

TAC Committee

Total Allowable Catch Committee Report and Determination for 2012/13

ABALONE FISHERY

25 May 2012

SUMMARY

The NSW abalone fishery has experienced a period of stock rebuilding, as evidenced from another year of increasing catch rates currently being experienced by fishers. This is very encouraging in that it implies that the low TACs of recent years, combined with a period of increased productivity have resulted in catches that are not overwhelmingly dominated by recent recruits to the fishery. Continuation of this pattern, along with corroborating changes in other indicators, will build confidence in the strength of stock rebuilding.

Advances in data collection by industry using electronic data loggers and the use of industry workshops to discuss the preliminary analysis of data, continues. These efforts, with very limited resources, to implement a finer scale management (FSM) approach that will ultimately result in an alternative and improved system of assessment, management and TAC setting, are commendable. There has been a great increase in the amount of fine scale data collected from the commercial fishing operations in recent years and the TAC Committee has been, and continues to be, very supportive of this approach. However, as yet these data have not been analysed and interpreted to adequately so as inform a sufficient understanding of the status and trends of the stock and the setting of the total allowable commercial catch (TACC) with an appropriate level of confidence. The industry workshop held in March 2012 appears to have been again relatively well supported by industry, with detailed consideration of data and catch planning occurring. This augers well for future FSM approaches, provided the framework for making recommendations and subsequent inclusion in the decision making process (TACs, LMLs and catch distribution) is agreed, in place, and used.

Some elements within Industry have again expressed frustration at what they perceive as continuing intransigence by the Total Allowable Catch and Review Committee (the Committee) in relation to its precautionary approach towards using industry observations, logger data and submissions, and particularly those relating to recent substantial increases in CPUE, to underpin Total Allowable Catch (TAC) increases. Other elements have been extremely supportive of TAC Committee determinations and, specifically, the recommendations on increasing size limits. The Committee reaffirms its obligation to set catches and minimum size recommendations at levels that, in the Committee's view, best secure the future sustainability prospects, both biological and economic, of the NSW abalone fishery.

A key question remains the strength and persistence of the 'pulse' of recruitment currently passing through the fishery, as this will determine both the extent of current stock rebuilding and the future scope of sustainable catches. Knowledge of how the stock is responding to previous management measures intended to protect it is also required, as is a better understanding of the relative benefits of the benefits of short-term increases in TAC relative to the contribution of uncaught abalone to stock rebuilding.

Departmental researchers remain heavily constrained in their ability to provide an additional, independent review of the status of the abalone resource based on available information. While the increasing level of logger coverage and the more ordered input of divers and others into the industry workshop process is encouraging, they are not well integrated into Departmental or TAC processes. There remains ongoing uncertainty about the interpretation of the information which is available.

The Total Allowable Commercial Catch under the Act is clearly defined. However, the Committee has concluded in the past that setting a single TACC number is not a necessary and sufficient action to achieve the role and function of the TAC

Committee under the Act. The Committee reiterates its position that the Determination is inextricably linked to selectivity (with size limit and spatial aspects) considerations. The Committee has therefore conditioned its determination in the context of these selectivity considerations, and in particular, minimum legal lengths.

This year, the Committee has made a suggestion to address the issue of a holistic determination by recommending that the Minister require the TAC Committee to make a determination incorporates both the TAC and the integral elements of selectivity i.e. size limits and spatial distribution.

Management issues

The industry submission to the Committee again confirmed the general effectiveness and capacity of data loggers to collect essential information on catch size, structure and location as part of a structured approach to spatial management. The degree to which this data has been able to be analysed (and linked to assessments under the former monitoring and assessment programme) has reduced its value to the Committee in informing appropriate catch setting.

The management arrangements to set and implement sub-Regional catch caps and limits, intended to spread the catch spatially and avoid localised depletion, were again not entirely successful, although an improvement was noted. Going forward, it will be important to introduce management that prevents sequential depletion (which starts with over-harvesting of accessible and profitable concentrations when the stock is abundant), and in developing, demonstrating and institutionalising a management control (FSM) that is effective in the longer term.

The arrangements for monitoring and assessment arrangements and the regional distribution of effort under FSM, including a draft harvest strategy have been driven by industry. The degree to which the Department, as the representative of whole-of-community interests in NSW fisheries resources, is engaged in, or endorses the new assessment and management process proposed by industry, is not clear. It will be necessary for the Department to take an active role in managing the FSM process to ensure that it produces information in an effective and timely manner, with the relevant measures to ensure quality assurance and quality control.

There does not yet appear to be any formal arrangement in place on appropriate methodology and protocols as a framework for FSM. The Committee considers that such an agreement should be developed as a priority and as an essential part of the process. The provision of adequate resources, a responsive and supportive administration, and cohesive and meaningful industry involvement will also be essential. Expecting industry to achieve consensus on difficult issues within industry workshop situations may be overly optimistic, particularly where advice suggests a conservative approach, such as ensuring adequate certainty over stock status before increasing TACs.

There appears to be a growing expectation among industry that the workshops will make decisions on the TAC, distribution of catch, and, eventually size limits. This is inconsistent with the Act and general good practice fisheries governance. Workshop derived advice, should, however, be an important element of the information used to inform decision-making. The current process whereby industry, virtually independently of the Department, has set up a monitoring and assessment framework using its own scientist and workshops requires better integration with Departmental and TAC Committee processes.

Predictions that the increase of the minimum legal length (MLL) to 117 mm would have severe negative implications for the fishery continue to prove to be unfounded. The Committee believes that the same representations made to effectively undermine the Committee recommendations to increase the size limits, that often

have the support from the Department, are similarly incorrect. The Committee also acknowledges that the aim of management for the fishery should be to implement more variable size limits to better manage the different growth rates in the fishery. By using the preferred strategy of incrementally raising size limits, carefully monitoring catches, size distributions and shell characteristics, it will be possible to identify faster and slower growing areas and develop FSM-based (variable) size limits.

Under current arrangements, the TAC Committee has to make a determination on the TAC that is essentially incomplete in that it does not include the elements of selectivity i.e. size limits and spatial distribution. This forces the Committee to make conditional determinations, and then await the Department's decision as to whether the selectively elements are implemented. This year, we have made a suggestion to address the issue of a holistic determination by recommending that the Minister require the Committee to determine the TAC, size limits and spatial distribution. It is the belief of the Committee that the current level of industry angst and controversy will be reduced using this approach, which will also require the more effective incorporation of Departmental and TAC processes with the current industry data collection and analysis programme and workshops.

Some elements of Industry consider that the TAC Committee is operating *ultra vires* by not following the management plan and Fisheries Management Strategy (FMS). It is clear, however, that the management objectives, performance indicators and triggers contained therein are problematical, both in terms of their level of precaution and utility. The Department has acknowledged this problem and the Committee has recommended their review, as part of the review of the Management Plan.

Restructuring in terms of the share transfers that occurred in the rock lobster fishery has not occurred. That said, the TACC in the abalone fishery has contracted, the number of active divers operating, as distinct from shareholders, has also contracted with increased leasing occurring and divers taking multiple shareholders' quota. This is a form of restructuring,

The reduced bag limit (two per day) and restrictions on access have successfully reduced the recreational catch, and the Committee considers that the recreational catch now and in the next few years is likely to be in the vicinity of 5-15 tonnes. The Committee does not however support current moves to increase the recreational fishery bag limit.

The Department is to be again congratulated on its efforts to deal with illegal fishing, and in particular, the ongoing trend in serious, well-organised crime syndicates who are allegedly continuing to steal significant quantities of abalone. The State-wide Operations and Investigations Group (SOIG) has made significant contributions to reducing the serious impact of illegal abalone fishing. Any reduction in capability in this area at a time when it is known that illegal fishing remains of significant concern, and vital stock rebuilding is occurring, would be questionable.

There has been a drastic reduction in the overall value of the fishery due to reductions in beach price and TACC. This reduction has substantially impacted on the capacity of the industry to pay the fees and charges associated with managing the fishery. In response, the Department has been very effective in reducing the management fees payable by Industry, from \$168.40 per share in 2007/08 to \$26.00 for 2011/12. This reduction, while welcomed by industry, has led to difficulties with respect to management decision-making. This has occurred a time when there is the greatest need for funds for monitoring and research to inform management action that will and ensure stock rebuilding is effective and ensure that TAC, catch distribution and MLL settings are correct.

A barrier to more effective cooperation in the past has been the unfortunate expectation by industry that the Minister's Office will engage and intervene in what would normally be considered to be minor operational issues. This avenue of redress appears to be waning and more appropriate channels of communication between industry, researchers and managers are now being developed.

Economic issues

The economic analysis possible under this section is restricted by the data and analysis provided to the Committee. While the Committee understands the competing calls on funding, and the constraints imposed by the economic significance of the fishery, the lack of data and analysis on the structure, conduct and performance of the NSW abalone industry is a serious shortcoming in the monitoring of the fishery. The Committee has recommended that the Department and industry make greater efforts to provide the economic advice needed to equip the Committee to provide advice on the economic situation of the industry.

Gross revenues from abalone fishing have improved over the past two years from \$1.99 million in 2009/10 to \$2.8 million in 2010/11 and an expected \$3.3 million in 2011/12. These values are very low, however, when compared to levels in 2000, when the gross value of the fishery was \$24.9 million in real terms due to both higher catches and prices. Net returns to shareholders are also likely to have improved over the same period. Improvements in 2011/12 are due to a dramatic decline in the cost of fishing.

Further evidence of the improvement in economic returns from abalone fishing and likely improvement in optimism in the future fishery, can be seen through a return to share trading in the fishery. During 2011/12 (to date) there have been four share transfers in the fishery totalling 160 shares¹.

The return to share trading in the fishery mirrors, to some extent, the previous situation in the NSW rock lobster fishery, whereby following a series of conservative TAC determinations and a significant size limit change, stocks rebuilt, TACs and profitability increased and the market for shares became very active. However, a lot more restructuring, in the form of share trading and associated reductions in the number of shareholders, accompanied by stock rebuilding, needs to take place in the abalone fishery for it to improve its economic viability.

As articulated in the TAC Committee's 2011/12 determinations, the abalone fishery is in a better position economically, but this is off a very low base. The rate of recovery of management fees and charges is also so low as to be insufficient to allow the industry to invest in appropriate management services (including research and compliance) to allow it to improve its economic situation into the future.

Biological issues

The information available to the Committee to assess the status of the stock has changed and diminished considerably in recent years. Prior to and including the Committee's 2008 determination the fishery assessment was based on fishery independent surveys, catch rate and weight composition from commercial fishing; integrated analysis using a length-based population model to estimate population size and recruitment, and predictions of the expected future trends in the status of the stocks under different possible levels of fishery catch.

Since 2008, through various decisions of the industry and Department, the Fishery Independent Survey has not been conducted, there has been no update of the

¹ One of these share transfers was a book transfer. The other three were genuine transfers with shares going to existing divers.

population model to assess stock status, and there has been no scientific prediction of future trends of the stock. Consequently in since 2009 there has been no formal scientific stock assessment or prediction of future stock condition.

