the following year.

The optimum time for both commercial and recreational Roe's fishing is during periods of fine weather and low swell. These conditions occur most often in the summer months. Therefore, it is more likely that commercial and recreational divers may be in the water at the same time. If this is a source of conflict between sectors, consideration could be given to management action such as a closure to commercial fishing during peak recreational fishing times (e.g. weekends and public holidays) in areas of high recreational fishing activity.

4.3 Allocation of the Abalone Resource within the Perth Metropolitan Area

With respect to the recreational sector, the Department does not recommend capping licences at this time and with that in mind, has given consideration to the following two broad models for allocating the abalone resource within the metropolitan area for both sectors. These are:

Model 1. establish an annual proportion of the SHL that may be taken by each sector;
or

Model 2. establish an average annual proportion of the SHL that may be taken by each sector over a three to five year period.

Both of these models may be managed either on a whole of fishery basis or at the subregional (north metropolitan, central metropolitan, south metropolitan) scale.

Taking into account the management, compliance and data collection and monitoring implications to be discussed below, the Department's preference is for *Model 2*, with this to be managed on a whole of fishery (metropolitan area) basis.

With respect to customary fishing, because of the limited data on this sector, and the relatively small quantity of abalone that is likely to be involved, the Department considers that regardless of the allocation model chosen and the scale of management adopted for the commercial and recreational sectors, the allocation to customary fishers should apply to the metropolitan area as a whole, rather than to specific subregions.

When determining the allocation model to be applied to the metropolitan area and its spatial scale of implementation, it is important to consider:

- the management regimes currently in place for each sector and the impact this has on the ability to control the level of catch in any given year;
- the need to maintain management flexibility;
- data collection and monitoring requirements;
- the need to maintain effective compliance noting the high financial and social value of abalone; and
- the need for cost effective management.

With respect to current management regimes, the commercial sector is managed under a strict quota management system, with TACCs being set on an annual basis and with the catch against quota being closely monitored. In contrast, while a Recreational Fishing Licence is required to fish for abalone, and there is a bag limit of 20 Roe's abalone per day for each of the six metropolitan fishing days, there is no limit on the number of licences that may be issued. Hence it is more difficult to regulate the total catch taken in any given year and there is a tendency for it to fluctuate according to weather and swell conditions.

Within the metropolitan area, there is a degree of spatial separation between the commercial and recreational sectors as recreational fishers are not permitted to fish for abalone using compressed air, and commercial fishers are not permitted to stand on reef-tops or fish from shore between Hillary's and Cape Bouvard. There is also a

closure to commercial fishing between Trigg Island and North Mole and at Rottnest Island.

In addition, the LML for Roe's abalone varies between the sectors (60 mm for recreational fishers and 70 mm for commercial fishers).

Recreational and commercial fishers are not active at the same time in the metropolitan area. The recreational fishery is open for only an hour and a half on each of the six consecutive Sundays from the first Sunday in November. Commercial abalone divers are not permitted to fish in this area from two weeks prior to the start of the recreational season until its conclusion, or on weekends or public holidays at other times of the year.

Thus, within the metropolitan area, much of the conflict between user groups stems not from direct competition for access to the resource, but rather concern on the part of industry about the large annual fluctuations in the recreational catch and incidental mortality.

4.3.1 Incidental mortality

Though it is more common in the recreational fishery, incidental mortality occurs in both the commercial and recreational sectors. Its extent is highly variable from year to year, and is largely dependent on weather and swell conditions.

The SHL does not include explicit recognition of incidental mortality. Instead it reflects the retained total commercial and recreational catch that is sustainable. Consistent with this approach, the Department believes that allocations should be based only on retained catch. Thus, should reductions in incidental mortality by either sector result in an increase in the SHL, the benefit would be shared by each sector according to its proportional allocation.

4.3.2 Allocation Models for the Commercial and Recreational Sectors

As summarised above, there are two broad models for allocating the abalone resource between the commercial and recreational sectors within the metropolitan area. These are:

Model 1. establish an annual proportion of the SHL that may be taken by each sector;

or

Model 2. establish an average annual proportion of the SHL that may be taken by each sector over a three to five year period.