Collection of fine scale data on fishing effort and catch, through the use of GPS-linked data loggers has increased since then as more, and more reliable, data loggers have been provided to divers. Descriptions of the data from the data loggers were again presented to the Committee this year. However, as in previous years, these data were not analysed or interpreted with respect to stock status or trends. In particular there was no analysis that related interpretations of the currently collected data from the data loggers to interpretations of historically collected data. Such analysis is necessary to provide perspective and context of the current interpretation of stock status.

The Committee reviewed and considered the documents from the 2012 industry workshop and in particular the criteria for assessment of each subregion, and the industry suggestions about the appropriate catch from each subregion. This was useful input to the Committee. The Committee has made a number of suggestions to improve this input, which might usefully include: alignment of reporting areas to allow for historical comparison; further detail on basis for the conclusions reached; the use of more objective criteria for assessing the status of each spatial area; and more comprehensive presentation of the technical details behind the data and analysis provided by industry to the Committee.

There continues to be a heavy reliance on commercial catch rate as an indicator of stock abundance. This reliance on commercial catch rate has well known problems, and is notoriously 'hyper-stable' for abalone fisheries, because high catch rates can be obtained and maintained for a time by targeting concentrations of abalone in known patches of preferred habitat even if the overall population decreases. Another issue is that commercial catch rate is a 'trailing indicator', reflecting what has happened, rather than a 'leading indicator' that informs about what will happen – it contains no information about the numbers of sub-legal sized abalone that provide the future commercial stock. In principle, analysis of the fine scale data now being collected could provide solutions to these problems, but to date this has not been attempted or demonstrated.

These is a current serious weakness in the management situation whereby there are no clear answers to the key questions relating to the robustness of the recent stock improvements or the ability to detect any lack of robustness before the stock condition deteriorates. With the limited information and analysis that is currently available it is not appropriate or possible for management measures to be based on detection and tracking of the detailed nuances of population change in response to natural variability or the effects of previous management interventions – rather management measures must be simple, robust and precautionary.

NSW abalone stocks have historically suffered from significant over-fishing and over-depletion. There has been evidence of serial depletion, recruitment overfishing, progressively lower and briefer spikes of recruitment in most regions and an increasing reliance on abalone that have just growth through the size limit. Recent reductions of the total catch (commercial and recreational) and recommended increases of the minimum legal size have been a response to this situation.

There is no doubt that there has been substantial improvement in the state of the stock in recent years, starting in about 2006 but particularly since about 2009. The TAC reductions and increased MLL have succeeded in this regard and the population has accumulated stock 'on the bottom' from a period of low TAC and high productivity. There are spatial differences in stock recovery – slow in Regions 1, 2 and 3; faster in regions 4 and 5; fastest in Region 6. There is also no doubt that this

accumulation could be caught in the next few years through a higher TAC. But the central questions are (i) the extent of the recovery in relation to the key fishery properties (e.g. thresholds for recruitment overfishing and maximum stock productivity), (ii) the robustness of the recovery so far to fluctuation in stock productivity, and (iii) identification of the past management settings that allowed the historical overfishing to occur so that they are not repeated as TACs are increased again during stock recovery.

The information and analysis available does not provide convincing examination or confident conclusions in relation to these central questions. As in recent years the Committee has available very limited information and analysis for its decisions, there is a high level of uncertainty about the true status of the stocks and their responses to recent changes in the TACC and MLL. The TAC Committee has previously pointed out the problems that have flowed from dismantling the earlier system of monitoring and stock assessment before a replacement system was developed, tested and adopted. The Committee has also previously suggested that some relatively simple analyses be provided that would be expected to help interpretation. In particular some 'per recruit' analyses for yield, legal biomass, spawning biomass, mean length and mean weight would be a usually expected minimum analysis in the current circumstances. And the existing population model should be used to provide scenarios of the expected changes in these same abalone stock indicators given the recent changes in TACC and MLL.

Overall the situation is not greatly changed from the Review provided by the TACC in the re-determination undertaken in April 2012 and the overall conclusions drawn there still apply. It is concluded that there should be no further change in the TACC for Regions 1, 2, 3, 4 and 5 at this time, though the suggested survey in Region 1 South does provide a good basis for specifically allocating some research quota there. Region 6 continues to indicate strong stock recovery through the indicators available. The fine scale data suggests that the spatial pattern of exploitation in Region 6 is systematic expansion rather than serial depletion. There is widespread industry opinion that the sub-legal abalone are abundant in Region 6 and that higher catches would be sustainable. Furthermore management has committed to an increase in the MLL in Region 6 which will provide greater protection for the stock.

The TAC Committee remains committed to rebuilding a robust and profitable fishery. The size limit changes and regional distribution of catches recommended by the TAC Committee, in combination with the determined TAC levels, have three aims:

- to provide a larger and better protected spawning stock;
- to have a sufficient biomass to buffer the stock and fishery catch rates against periodic decreases in productivity; and
- to increase the biological and economic yield per recruit.

It should also be noted that this approach was put forward in some industry submissions and supported by the Department's management report.

The information available in relation to each of these aims is very limited by the monitoring and analysis provided, and this limitation continues to require a precautionary approach to fishery management. Given the clear dissatisfaction voiced by the current and past industry members of ABMAC, the TAC Committee believes it is important that the TAC Committee's strategy towards size limits is clear. A table is included in the report, which seeks to increase an understanding of the logic and limitations behind the TAC Committee's past and current MLL recommendations.

Because of the spatial variability of abalone life history parameters, increasing the yield per recruit implies different MLL in different areas. If the MLL is too small even moderate TAC levels can result in both growth and recruitment overfishing in areas where growth is fast and reproduction begins at larger size, which are the most productive parts of the population, resulting in sequential depletion. Conversely there are mechanisms that allow for the targeted harvest of abalone in areas of slow growth rate that would be mostly below the MLL needed to protect the faster growing areas. The TAC Committee has consistently recognised the need for different MLLs in different areas but has argued for higher overall MLLs to adequately protect fast growing areas, augmented by specific arrangements to provide harvesting access to slower growing areas. In the absence of adequate MLL protection for the fast growing portions of the stock this is provided for by a low overall TAC, but alone this is an inefficient tool and does not allow the fishery to reach its biological and economic potential, as industry has observed.

In the circumstances it is decided that the TAC for 2012/13 and should be increased to 120t, with all of the increase in Region 6 and an additional 1.5t research quota (in addition to the TAC determination) available in Region 1 South. In making this judgement the Committee is very aware of countervailing interpretations that are possible, the increasing dependence of the fishery on Region 6 (and key subregions within it), and that the information and analysis available is weak for detecting any problems in time for management correction. Consequently the Committee recommends that there is increased monitoring, analysis and management focused on Region 6 during 2012/13. This could include detailed analysis and interpretation of the fine scale data in relation to stock status and trends, increased sampling for length and weight distributions in the catch, re-sampling of the Independent Survey sites, and close monitoring with effective action to keep catches within the intended subregional caps.

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**TOTAL ALLOWABLE CATCH COMMITTEE
ABALONE FISHERY
REPORT AND DETERMINATION FOR 20012/13**

1. INTRODUCTION

The Total Allowable Catch Committee is established by Section 26 of the *Fisheries Management Act 1994*. In 2012, it consisted of:

- Mr Ian Cartwright – Chairman
- Dr Keith Sainsbury – fisheries scientist
- Dr Jessica Hartman – natural resources economist
- Mr Bill Talbot – fisheries manager

The Committee was provided with Secretariat services by DPI and acknowledges the work of Edward Douglas in this regard.

The Committee is required to determine the total allowable catch for the commercial sector (TACC) of the abalone fishery and, in doing so, to give effect to the objectives of the *Fisheries Management Act 1994*, as amended by the *Fisheries Management Amendment Act 1997*. While is not subject to the control or direction of the Minister in formulating the TACC the Committee may be required by the Minister to undertake a re-determination, as has occurred in the past. In reaching its decision, the Committee is required to have regard to:

- all relevant scientific, industry, community, social and economic factors;
- the need to ensure that the abalone resources are exploited in a manner that will conserve stocks in the long term;
- the impact of fishing on other species and the environment; and
- the precautionary principle as set out in Section 30(2)(c) of the Act.

The Committee is also consulted out of session concerning a range of management issues.

The TACC under the Act is clearly defined. However, the Committee has concluded in the past that setting a single TACC number is not a necessary and sufficient action to achieve the role and function of the TAC Committee under the Act. The Committee reiterates the position that the determination is inextricably linked to selectivity (size limit and spatial aspects) considerations and that its recommendations in this regard are not discretionary.

The Committee produces a stand-alone report each year as background to, and in support of, the TACC determination. The report includes a number of recommendations for the management of the fishery as they relate to the TACC, based on the experience and background of the Committee members. The Committee finds it helpful when the NSW Department of {Primary Industry (DPI) and industry provide views on the TACC report, creating a dialogue on a range of issues directly related to the TAC in a whole-of-fisheries context. As stated above, however, the Committee makes a determination on the TACC under the Act, and the degree to which its suggestions and recommendations, including those on size limits and the spatial distribution of catch, are accepted is currently a matter for

DPI. This issue has again created difficulties for the TACC Committee and suggestions have been made in this report to rectify the matter. To meet its statutory obligations, the Committee must consider the full extent of abalone exploitation. Total removals from the stocks of abalone are made up of:

- the quota allocated to commercial fishers;
- the legal catch of recreational fishers (the sum of the bag limits); and
- other catches (by both commercial and non-commercial fishers) not sanctioned by the Regulations controlling the fishery and not recorded in the statistics.

The Act defines, in Section 30(2)(c), how the Committee should apply the precautionary principle, namely:

'if there are threats of serious irreversible damage to fish stocks, lack of scientific certainty should not be used as a reason for postponing measures to prevent that damage.'

The Committee views the word 'threat' in this context to mean an 'indication of probable harm to come'. Thus it believes that where evidence before it indicates probable future harm to the fishery or the stocks but there is some scientific uncertainty surrounding that evidence, it must not postpone action to prevent that harm occurring. Similarly, the Committee should not take pre-emptive decisions on issues such as increasing the TAC when there is insufficient verifiable information on which to base such decisions. Uncertainty, principally in the strength of the current and possible future recruitment events into the fishery, continues to surround a number of key aspects of the abalone stock assessment. The Committee must, and does, take this into account when setting TACCs and recommending limits for regional catches.

The determination of the Committee is to be published in the Gazette by the Minister. In the light of the determination, the Minister is required to review the regulations and any other instruments under the Act. The determination is to be implemented in accordance with the Management Plan.

2. PROCEDURES

2.1 Public Consultation by TAC Committee

The Committee called for public submission on the appropriate total allowable catch under the requirements of Section 31 Division 4 of the *Fisheries Management Act 1994*. Abalone fishers, relevant industry bodies, environmental groups and the community generally were encouraged to make submissions on the total allowable commercial catch. The details of this consultative process are set out in Appendix 1.

The Committee interviewed and received reports from:

- NSW Department of Primary Industries Fisheries Research;
- NSW Department of Primary Industries Management;
- NSW Department of Department of Primary Industries Fisheries Compliance;
- representatives and members of the Abalone Management Advisory Committee; and
- industry members.

A summary of submissions and the issues raised is provided in Appendix 2.

As in previous years, submissions to the Committee were provided in an open forum situation, which allows stakeholders an opportunity to hear views on the status and management of the abalone resource. Industry attendance was lower than usual, the cause of which was understood to be a lack of confidence in the process of TAC setting by some elements of industry. There was also an option for the Committee to accept *in camera* submissions, where requested. No such requests were received in 2012. During the forum, the Committee and industry were able to ask questions of clarification, and the stakeholders present discussed a number of issues relating to the status of the resource and the fishery. These comments greatly assisted the Committee in its deliberations. The tone of discussions and quality of debate on key issues related to the TAC-setting process were much improved in comparison with those in recent years.

2.2 Matters considered

Before reaching its determination, the Committee considered:

- the documentation available on the fishery and the submissions it received;
- the management objectives set out in the draft management plan;
- the current state of the fishery;
- advice on the status of management of the fishery provided by the Department;
- advice on the economic status of the fishery as assessed by the Department and by industry representatives;
- an abbreviated stock assessment for abalone provided by the Department;
- data and analysis presented by the NSW Abalone Council,
- a range of technical and other industry comments regarding the status of the abalone stock and other matters regarding aspects of the management of the abalone industry; and
- the compliance situation as assessed by the Department and by industry representatives.

This report covers the three key areas affecting the management of the fishery, including the TACC setting process. These are:

- management considerations;
- economic considerations; and
- the status of the stocks.

The Determination of the Committee for the annual TACC for abalone for the 2011/12 fishing season is provided at the end of the report.

The Committee notes that the Department was unable to deliver the stock assessment and associated supporting documentation in sufficient time to allow the MAC time to comment and meet the deadlines for submissions to the Committee. The Committee also received papers only a few days (on in some cases on the day) before the Open Forum, which did not allow for sufficient consideration. Also, the dates for the meetings were set unusually late and aligning the diaries of busy professional people is very difficult.

*The Committee **recommends** that an action list and timetable be developed well before year end and adhered to. The list should be promulgated to industry and cover dates for the 2012 TACC Open Forum and meetings (including locations), the delivery of associated supporting documentation; and for delivery of the TAC Committee Report and Determination.*

2.3 Format of the Report

As in recent years, the TAC Committee, in addition to the Determination and suggested regional catch limits, has made a number of recommendations for the consideration of the Department. These recommendations are provided to clarify the position of the Committee on a number of issues, as they relate to the TACC. The Committee finds it very helpful where the Department comments on the assumptions and recommendations made in the various sections of the Committee Report. This has not occurred this year.

3. Management Considerations

3.1 Introduction

This section provides a brief historical background to the New South Wales abalone fishery and its management. Current issues and fisheries performance, recreational fishing, compliance and management arrangements are discussed. Recommendations are made concerning management actions that would assist with the recovery of the commercial fishery, in particular the adoption of an appropriate finer scale management regime. The impact of the severe reduction in resources that are provided by the NSW Department of Regional Infrastructure and Services (DTIRIS – the Department) continues to result in shortfalls in the level of scientific information which has traditionally informed the process of setting a Total Allowable Commercial Catch (TACC) for this fishery. Notwithstanding the laudable efforts by the NSW Abalone Council to address this issue through the collection and (limited) analysis of data using loggers, augmented with industry workshops, this gap has again left the TAC Committee in a most difficult position. Divers continue to see evidence of, and the TAC Committee acknowledges that, a significant recruitment has occurred. CPUE is increasing in many areas of the fishery, and there has been some recovery in abalone stocks. There is, however, restricted ability to understand the extent of this recovery, and, importantly, very limited information to use to look forward in a predictive sense.

3.2 Fishery background

The New South Wales commercial abalone fishery was established in the early 1960s, and in 1973 annual production peaked at approximately 1250 tonnes. Since that time the status of the abalone stock and annual production has steadily declined to the extent that the Total Allowable Commercial Catch (TACC) is less than 10% of peak production.

The fishery extends from Forster in the north to the border with Victoria in the south. Since 2002, the bulk of the commercial catch of abalone has been harvested from the area of the coast that is south of Jarvis Bay.

Following the observation of declining catch rates at the end of the 1970s, in 1978 a Parliamentary Select Committee recommended that entry into the fishery should be restricted. From over 100 applications, the number of permits initially issued was 59. In 1979, an economic survey considered that around 29 divers could derive a 'reasonable income' from the fishery at a time when annual production from the fishery was in the order

of 600 tonnes. By 1980, 55 divers still remained in the fishery. Under the 2-for-1 transfer arrangements and a buy-back scheme, the number of licences was reduced to 37 by 1992.

These 37 licence holders were then allocated 100 shares in the share management fishery and, notwithstanding court challenges, in February 2000 the final shares became the statutory fishing right under the share management fishery arrangement. Prior to the commencement of the share management plan, the 100 shares were the minimum shareholding to be eligible for an endorsement to take abalone (i.e. as a diver). This minimum was subsequently reduced to 70 on commencement of the plan to enable endorsed divers and crew to make an investment in the fishery.

3.3 Current issues and fisheries performance

3.3.1 Industry structure

There are currently 47 shareholders with shareholdings varying between 10 and 160. Of these, 38 are currently eligible for an endorsement, i.e. are entitled to deploy an active diver.

The Environmental Impact Statement (EIS) identifies diver numbers as a key risk to the long-term sustainability of the fishery and that improvements to the economic efficiency of the fishery should occur with any substantial reduction in actual diver numbers. There are now positive signs in that in the past five years a trend has developed which shows a contraction in the number of active divers that are operating in the fishery. On average in 2008/09, 25 divers reporting fishing per month, which is a decrease of approximately one-third in comparison with the period 2000-2006. While *active* diver numbers have fallen, the number of endorsements in the fishery is high and has increased slightly, representing considerable and undesirable latent effort. This is unlikely to be a problem while the TAC remains low, but when (and if) the rebuilding of stocks becomes substantial the opportunity to increase diver numbers remains. Reasons for the lack of structural adjustment are discussed in the economics section of the report.

During the 2009/10 fishing period, about half of the commercial catch has been taken by 8 divers, with the remaining number of authorised divers reporting very low catches. Increased catch rates resulted in the average number of days fished falling from 69 in 2004/05 (average 57 kg per day) to 21 in 2009/10 (average 152 kg per day) and 16.6 in 2011/12 (average 174 kg per day).

This change in the trend coincides with an increase in the amount of the TACC that is leased across the fishery (from 5-11% of the TAC in 1998-2001 to 24% in 2010/11) and indicates that some informal restructuring is occurring within industry.

3.3.2 Fine scale management.

Increasingly, and in common with other abalone jurisdictions, NSW is seeking to adopt fine scale, regional management of abalone fisheries with catch caps or regional TACCs and varying minimum sizes, introduced with the support from the industry and supported by the use of electronic loggers.

It is the belief of the Committee that the term 'finer' (rather than fine) scale management would be more a more appropriate term in the NSW context, and that the units for spatial management should be selected in such a way as to balance cost and the difference between the habitat and dynamics of abalone populations. Currently industry is proposing 21 different management areas (i.e. areas with separate TAC allocations). The distribution of catch between these areas will be based on data from the fishery and range of performance indicators (many of which are yet to be developed), informed by industry discussions at workshops.

The industry presentation to the Committee again confirmed the general effectiveness and capacity of data loggers to collect essential information on catch size, structure and location as part of a structured approach to spatial management. The degree to which industry has been able to introduce data logging, with the recent support of the Department, Dr Craig Munday's work and a FRDC TRF project, is a credit to those involved. The contribution by Duncan Worthington and the TAC is particularly noteworthy. The Committee continues to be supportive of such approaches and, given the cost recovery and research framework in NSW, agrees that it provides a very viable way forward subject to resolution of a number of issues.

The industry workshop held in March 2012, at which the TACC and TACCs by block were discussed, appeared to be very effective in achieving a consensus view on what was considered by participants to be a conservative TACC of 124.5 tonnes. It is clear that considerable effort is now going into this work.

Of concern to the Committee is that the arrangements for monitoring and assessment arrangements to inform this new approach have been primarily driven by industry, with minimal input from Departmental researchers. The same applies to the regional distribution of effort, where industry appears to lead discussions and decisions on the distribution of catch, based on voluntary approaches. In this regard, there is little to indicate in the reports provided to the Committee on the degree to which the Department, as the representative of whole-of-community interests in NSW fisheries, is engaged in, or endorses the new assessment and management process proposed by industry. It will be necessary for the Department to take an active role in ensuring that FSM is introduced in an effective and timely manner, with the relevant measures to ensure quality assurance and quality control. Further substantial and detailed discussion between industry, researchers and managers will be required. The Committee is pleased to see that the dysfunctional government/ industry relationship that has plagued the NSW abalone industry is now being addressed. Industry workshops, while slow to get off the ground, appear to have improved prospects for success, as evidenced by the positive result and general support for the outcomes of the Eden workshop mentioned in the previous paragraph.

There does not yet appear to be any formal arrangement in place on appropriate methodology and protocols as a framework for FSM. The Committee considers that this is an essential part of the process.

Ongoing success in this area will be very much conditional on adequate resources, a responsive and supportive administration, and cohesive and meaningful industry involvement. Expecting to achieve consensus on difficult issues within industry workshop situations may be overly optimistic and experience from other fisheries has shown that industry find it difficult to agree on decisions that will have direct negative economic impacts on revenue, particularly where cuts in TAC are required. Some form of formal voting may be necessary to ensure an outcome in terms of the advice to be provided to managers/ TAC Committee.

There appears to be a growing expectation among industry that the workshops will make decisions on the TAC, distribution of catch, and, eventually size limits. This is inconsistent with the Act and general good practice fisheries governance. Workshops will make decisions about the advice to be provided to the Department/ TACC and this advice will be an important element of the information used to inform decision-making.

While noting these issues, the Committee strongly endorses the industry view that the fishery must continue to move towards FSM as rapidly as possible, by formalising and expanding the collection of comprehensive data at fine scales using data loggers. More informed decisions as to scales of spatial management and other measures (including

TACCs and size limits) can then flow from analysis of that data. The lack of such analysis, which is attributed to a shortage of funding, continues to hamper an understanding of the status of the resource and thus TAC setting.

As soon as possible, the Committee strongly recommends that data logging and provision of data should be a condition of access to the fishery, i.e. industry must fit a working logger to be endorsed to operate. For its part, Government will need to invest in the systems and infrastructure to store and analyse the data for the use and benefit of both industry and government. Tasmania will be mandated the adoption of loggers across the fishery in January 2012.