Each of these models could be managed on either a whole-of-fishery basis, or at the subregional level. A detailed discussion of the models and the implications of managing them at each spatial scale follows.

Regardless of the model and scale of management chosen, the Department considers that the proportional allocation to each sector should be specified in terms of a percentage range, rather than as a specific point or target. This approach recognises that because of the current management arrangements, the two sectors effectively

target separate sub-stocks of abalone. Thus, it is both appropriate and expected for there to be some annual variation in the proportion of the total catch taken by each group.

Whichever model is adopted, an agreed process and strategy to deal with the possibility of the recreational sector surpassing its allocation needs to be developed. There are a number of management strategies which could be implemented if this occurs. They include adjusting management controls on the recreational fishery to reduce the catch to the appropriate level or purchasing entitlement from the commercial sector for use by recreational fishers (N.B. this could take the form of direct purchase of quota units or compensation for loss of access to a certain areas depending on the model adopted).

4.3.2.1 Overview of Issues Associated with Allocating Catch Shares Based on a Proportion of a Single Year's SHL Versus an Average Annual Proportion of the SHL over an Extended Period

In considering the information presented below on the two broad models identified for allocating catch shares between the recreational and commercial sectors within the metropolitan area, it is important to understand the management and data collection/monitoring implications, particularly for the recreational fishery, associated with allocating based on a proportion of the SHL for each year, compared with allocating based on an average annual proportion of the SHL over an extended period.

Essentially, this difference amounts to the need for real-time, within-seasons management of the recreational fishery in the former case, compared with the ability to manage this sector's catch between seasons (such that it remains at the average annual catch remains at the target level) in the latter.

The recreational catch currently fluctuates annually according to weather and swell conditions. A reliable estimate of the catch in a given season is not available until at least February-March of the following year.

Implementation of an allocation strategy based on each sector being permitted to take a specified proportion of the SHL for each year would necessitate the implementation of mechanisms which largely eliminate uncertainty with respect to the annual recreational catch.

The scope to deliver this type of management has limitations both legislatively and in terms of the practicality of implementation. For example, the *Fish Resources Management Act 1994* and relevant subsidiary legislation do not currently allow the length of the season in any defined area of the fishery to be easily adjusted at short notice. Even if this were possible, the task of advising the recreational sector of changes to where and when fishing is permitted at short space of time, and the associated compliance effort, would be labour intensive and costly.

Overcoming these types of issues may necessitate significant changes to legislation and licensing requirements.

Perhaps most important would be the necessity to monitor the recreational catch on a week by week basis. Systems to do this do not currently exist within the Department, and with a need to concentrate on improving recreational fishing data for outside of the metropolitan area, to proceed with their implementation at this time would be a major challenge.

In contrast, basing the allocations on an average annual proportion of the SHL over a more extended period would largely eliminate the need for real-time management and catch reporting. Instead, should it become apparent from trends in the recreational catch that it is unlikely to fall within the target level at the end of the allocation timeframe (i.e. the period over which the catch proportions are to be averaged), management changes aimed at either reducing or increasing (as the case may be) for subsequent seasons.

4.3.2.2 Model 1: Establish a Proportion of the SHL that May be Taken Annually by each Sector

This model would entail establishing the proportion, expressed either as a percentage or percentage range, of the SHL that may be taken annually by the commercial and recreational sectors.

As discussed in section 4.3.2.1 above, for this model to operate successfully, it would be necessary to implement management and catch monitoring mechanisms that largely eliminate uncertainty about the recreational catch taken relative to the target level.

There are currently limitations on the degree to which this could be achieved in terms of legislation, practical application and cost of implementation.

The difficulties associated with adopting this model could be overcome to some extent by specifying the proportional allocation to each sector as a percentage range, rather than as a strict ratio, as this would leave some scope of annual variation in relative catch shares (which may in turn reduce the rigorousness of the real-time management and monitoring systems required).

(a) Application of the Model at the Subregional Level

Applying this model at the subregional level would recognise that the proportion of the total catch by commercial and recreational sectors differs across the metropolitan area. For example, in the Central subregion, recreational fishers took an average 70.5 per cent of the total catch between 1999 and 2004. In the South subregion however, recreational catch accounted for an average of only 12.5 per cent of the total catch over the same period.