During the 2011/12 season industry appears to have made considerable progress with data collection using GPS/data loggers. Issues to be addressed include:

- the ability to link previous fisheries independent surveys and stock assessment outputs to the new FSM approach;
- significant gaps in coverage; and
- a comprehensive analysis that provides sufficient confidence and promotes the setting of TACs and size limits in such a way as to balance stock rebuilding with deriving appropriate short and long term economic returns from the fishery.

These issues are discussed further in the biological section of this report.

*The Committee **recommends** that the framework for an appropriate finer spatial scale management approach, agreed jointly between government and industry (with TACC input where appropriate) should be pursued as a matter of priority. In particular, attention should be given to the roles of industry, researchers, managers and the TAC Committee.*

3.3.3 Harvest strategy

The TAC Committee continues to be of the view that the wording of some of the objectives, and most of the performance indicators in the current plan are significantly obsolete due to changes in monitoring and assessment and knowledge of the resource. As noted elsewhere in this report, new performance measures and reference points should be developed as a priority. Department staff acknowledged that new objectives, performance indicators and triggers will need to be developed and the Committee looks forward to the finalisation of new measures that are more meaningful, and reflect the changes in assessment and monitoring that will occur under fine scale management. The committee notes that the current management plan/fisheries management strategy is to be redeveloped. The Committee supports this as a priority activity to be undertaken in a short a timeframe as is practicable.

*The Committee **recommends** that the current performance indicators and triggers in the FMS/Management plan be reviewed, taking account the move to FSM approaches.*

The Abalone Council of NSW (ACNSW) previously presented a draft harvest strategy (HS) to the Committee. As stated previously, the Committee believes that this is a step in the right direction and the initiative is strongly supported. Unfortunately, it seems that little progress has been made on further development of the draft during the last 12 months. The Committee continues to have significant detailed comments to make on this document, but considers that at this stage reiterating comment on guiding principles would be the most productive way forward. These principles are that:

- The objectives of the HS are consistent with the Act, including resource sharing etc.
- As the HS will dictate how a community resource will be harvested, it should be driven strongly by the Department as a joint exercise between managers, researchers and industry – the current HS appears to have been developed in isolation by industry.

- Performance indicators should be measurable and appropriate, given the shift to FSM, new monitoring and assessment arrangements and catch planning workshops.
- The role of industry/ACNSW, industry workshops, the TAC Committee and Departmental managers and researchers must be clearly defined, within the requirements of the Act.
- Objective scientific testing of the performance of proposed HS decision rules/strategies against objectives of the Act under various conditions of recruitment/ catastrophic changes in mortality /catching efficiency should be undertaken, prior to its final adoption.
- Adequate quality control/assurance/ audit to be included.
- Consideration to be given to long-term human and financial resourcing requirements to implement and monitor the HS, based on current Government cost recovery principles.
- Use of 'weight of evidence' considerations to avoid overreliance on particular indicators, especially catch rates and individual views.

It is assumed that the TACC will be consulted on, and as appropriate, involved in, the development of the details of the final harvest strategy.

3.3.4 Catch rates

The decline in catch rates has been addressed, and for regions 3-6 have increased for the 6th successive year.

CPUE is considered to be an index of abundance in fisheries. Since CPUE is fishery dependent, and in the case of abalone, liable to 'hyperstability' (meaning that high catch rates can be achieved from aggregations, even under circumstances of severe depletion of the overall stock) means that, as an index of abundance, CPUE should be used with some caution. Given the recent 'knife-edge' recruitment nature of this fishery and the uncertainty of the most recent recruitment, recent increases should not be seen as an indication that the fishery is in a position of assured sustainability going forward. CPUE is a backward rather than a forward looking tool and can mask fishery failure as was the case in 2001, when CPUE was high, with a TAC of the order of 300 tonnes; this was followed by reduced catches and CPUE, despite severe cuts in the TAC. Consequently, the Committee is unable to agree, with the requisite level of certainty on which to base action, with some of the CPUE-based conclusions on the status of the resource reached by certain elements of industry.

As a number of the industry submissions noted, with the current catch settings and effort levels, there is little surprise that catch rates have improved (off an extremely low base) substantially. The extent of the areas capable of maintaining these catch rates, with little data of size distribution, including sub-legal abalone, remains uncertain, as does the overall extent of the recovery. The degree to which there have been recent successful settlement events resulting in strong year classes of juveniles is unclear, as is the ability of the fishery to sustain increased TACs.

3.3.5 Minimum sizes

The minimum legal length (MLL) for abalone in New South Wales was increased to 117 mm from the 1st of July 2008 following a recommendation to the Minister from the SARG. The TAC committee, as a precautionary measure has suggested increasing the 'default' size limit to 119 and 120 respectively for the last three years. These recommendations, while accepted by the Department and many in industry, have not been adopted due to strong opposition by the MAC and some sectors of industry.

Minimum sizes are usually designed to ensure that a reasonable section of the abalone population (50%) will have at least two spawning opportunities before they can be harvested

(a length setting known as $L_{50} + 2$). While the matter of setting appropriate size limits is under review a number of Australian abalone fisheries, most utilise a combination of minimum sizes to comply broadly with this setting, often set on a regional basis and reinforced with voluntary arrangements and supported by industry training. These arrangements recognise that some abalone reach maturity at well below the average (for the fishery) minimum size, i.e. are considered slow growing (stunted), and others do not reach maturity at maximum size, i.e. are fast growing. Having a range of minimum sizes and combined area-based TACCs that reflect the nature of abalone populations, has the potential to provide improved yields and afford greater protection to reefs from serial depletions and the harvesting of immature abalone. It should be noted however, that fisheries where this approach has been successful, generally using workshop-based approaches, enjoy a greater abundance of abalone with a far greater number of year classes and a higher proportion of mature, breeding adults in the fishery than is currently the situation in NSW.

The Fishery Management Strategy (FMS) for the NSW abalone fishery proposes that any upward increase in the minimum size for abalone should only be done on an incremental basis and at a time when catch rates are high. The TAC Committee partially shares this view and continues to recommend that measures increasing the average size of commercially harvested abalone in NSW should be a priority for management and industry.

The commercial fishery in NSW has been historically based predominately on abalone that are just above the minimum size. In this situation, and unless the TAC/caps are set appropriately, abalone can be repeatedly removed from reefs, measured and not retained because they are just undersize. Use of this practice, which is commonly called 'chipping' and leads to some mortality of undersize abalone due to shell damage, is now much less prevalent under recent catch settings.

The decision by DPI to again not raise the size limit as recommended in both of last year's TAC Committee Reports to afford greater protection and increase the productivity of the abalone stock was very disappointing. An increase in size limit is an appropriate action in the current circumstances that will provide adequate protection to the fishery under the current circumstance of limited information and will also, in the Committee's view, move the fishery to a more productive and sustainable level.

The Committee again acknowledges that the aim of the fishery should be to implement more variable size limits to better manage the different growth rates in the fishery. By incrementally raising size limits, carefully monitoring catches, size distributions and shell characteristics, it should be possible to identify faster and slower growing areas and develop FSM-based (variable) size limits.

Some members of Industry, and in particular the MAC, have in the past made strong representations that this action was not appropriate, based on:

- a potential shift of effort towards areas with larger abalone present thereby exacerbating the current problems with the spatial distribution of effort;
- the decision being incompatible with previous undertakings to move towards FSM with variable size limits;
- the potential to restrict the TACC and restrict the productivity of the fishery; and
- the impact on the Japanese and potential Chinese markets, which apparently require quantities of smaller abalone and high meat to total weight ratios.

Current and recent past members of AbMAC continue to advocate that the Committee's approach to size limits is fundamentally flawed on the above basis, and claim almost

unanimous support for this position. The Committee notes that a number of other members of industry showed strong support for the size increase, both verbally and in written submissions.

The Committee has been repeatedly advised that the disruption to normal fishing expectations from previous size increases has been short-term and minimal, despite AbMAC assertions that such increases would lead to ruination. Conversely, the benefits have been considerable, particularly as they resulted directly in less abalone being taken to fill the TACC. The TAC Committee was informed again this year that the Japanese market is under increased pressure from aquaculture product, reducing demand for small abalone. This development appears to be somewhat at odds with the argument that widespread size limit increases effectively lock NSW out of a substantial marketing opportunity.

We repeat our view that, ideally, size limit increases should be matched spatially to growth characteristics. However, the nature of NSW abalone industry, the early stage of cooperative management approaches and cost/complexity of administering various size limits means that such an approach will be difficult to fully implement. Given the status of the resource and other factors described in further detail in Section 5 of this report, the Committee has conditioned its determination on the introduction of increased size limits.

3.4 Recreational Fishing

There is now general acceptance that the decision in July 2005 to reduce the recreational bag limit from ten abalone per person per day to two abalone per person per day has had a profound effect on the recreational harvesting of abalone in NSW. Prior to the introduction of the reduced bag limit four years ago, the Committee set the provisional allowance for the recreational catch of abalone at 50 tonnes. Following the introduction of the reduced limit this allowance was decreased to 20 tonnes, and then for last year further reduced to the current estimated figure of 10 tonnes.

In the past the Committee has been confident that the 10 tonnes it allows for as recreational catch in the TACC setting process was a reasonable estimate of what may now be taken by this sector of the fishery. In August 2010 changes in management opened up part of Region 1 South between Botany Bay and Wreck Bay to recreational fishing on weekends and adjacent public holidays. The area between Port Stephens and Botany Bay was opened to recreational fishing under the same arrangements in March 2012. These changes now permit recreational fishing for abalone in areas adjacent to large population centres and are likely to have increased the level of recreational harvest.

The Committee is aware that a project to obtain state-wide estimates of recreational fishing catch is planned to commence in this calendar year. Consequently it is intended that the figure of 10 tonnes will remain in place until more precise information becomes available on the extent of the recreational catch.

The Department has stated that a proposal to increase the recreational abalone bag limit from 2 to 5 will be put out for public consultation in the upcoming review of recreational bag and size limits. The Committee considers that this change may result in a significant increase in recreational harvest and risks, and in particular, cause local depletion in areas adjacent to large population centres. This proposed change highlights the need to improve the accuracy of estimates of the recreational harvest and the ability to model the likely impact of an increased bag limit. The Committee recommends that the Department delays any decision to increase the recreational bag limit until the project to determine the current recreational harvest is complete. The Committee also recommends a default state-wide recreational fishing size limit of 120mm as a precautionary measure to limit the impact of recent changes to recreational fishing access arrangements.

*The Committee **recommends** that further changes to the abalone recreational fishing bag limit be delayed until the completion of the research program to determine the extent of the recreational abalone catch in NSW.*

3.5 Compliance Issues

The level of illegal, unreported and recreational catch, and trends during the history of the fishery, remain very uncertain.

Since the decision to reduce the recreational bag limit from ten abalone per day to two, there has been both extra focus on compliance and increased penalties for illegal recreational fishing. Reports from industry, management and compliance all agree that this has substantially reduced the illegal recreational catch.

In previous years, the illegal and unreported catch was assumed to be 40% of the legal and reported catch in 1987 – that is 102t from Regions 2-6. The absolute quantity of illegal catch is very unclear. General impressions from compliance officers and industry are that the illegal catch probably was about 100t per year in the past, that it was likely to have been below 100t but above 50t in 2008, and to be in the vicinity of 20-40t per year since then. The introduction of indictable offences for abalone theft, the targeting of poaching syndicates by compliance officers, and the development of improved methods to permit indigenous catch are all thought to have improved the situation. In the present circumstances of stock condition and stock assessment capability it was considered appropriate to have any reduction in illegal catch contribute to stock rebuilding.

Objective 7 of the Management Plan is to minimise the number of offences committed by fishers in relation to abalone. Compliance rates as reported by DPI for the commercial sector for 2009/10 is recorded at 71% and 79% for the recreational and commercial abalone sectors respectively.

The plan provides for a review of the situation when the aggregate compliance rate for the fishery falls below 70% but the combined compliance rate of 75% is still comfortably above this figure.

The Compliance Report for the 2011/12 season again contains a refinement of the recording of illegal activities by the recreational (or non-commercial) sector. It is encouraging to see that this issue has been identified and will part of a move to improved reporting of illegal/non licensed commercial fishing. In a fishery such as this which has clearly been under a high degree of stress for a number of years, and which has seen substantial cuts in both the commercial and recreational catch from the fishery, illegal catches must be kept to a minimum if the stock is to recover. The recent increased abundance of abalone will provide an additional incentive for illegal fishing

The Committee appreciates the difficulty in accurately defining the illegal catch of abalone from NSW waters. For stock assessment purposes, the Department continues to rely on the original figure for the illegal and recreational catches. As discussed previously, it seems clear that the reduction in the recreational bag limit to two abalone per day has significantly impacted on the “small scale” poacher who relied on taking multiple recreational bag limits of 10 (the old daily bag limit) to make his illegal activities viable.

Compliance reported, however that ‘illegal abalone activity remains high in NSW’. This activity is fuelled by strong black market demand and is undertaken by highly organised illegal syndicates. Despite considerable success with apprehensions and prosecutions, these activities continue to cause concern.

The Committee continues to be impressed by the efficiency and effectiveness of compliance staff. The State-wide Operations and Investigations Group (SOIG) does the bulk of the compliance activity that is targeted at serial abalone poachers and is supported (albeit with reduced manpower resources) by coastal fisheries officers and members of the police force.

Amendments to the Fisheries Act providing for increased penalties for abalone poaching (indictable offences) to include indictable offences for abalone poaching has placed NSW will be on a similar footing to Tasmania, Victoria and South Australia in having a key tool to address the scourge of abalone poaching.

Finally, the Committee noted comments that budgetary constraints appear to be impacting on compliance staffing arrangements within the abalone sector. It seems questionable to reduce capability in this area at a time when it is known that illegal fishing remains of significant concern and has the capacity to undermine stock rebuilding.

3.6 Indigenous Fishing

Amendments were made to the Fisheries Management Act in 2010 to formally recognise the spiritual, social and customary significance to Aboriginal persons of fisheries resources and to protect and promote Aboriginal cultural fishing.

These new arrangements include the creation of an Aboriginal Ministerial Advisory Council (AFAC) and management changes aimed at improving access for the purpose of cultural fishing. The amendments include special provisions to allow aboriginal people an extension to certain fishing rules including bag and possession limits to accommodate small communal and cultural gatherings. These provisions will be implemented once regulations are developed in consultation with the AFAC.

As a short-term measure the Department introduced an interim compliance policy that allows an Aboriginal person to take double the prescribed recreational bag limit with an additional allowance for abalone increased to 10 per person. The interim policy also allows the shucking of abalone within 100 metres of the high water mark if the abalone are to be consumed in this area.

If Aboriginal people have a need to access the fisheries resource for larger cultural events applications for Aboriginal cultural fishing permits can be made. A written request to the Department outlining species and numbers proposed to be taken is required before aboriginal fishing permits can be issued. Permits for 3,890 abalone were issued in 2009/10, 1,700 in 2010/11 and 1,665 in 2011/12. However, the actual amount of abalone taken is unclear as there is limited compliance with reporting requirements. It is likely that the amounts requested are not fully caught and compliance staff estimate that the number is considerably less.

3.7 Fishery Management Costs

Shareholders in the NSW abalone fishery are required to meet all management costs attributable to the commercial fishery in accordance with pricing principles recommended by the independent Pricing and Regulatory Tribunal (IPART).

Industry has experienced declining beach prices for abalone (in 2002 - \$46 per kg, in 2010/11 - \$30.00 per kg) mainly caused by the steady increase in the value of the Australian dollar and progressive drops in TACC from 300 tonnes in 2002 (worth \$12.7 million) to 94 tonnes in 2009/10 (worth around \$1.9 million). These changes have substantially impacted on the capacity of the industry to pay the fees and charges associated with managing the fishery, including those associated with management, compliance and research services in a cost recovery environment.

A number of actions have been taken within the context of the existing cost recovery framework to reduce the costs to industry, primarily through substantial reductions to the management charge. After a rise to \$42.00 per share in 2009/10, fees declined to \$30 in 2010/11 and \$26.00 for 2011/12.

In 2008, faced with a situation whereby management costs were remaining relatively high in a time of declining returns to shareholders from the fishery, DPI acquiesced to an industry choice of ceasing the then research programme and commencing a structured fishing-based programme. While this did reduce management costs the TAC Committee were advised that the Department went to some lengths, both in the written information provided and in formal and informal discussions at meetings with industry, to make clear what the likely consequences might be flowing from an inappropriate reduction in funding for the management the NSW abalone fishery.

The Committee notes that while the decision to drastically reduce funding for research and monitoring had over-whelming support from share-holders, this has left the fishery in a difficult position with respect to management decision making. The consequences of this reduction and the flow-on effects to the task of setting a TACC have been discussed extensively in previous reports of the committee. As the fishery recovers the TAC Committee continues to be of the view that expenditure on research needs to be maintained at a sufficient level to ensure that there is an adequate level of information on the status of the resource. The Committee believes that ensuring the appropriate collection and analysis of data in support of management arrangements is a core responsibility of Government and that appropriate mechanisms for the proper collection and analysis of that data must be put in place as a matter of urgency.

Objective 4 for the current management plan requires the promotion of cost effective management, as determined by independent review. The Committee notes that no such review has occurred since the Plan was established. Given the Committee's concern that management fees are now at such a level as to prejudice the provision of information to allow for adequate management of the fishery, such a review would be timely.

By means of comparison, management costs (including monitoring and assessment, compliance etc) at around 6% of GVP is a common benchmark in OECD countries. Currently the abalone management fee represents 3.26% of estimated GVP. Given the need to understand what caused the previous declines in the fishery and the uncertain level of current and future recovery, the current level of expenditure on management costs is likely to be inadequate.

*The Committee is concerned that the necessary resources may not be available to develop and support the initial implementation of a viable alternative industry based assessment and management package. It is therefore **recommended** that an independent review of the cost-effectiveness of current management services should be undertaken.*

The Committee continues to strongly support the decision of the Department to apply additional resources towards the establishment and implementation of alternative, finer scale spatial assessment and management arrangements.

3.8 Community Contribution

The Act sets out the requirement for shareholders in a share management fishery to pay a periodic Community Contribution. It is a monetary contribution to the NSW public for the right to access the fishery and is, in effect, a means of collecting 'rent' or super-normal profit, net of all costs (above that that expected from a comparable alternative investment). The community contribution charge in the NSW commercial abalone fishery is calculated

annually and considers CPI, abalone beach price and TACC. It is payable by each shareholder following each fishing period. The formula for calculating the community contribution charge was developed by a NSW Government Working Group. The community contribution charge has been set at \$0 since 2005/06, following a decline in TACC and average estimated beach price. See Section 4.14 below for further discussion of the Community Contribution.

3.9 Co-management approaches

The lack of a functional MAC or some similar consultative/advisory process has clearly hampered the effective management of the fishery.

An ongoing barrier to cooperation in the past has been the unfortunate expectation by industry that the Minister's Office will engage and intervene in what would normally be considered to be minor operational issues, and that this avenue of redress remains a viable alternative approach to more proper channels of communication between industry, researchers and managers.

The industry workshop held in March 2012 appears to have been again relatively well supported by industry, with detailed consideration of data and catch planning occurring. This augers well for future FSM approaches, provided the framework for making recommendations and subsequent inclusion in the decision making process (TACs, LMLs and catch distribution) is agreed, in place, and used. Reliance on voluntary approaches has been shown to be manifestly inadequate in most abalone fisheries in other jurisdictions and a balance is required between regulatory and voluntary/co-management approaches.

The Eden workshop held in March avoided explicitly discussing the issue of size limits again, which, while understandable given the preliminary nature of the process and the contentious nature of the issue, was entirely unacceptable to some parts of industry. To be fully effective, future workshops will need to give some consideration to size limits. The way in which catch targets were arrived at appeared somewhat arbitrary (acknowledging the generally responsible approach taken by industry). There was little explicit consideration of trade off between the short term financial benefit of taking a catch now and the contribution to the fishery (and biological and economic benefits) of investing in a faster rate of rebuild by leaving the fish in the water. A good harvest strategy with explicit targets and indicators should address this issue.

*The Committee **recommends** that for the future an effective consultative forum be established to enable discussion and to exchange information on key aspects of the abalone fishery such as the previous year's Determination and TAC Committee report, stock assessment, management and economics, prior to the TAC Committee deliberations. LobMAC provides a useful model for such an approach.*

3.10 Role of the TAC Committee

As discussed above, there is considerable controversy surrounding size limits in the abalone fishery. It is very apparent that some members of industry support the TAC Committee including advice on size limits and spatial catch recommendations in their determinations while others are strongly of the view that the TAC Committee, under its legislative responsibilities, should have no part in influencing the choice of MLLs or the spatial distribution of catch.

The role of the TAC Committee in setting a TAC under the Act is clearly defined under Section 28(2) of the Fisheries Management Act, 1994, which states that The 'TAC

Committee is required to determine a specified total allowable catch for a share management fishery if the management plan for the fishery so requires’.

Further instructions as to the general considerations for the TAC Committee to take into account in determining a TAC is provided in Section 30 of the Act:

- 1) In determining total allowable catches under this Division, the TAC Committee is to give effect to the objects of this Act and is to have regard to all relevant scientific, industry, community, social and economic factors.
- 2) The TAC Committee is also to have regard to:
 - the need to ensure that the exploitation of fisheries resources is conducted in a manner that will conserve fish stocks in the long term, and
 - the impact of fishing activities on all species of fish and the aquatic environment, and
 - the precautionary principle, namely, that if there are threats of serious or irreversible damage to fish stocks, lack of full scientific certainty should not be used as a reason for postponing measures to prevent that damage.

In light of the above, the TAC Committee considers that it would be derelict in its duty not to condition TAC determinations with advice on size limits and spatial distribution of catch and hence the advice provided as an integral part of the TAC determination. It has again taken such an approach for the 2012/13 Determination

To address this controversy, the TAC Committee that consideration be given to the provisions of the Act under Section 28(4) under which:

‘The TAC Committee may also determine, in accordance with this Division, any other matter relating to fishing effort in a share management fishery if (and only if) required to do so by the Minister. This Division applies to the determination of any such matter in the same way as it applies to the determination of a total allowable catch’.