This option would essentially entail determining three defined annual allocations and . assumes that the proportion of the catch taken by each sector in each subregion is, or should be, constant from year to year. It would limit management flexibility and could disrupt rotational fishing behaviour in the commercial sector which is important for sustainability and industry's sense of stewardship of the resource.

Implementing this option would further complicate the real-time recreational fishery management and monitoring requirements described above because these would need to be applied to three subregions.

In addition to its implications for the recreational fishery, this option would increase the complexity of commercial fishery management and monitoring because TACCs would have to be determined and allocated for each subregion, instead of for Area 7 as a whole as is currently the case. Not only would this be likely to increase the cost of management, but its implementation would trigger the need for an intrasectoral allocation process within the commercial fishery with respect to access to the specific subregions of the metropolitan area.

Management at this spatial scale could be simplified if the commercial and recreational sectors were prepared to accept all or part of their allocation in the form of spatial closures. For example, if the commercial sector were willing to accept a closure to fishing in the Central subregion, and the recreational sector were prepared to accept a closure to fishing in the Southern subregion, it would be necessary to monitor only the total catch from these areas against the subregional SHL. This would leave only the Northern subregion where proportional catch shares would need to be monitored.

This model and scale of application represents the least practical alternative from an administrative point of view. It is the Department's least favoured option.

(b) Application of the Model Across the Entire Metropolitan Area

Applying the model at this broader spatial scale would preserve a greater level of management flexibility and simplify recreational management and monitoring requirements compared with *1(a)*. In addition, there would be no need for changes to the way in which the commercial fishery is managed.

This said, the need for real-time management and monitoring of the recreational fishery which are inherent requirements of this model, are a significant impediment to its implementation.

The Department does not support this allocation option.

4.3.2.3 Model 2: Establish an Average Annual Proportion of the SHL that May be Taken by Each Sector Over a Three to Five Year Period

Instead of being described as a percentage, or percentage range, of the SHL that may be taken annually, under this model the proportional allocation to each sector would be defined as an average percentage, or percentage range, of the SHL that could be taken over a period of three to five years.

As discussed above, allocating in this manner would largely overcome the real-time management and reporting requirements associated with *Model 1*.

If this model were adopted, the Department believes that the period over which catches should be averaged should be five years, as this would assist with smoothing

the effect of annual fluctuations in the recreational catch. It would also allow sufficient time for any emergent trends in the recreational catch to be recognised and for appropriate management changes to be implemented for subsequent seasons within the five-year allocation period to ensure that the catch remains at the required level.

(a) Application of the Model at the Subregional Level

As with option *I(a)* the implementation of this model at the subregional level would necessitate the implementation of legislation, licensing changes, compliance programs and data collection procedures to enable finer scale management of both the commercial and recreational fisheries. It again raises the spectre of an intrasectoral allocation debate within industry.

Also as with option *I(a)*, the implementation of this option could be simplified if the commercial and recreational sectors were prepared to support allocation by means of spatial closures.

Although this option is more practical than *I(a)* above because of the elimination of real-time recreational management and monitoring requirements, the commercial allocation issues, as well as the management, licensing, compliance and data collection needs associated with moving to a finer scale of management are prohibitive. Therefore, this option is not favoured by the Department.

(b) Application of the Model Across the Entire Metropolitan Area

This is the Department's preferred option as it:

- is consistent with maintaining resource sustainability;
- would preserve management flexibility;
- would allow a clear allocation to be made to each sector; and
- would enable allocations to be managed and monitored in a cost effective manner by eliminating the need for real-time monitoring, and management at a fine spatial scale.

The annual variations in catch permitted under this model, particularly if combined with specifying each sector's allocation as a percentage range, also allows for recognition of the circumstance that the commercial and recreational sectors effectively fish separate sub-stocks of abalone.

Thus, on the basis that it achieves the objectives of Integrated Fisheries Management in a way which is practical and cost effective to manage when compared with the alternatives explored in this submission, the Department believes that this is the option that should be implemented.