Under this provision it appears that the Minister may request the TAC Committee to make a determination on size limits and spatial distribution of catch in the same way as the TACC, which would, in our opinion, remove much of the controversy surrounding the size limit issue. The TAC Committee suggests that some thought be given to utilising this provision in the future, possibly commencing for the determination due in early 2013 rather than this year, and the benefits such a requirement may provide.

*The TAC Committee **recommends** that the TACC be required by the Minister to make a determination on size limits and spatial distribution of catch. Such a Determination would be an integral part of the TAC setting process, and would be done in full consultation with industry and the Department.*

3.11 Conclusion

Industry representatives are confident that the decline in commercial catches has been arrested and that stock rebuilding is occurring to the point where some believe substantial increases in catch are warranted. The move to an increase in minimum size has some support from industry, but a universal and strong rejection by current and (mostly) former MAC members. Whilst commercial catch rates have improved over the last year measuring the status of resource using the available data remains problematic.

The decision of NSW abalone shareholders to overwhelmingly accept the invitation by DPI to substantially reduce their payment of charges for research without putting in place

alternative and complementary activities continues to have a profound effect on the TACC setting process for the 2011/12 quota period. At the time of writing there remains limited data (compared to what has been provided before) on which to base a coherent decision on the quantum of the TACC.

The increases in minimum size which were in accordance with a recommendation in the report prepared by the SARG has, despite initial criticism from some industry members been generally well received and is, in the strong opinion of the TAC Committee, continuing to deliver benefits for the NSW abalone resource and industry, as demonstrated by a considerable number of industry submissions.

Industry support for the efforts made by the Department to improve the effectiveness of its compliance performance continues to be most encouraging. Hopefully the current government fiscal position does not result in a contraction in the resources that DPI provides for compliance and a subsequent decline in compliance effectiveness at this important time for the fishery. The shift to indictable offences is a welcome and significant step forwards.

Improvements in the relationship between industry and the management arms of the Department are now becoming apparent and will be essential to an effective management process for the fishery. The substantial disconnect between the research and management sections of the Department appears to be, thankfully, being addressed with the change in senior management.

The prospect of the successful development and implementation of more effective, affordable management arrangements are increasingly apparent. This, coupled with the continued reversal of stock declines and a longer-term view of what are sustainable catches, will be fundamental for the future. If these are achieved, then the long-term recovery and future of the fishery will be assured.

4. Economic Information

4.1 Introduction

In this section of the report, the economic status of the NSW abalone industry is described, consistent with the requirement that the Committee have regard to economic and social issues in making its determination. A summary of quota and share market prices is presented as an indicator of both short and long run industry profitability where these have been made available. Analysis of other data affecting the economic performance of the fishery, such as gross revenue, a crude estimate of net revenue, export prices and catch per unit effort, is also presented.

A full assessment of economic performance is not possible due to the absence of timely and relevant data on fishing costs and other economic indicators, such as the full range of share and quota prices for the fishery in a given year.

4.2 Volume and value of production

The volume of reported catch of abalone in 2010/11 was 93.8 tonnes, an increase of 26 per cent from 2009/10 (Figure 1). This catch accounted for around 99 per cent of the TACC. Since 2005/06, industry has been able to catch virtually the full TACC; and more recently with reportedly less effort. With reported catch in the current year to end April at 80.9 tonnes, it is likely that actual catch will approach the TACC of 110 tonnes set for the current year.

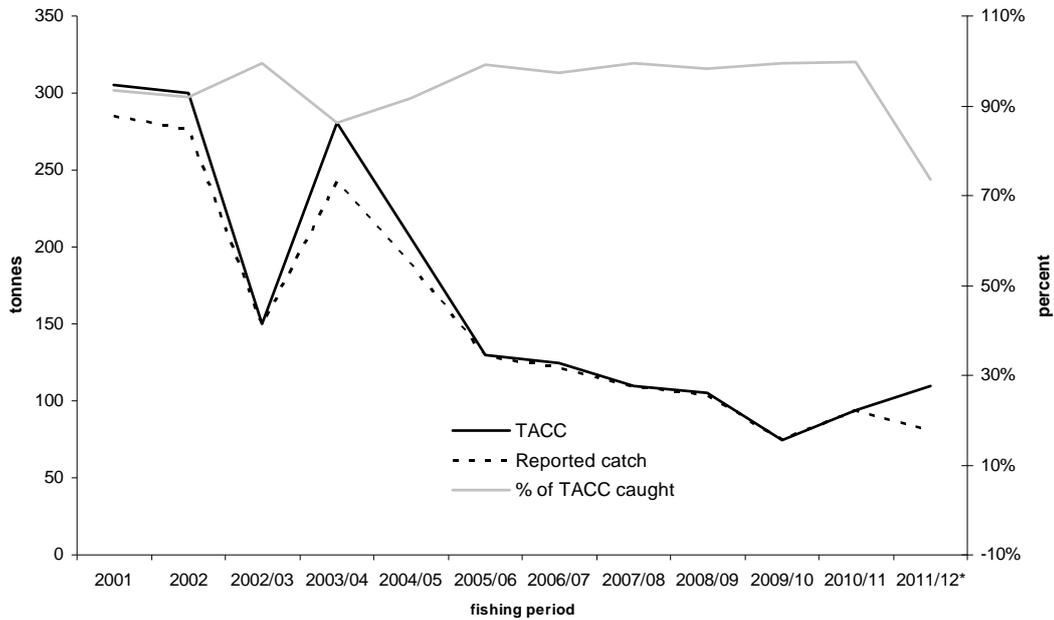


Figure 1. TACC (t), total reported commercial catch (t) and proportion of TACC caught (%) for each fishing period from 2001 to April 2012.

The real value of reported catch of abalone in 2010/11 was \$2.8 million, an increase of 42 per cent when compared to the previous year when the real value of reported catch was around \$2.0 million (Figure 2). Production and reported prices for the first ten months of 2011/12 suggests that the value of reported catch for the current year will be higher again, at around \$3.3 million. These values are very low, however, when compared to levels in 2000, when the gross value of the fishery was \$24.9 million in real terms due to both higher catches and prices.

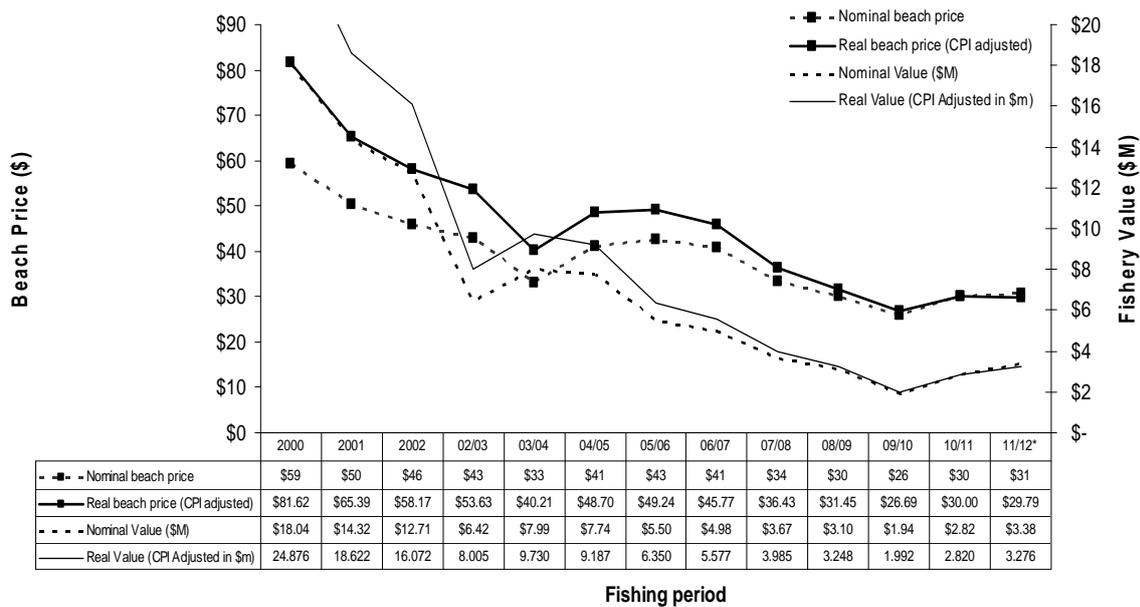


Figure 2. Estimated nominal and real value of the fishery (\$ m) and average nominal and real beach price (\$) for each fishing period from 2000 to 2011/12.

NSW abalone production is a very small percentage of Australia's overall production, at around 1 per cent in 2009/10 (ABARES, 2011). The bulk of Australian production of abalone comes from Tasmania, Victoria and South Australia.

4.3 Prices

Prices for abalone are estimated from data abalone processors provide to the Department. In 2010/11, the average real price of abalone was around \$30/kg, which was a slight increase when compared to 2009/10. Prices in 2011/12 are expected to remain steady, at around \$30/kg in real terms (Figure 2). Since 2000, prices have trended downwards from a level of around \$82/kg in real terms. This steady decline in prices can be attributed to the rapid expansion of cultured abalone production and the continued strength of the Australian dollar against the Japanese Yen and US dollar. In real terms, abalone beach prices have not kept pace with inflation.

ABARES (2011) have forecast that the Australian dollar will remain relatively strong over the short term. However, over the medium term an expected depreciation of the Australian dollar should result in higher prices for abalone on international markets. The aquaculture production of abalone is likely to expand, which will place ongoing pressure on price, particularly in the smaller sizes in less-discriminating markets.

4.4 Catch per unit effort and average size

Catch per unit effort (CPUE) data gives a general indication of overall trends in availability of abalone to the fishery. CPUE in 2010/11 increased by 20 per cent from the previous fishing period to around 33.7kg/hour. The CPUE for 2011/12 to end April has continued to increase to 39.5kg/hr. These increases in CPUE are a positive sign and are likely to be as a result of recent recruitment, lower TACCs and a higher size limit.

Higher size limits, and significantly reduced numbers of fish being taken when compared to earlier in the decade, continue to put the fishery in a much better position to improve productivity and consolidate recruitment events going forward. Subject to the extent of current and future periods of recruitment, this is a positive sign of likely improved returns from fishing in the future.

The average size of abalone in the fishery catch has risen continuously since 2005/06 from 280g to 318g in 2011/12 to end April.

There was no evidence presented to the Committee that the increase in the lower size limit from 115mm to 117mm and from 117mm to 120mm south of Womboyn has excluded significant areas of the fishery. Further, the increase in average weight of abalone has been in excess of that anticipated due to the increase in the size limit. As such, the concerns about the negative impact on economic returns as a result of a higher MLL have not been borne out. It is the opinion of the Committee that a further increase in the MLL to 120mm in the northern part of Region 6 and of 123mm in the southern part of Region 6 will further improve economic returns.

4.5 Abalone markets

Abalone product is sold through registered and registered restricted fish receivers to processors along the NSW coast. Increasingly there has been a tendency for shareholder/divers to become registered and registered restricted fish receivers and sell product directly to processors.

The NSW abalone industry is predominantly export oriented. As a result, prices received for NSW abalone are subject to economic conditions in the main export markets, competition from exports from other abalone exporters, and other factors, the two most significant being aquaculture production and exchange rate fluctuations.

The main export markets for abalone are China, Hong Kong and Japan. Total exports of abalone from Australia declined from 4,910 tonnes in 2003/04 to 3,320 tonnes in 2008/09. Exports increased in 2009/10 to reach 3,639 tonnes. Prices received for abalone on export markets fell between 2000/01 and 2009/10 as a result of an appreciation of the Australian dollar against the US dollar and Japanese yen (ABARES 2011). An expected depreciation of the Australian dollar over the medium term should result in higher prices for abalone on international markets (ABARES, 2011).

Wild caught abalone has been subject to increased competition from aquaculture product. Nearly 10 per cent of total abalone production in 2009/10 in Australia was sourced from aquaculture farms (ABARES, 2011). The Australian abalone aquaculture sector has grown by 54 per cent over the past five years to 721 tonnes in 2010/11. The Department reports that by 2014/15 approximately one-third of total Australian abalone production could be farmed product. As costs associated with producing farmed product fall both in Australia and, more significantly in the key producers (China and Korea), prices may fall, undercutting those for wild caught product in the future, particularly for smaller sizes of abalone.

Important long-term structural changes may be occurring as a result of the growth of the aquaculture industry and, perhaps, changes in tastes and preferences for abalone in China and Japan. Industry report that the niche market that NSW abalone previously held in Japan is shrinking due to aquaculture competition. One processor considers that there is potential to competitively market smaller abalone in China using the fact that it is wild caught rather than cultured as a marketing edge. The argument about the importance of availability of small abalone to take advantage of these markets is not consistent with the experience in other states. Further, to target such markets at the risk of damaging the long-term sustainability of the resource would be highly inappropriate. However, and as discussed elsewhere in this report, identifying and harvesting slower growing discrete populations of abalone in a way that does not prejudice the rebuilding and productivity of the overall stock is encouraged by the Committee.

As aquaculture operations continue to expand in Tasmania, Victoria and South Australia, new overseas markets marketing initiatives for wild caught abalone will need to be explored. The Committee notes the McKinna Report on the development of a marketing strategy for Australian abalone may offer some suggestions in this regard.

4.6 Management charges

Management charges in the abalone fishery have reduced significantly from a high of \$329 per share in real terms in 2002 to \$25 per share for the 2011/12 fishing period (Figure 3). This is lower than in 2010/11 when management fees were at around \$30 per share. Based on production and average beach prices to end April 2012, management fees in 2011/12 are likely to represent 3.3 per cent of the gross value of production of the fishery. This is much lower than the lobster fishery, where management fees represented around 10 per cent of the gross value of production of the fishery in 2010/11.

The reduction in management fees in the abalone fishery has been made possible through: cutbacks in management activities previously undertaken by NSW DPI; agreement by NSW DPI to subsidise management activities previously recovered from fishers; and, improvements in the efficiency of service delivery by NSW DPI. The Committee has been

advised by NSW DPI that the size of the subsidy currently being received by industry to fund necessary ongoing management activities is in excess of \$300,000².

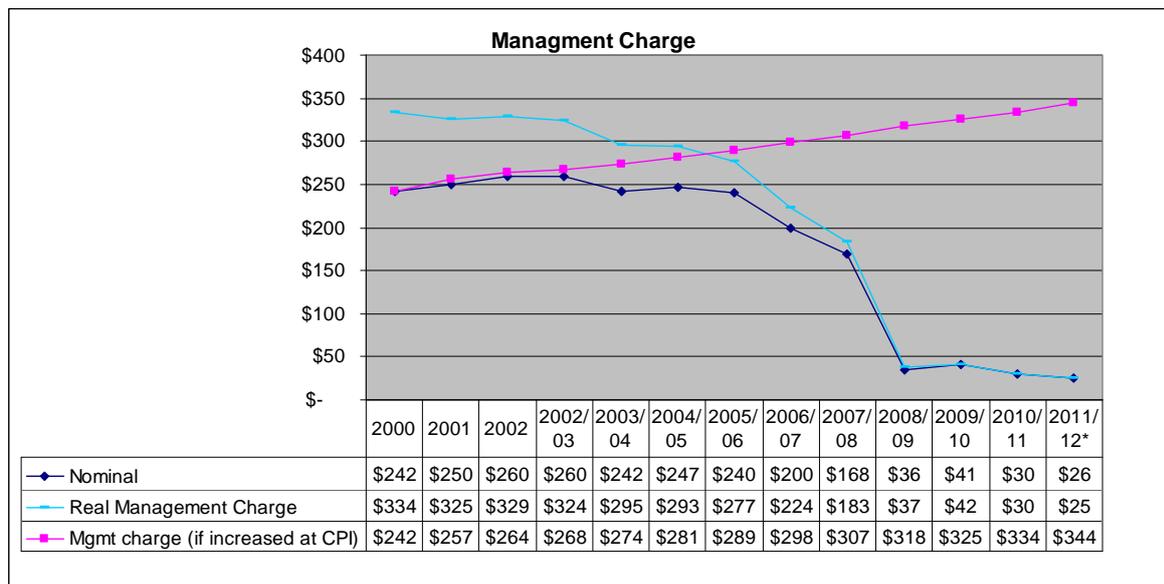


Figure 3: Nominal and real management charge (\$) per share for the 2000 to 2011/12 fishing periods

The current management fee of \$25 per share is considered to be inadequate to supply appropriate management services, in particular assessment and monitoring (see also Section 3 above). However, the committee notes that some of the management charge that is recovered from fishers is being used to develop fine scale management. Without adequate assessment and monitoring the economic return to the fishery may be negatively impacted.

The Committee notes that NSW DPI has a process in place for the repayment of debt for management fees that are currently being subsidised by Government. At the present time, the average level of debt in the abalone fishery is \$18,000, with around 64 per cent of shareholders owing more than \$10,000 and around 4 per cent of shareholders owing more than \$50,000. This debt is to be re-paid at a maximum rate of 10% of GVP/no. of shares; which, on average, is \$7.69 per share annually for the next 100 years. Assuming a discount rate of 5 per cent per annum, the last payment in 2111 will be worth 0.04 cents.

4.7 Fisher net income

Despite gross returns from abalone fishing remaining reasonably constant, it is likely that net returns to shareholders will have improved considerably over 2011/12 (to date) due to a dramatic decline in the cost of fishing. Over 2011/12 the cost of fishing fell significantly as a result of increases in catch rates over the same period. This is evidenced through a reduction in the price paid to divers by quota holders; from \$15.0/kg in 2010/11 to around \$10.0/kg in 2011/12 (to date; based on anecdotal evidence). A simple calculation of net returns indicates that the net return from abalone fishing for a shareholder holding 100 shares with a nominated diver is likely to have increased from around \$40,510 in 2010/11 to

² The Committee also notes that some fee relief also occurs in the inland (restricted) fishery and there are non-recovered costs in the Estuary General fishery.

around \$63,417 in 2011/12 (Box 1). Prior to this, between 2009/10 and 2010/11, net returns doubled.

BOX 1: A crude estimate of net returns from abalone fishing for a shareholder with a nominated diver

2010/11

The Committee understands that a reasonable approximation to the cost of catching abalone in 2010/11 was around \$14/kg, or \$381.01 per share. Adding management charges of \$30.33 per share gives total costs per share of \$411.34. Deducting costs from gross returns in 2010/11 of \$816.44 per share, gives a net return of \$405.10 per share. A fisher with 100 shares would then have a total net return of \$40,510.

2011/12

The Committee understands that a reasonable approximation to the cost of catching abalone in 2011/12 is around \$10/kg, or \$318.47 per share. Adding management charges of \$25.94 per share gives total costs per share of \$344.41. Deducting costs from expected gross returns in 2011/12 of \$978.58 per share, gives a net return of \$634.17 per share. A fisher with 100 shares would then have a total net return of \$63,417.

Note: Values are nominal. The analysis does not account for administration costs or costs of holding debt associated with purchase of shares.

Improvements in net returns indicate that the abalone fishery is in a much better position economically, but this is off a very low base. Further, and as discussed above (Section 4.6) industry has been receiving a considerable subsidy for management fees. Eventual repayment of this debt will erode improvements in net returns.

Another issue is that the current rate of recovery of management fees and charges is so low as to be insufficient to allow the industry to invest in appropriate management services (including research and compliance) to allow it to improve its economic situation into the future.

4.8 Shares

There are currently 47 shareholders in the fishery (increased from 44 in 2010/11). Of these shareholders, 38 had more than 70 shares and so qualify for endorsement. The remaining 9 do not qualify for an endorsement and presumably lease-out quota.

The average number of shares per shareholder has fallen from 97 in 2000 to 78.5 in 2010/11 and 73 in 2011/12. This is the opposite of what has occurred in the lobster fishery, where the average number of shares per shareholder has increased. Shareholders owning 70 or more shares increased from 37 to 39 between 2000 and 2001, to 41 in 2003, and to 42 in 2004. The number decreased to 39 in 2006/07 and then to 38 in 2007/08. it has remained stable. The number of shareholders with less than 70 shares was 1 in 2000, 3 in 2001 and 10 in 2002. The number was at 7 between 2006/07 and 2009/10, and increased to 9 in 2010/11. The distribution of shareholdings at each different level in 2011/12 is illustrated in Figure 4.

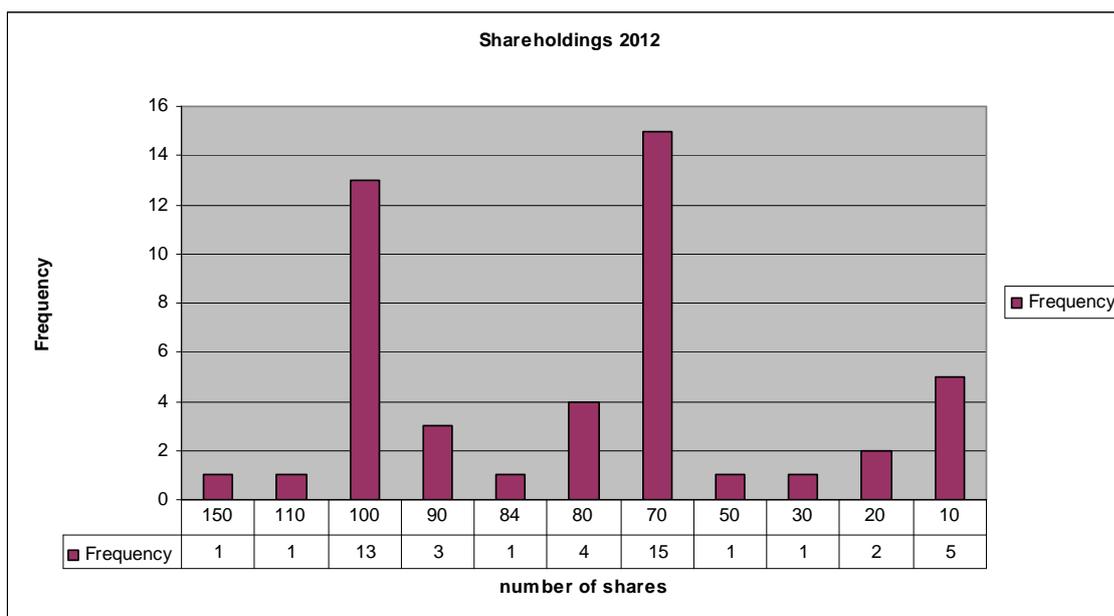


Figure 4: Number of shareholders at each level of shareholding in the 2011/12 fishing period.