Allocation to Customary Fishers

The sustainable harvest level currently does not include recognition of take by customary fishers, and will need to be increased by an amount equal to this sector's initial allocation.

In terms of the initial allocation to this sector, the most important issue from the Department's perspective is to over, rather than under allocate. To under-allocate would be to risk claims for compensation once an improved understanding of customary fishing is gained.

Even if an allocation model which divides the metropolitan area into subregions is adopted for the commercial and recreational fisheries, the department believes that the initial allocation to customary fishers should apply across the metropolitan area as a whole, noting the relative size of the likely allocation and the lack of information about the actual catch level and location of capture.

In the future it will be important to identify the nature and level of customary fishing for abalone that occurs both inside and outside the metropolitan area in order that informed allocations and re-allocations can be made.

5. MANAGEMENT ISSUES

Depending on the allocation option chosen for the metropolitan component of the abalone fishery, it will be important for the department to develop a range of management tools to ensure that sectors can be managed within their allocations.

As identified in this submission and FMP 204, there is already a reasonable degree of spatial and temporal separation between the recreational and commercial sectors in the metropolitan area and this is further complemented by the fact that one group operates on the reef-tops while the other dives in sub-tidal waters beyond the reefs. This historical arrangement has resulted in minimal conflict between user groups.

Because of the nature of commercial abalone fishing there is less risk of allocation over-runs than there is with the recreational sector. Consequently it will be important for the department to develop a range of management options and refinements to existing management strategies in order to deal with the following issues:

- Accurate and timely monitoring of recreational catch;
- Rigidity of present recreational licensing regime in terms of responding to the requirement to reduce fishing effort, (possible option – day licences purchased on the internet);
- Rigidity of legislative and administrative arrangements in terms of shortening or extending fishing seasons; and
- Processes for communicating information regarding management changes to the community at short notice.

6. RE-ALLOCATION OF RESOURCE SHARES

- *Mechanisms to allow for future re-allocations between the sectors over time.*

To address the possibility of shifts in resource shares from the commercial to the recreational sector over time, it will be necessary for the Department to develop a mechanism that will enable the re-allocation of the resource.

There are a number of strategies that could be adopted, and the one which is most appropriate will depend on the allocation model chosen. They include adjustment of management controls in the recreational fishery to return catches to the required level and the purchase commercial access for re-allocation to the recreational sector. In contrast to the rock lobster fishery, where the latter is the preferred option, in the abalone fishery it is more likely that the issue will be dealt with by changes to recreational management, as the catch by this sector is already at or close to the level that can be sustained in the areas this group can physically access.

7. CONCLUSION

In preparing this submission, the Department recognises that proportional catch shares are to be allocated only for the metropolitan area at this time, but that IFACC may provide advice on alternative mechanisms for resolving resource sharing conflicts in other areas of the State.

The Department has identified three strategies – spatial closures, differential legal minimum limits and temporal closures – that could be used to address resource sharing issues outside of the metropolitan area.

With regard to the allocation model to be adopted within the metropolitan area, it is important to consider:

- the management regimes currently in place for each sector and the impact this has on the ability to control the level of catch in any given year;
- the need to maintain management flexibility;
- data collection and monitoring requirements;
- the need to maintain effective compliance noting the high financial and social value of abalone; and
- the need for cost effective management.

Two broad models for allocating catch shares between the commercial and recreational sectors have been identified. These are:

1. establish an annual proportion of the sustainable harvest level (SHL) that may be taken by each sector; or
2. establish an average annual proportion of the SHL that may be taken by each sector over a three to five year period.

Both of these models could be implemented either on a whole-of-fishery basis or at the subregional level.

Taken on balance, the option of allocating each sector a proportion of the average annual SHL for the entire metropolitan area over a five-year period is the most favourable option, as it achieves the objective of IFM in a more cost-efficient manner than the other allocation mechanisms.

The allocation to customary fishers is considered by the WA Government to have priority over that to commercial and recreational fishers. As there is currently little data on the customary take, and as the quantity of abalone involved is likely to be

relatively small compared with the other sectors, the Department believes that even if an option that would entail allocation by subregions is implemented, a single allocation to cover the entire metropolitan area should be made to customary fishers.

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