No shares were traded in 2006/07, 2008/09, or 2009/10. In 2007/08, 80 shares were traded at an average price of \$4,124 (CPI adjusted); a trade that the shareholder made public as a ‘book’ value transaction between two fisheries businesses. Industry has reported that restructuring through the sale of shares has been constrained as a result of encumbered licenses. However, as mentioned above, only four per cent of shareholders owe more than \$50,000. The Committee considers that it is only these shareholders, representing nine per cent of shares, which could be considered to be encumbered to a point where restructuring would be constrained³.

There has been a return to share trading in the fishery in 2010/11 and 2011/12. In 2010/11 a total 80 shares were transferred in two transactions. In 2011/12 there have been four share transfers in the fishery totalling 160 shares⁴; a further two transactions are pending. Unfortunately, the price at which these share transactions took place has not been made available.

The return to share trading in the fishery is evidence of the improvement in economic returns from abalone fishing and likely improvement in optimism in the future fishery. However, as price information on these share transfers is not available, it is difficult for the TAC Committee to make a full assessment of the degree to which optimism has returned in the fishery. The Committee urges industry to make such information available wherever possible.

The return to share trading in the fishery mirrors, to some extent, the previous situation in the NSW rock lobster fishery, whereby, following a series of conservative TAC determinations and a significant size limit change, stocks rebuilt, TACs and profitability increased and the market for shares became very active. However, a lot more restructuring, in the form of share trading, and associated reductions in the number of shareholders, needs to take place in the abalone fishery for it to improve its economic viability.

³ This is in addition to encumbrances through mortgages.

⁴ One of these share transfers was a book transfer. The other three were genuine transfers with shares going to existing divers.

In accordance with the Fisheries Management (Abalone Share Management Plan) Regulation 2000, shares can be traded in packages of 10. The ability to trade shares allows existing shareholders to structure their operations based on performance during the year and, to some extent, the availability of abalone. The reason for the minimum size of package is unclear; however it may be impeding potential improvements in efficiency that may have otherwise arisen as a result of the transfer of smaller numbers of shares. The Committee notes the Department would like to remove this impediment, but industry is still undecided.

Another trading rule is the cap of 210 on the maximum shareholdings in the abalone fishery. This cap could be considered unnecessarily restrictive as it falls well short of a monopoly situation. The Committee notes the Department's intention to amend the maximum shareholding to 40 per cent of the total number of shares initially issued in the fishery.

4.9 Nominated divers

Diver numbers appear to have been more responsive to the economic circumstances of the industry than the number of shareholders. Diver numbers have trended downwards since 2008/09, from 35 to 28 to date in 2011/12 (Figure 5). The most recent four fishing periods show a continuing trend for fewer numbers of divers to take a great percentage of the catch (Figure 6).

The average number of days fished per diver has fallen from 69 in 2004/05 to 21 in 2009/10, 20 in 2010/11 and 16.6 in 2011/12 (Figure 5). The average catch per day has increased from 57kg/day in 2004/05 to 118kg/day in 2009/10, 154kg/day in 2010/11 and is currently at 174kg/day for 2011/12.

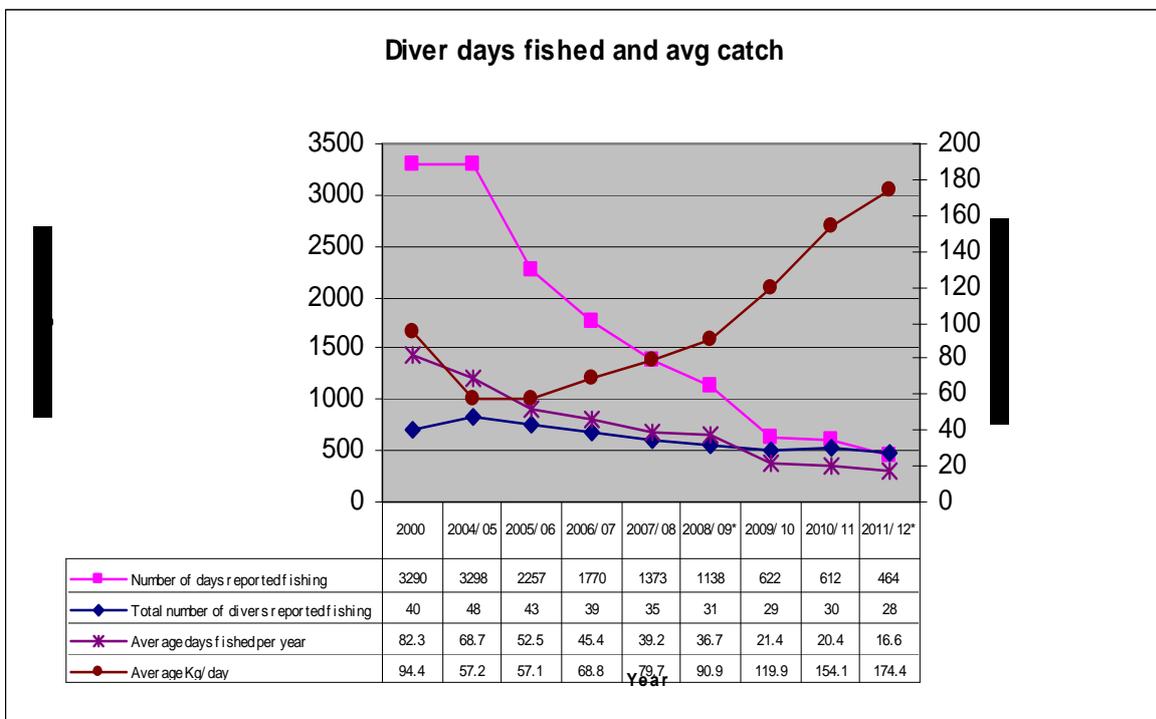


Figure 5: Total days fished, average days per diver and average catch per day from 2004/05 to 2010/11

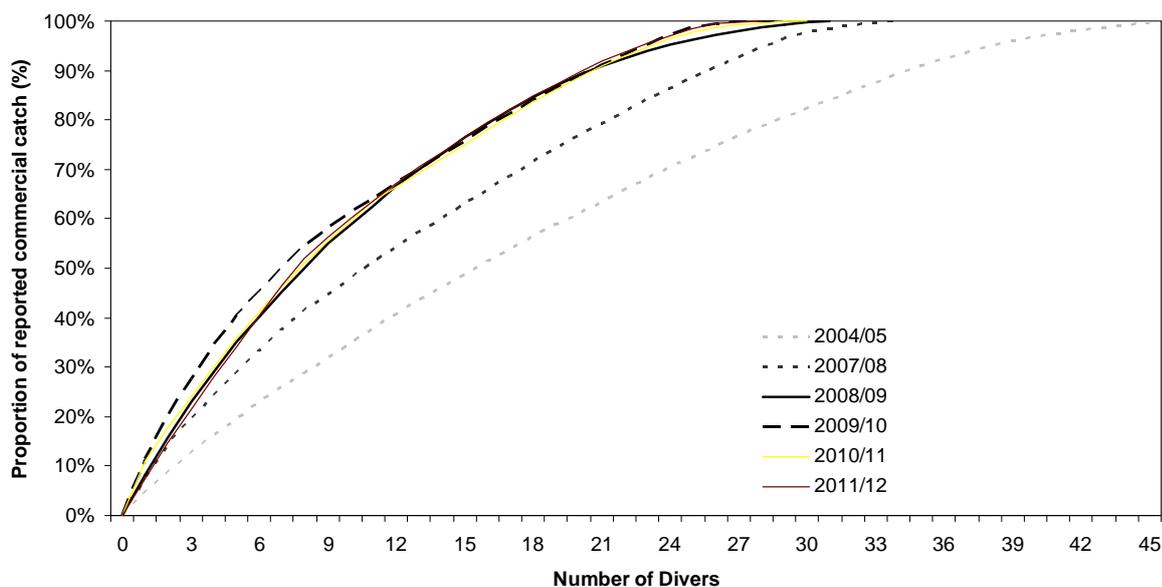


Figure 6: Percentage catches accumulation by divers from 2004/05 to April 2011/12.

4.10 Quota transfers and values

Quota became fully transferable in the late 1990s. The number of shareholders leasing out quota has ranged from 7 in calendar year 1998 to a peak of 25 in 2003/04. Since then there has been a decline to 20 in 2007/08. Numbers have remained low since this time. In 2010/11 22 shareholders leased quota (Table 1).

Industry has reported that the quota market is again very active when compared to the same time in past years. However, this is not borne out by the data. To date in 2010/11, 74 per cent of the TACC has been caught, and 21 quota transactions representing 23.7 per cent of the TACC have taken place. At the same time last year, 77 per cent of the TACC had been caught and 18 quota transactions representing 28.2 per cent of the TACC had taken place.

Given the increase in catch per unit effort in 2011/12, one would have expected a more active quota lease market than has been seen to date.

Unfortunately, information on the price at which quota is transferred is not collected by the Department. A price of \$18/kg from one quota transfer was voluntarily reported in 2008/09.

*The Committee **recommends** that Industry make available information on the price of share and quota transfers in the abalone fishery, and that the Department and Industry work together to develop more detailed information on the structure and operation of the quota market*

Industry members, particularly Mr George Chung, have indicated that many transfers are not commercial, in that they are un-priced transfers between shareholders, on a quid pro quo basis. If this is the case, then a potentially thin market is made even thinner, and potentially less efficient in revealing the value of abalone.

The Committee recommends that the Department and Industry work together to develop more detailed information on the structure and operation of the quota market.

Table 1: Total quota transferred (t), amount of TACC transferred (%), number of quota transferors and the total number of processed transfers in each fishing period from 1998 to April 2011/12.

CY or FY	Amount of quota transfer in (kg) and % of TACC	Number of shareholders leasing out quota	Processed quota transfers
1998	18,800 kg (5% of TAC)	7	N/A
1999	31,000 kg (9% of TAC)	13	N/A
2000	33,158 kg (11% of TAC)	23	N/A
2001	21,016 kg (7% of TAC)	19	Minimum 19 (exact no. not available)
2002/03*	46,376 kg (15% of TAC)	23	N/A
2003/04	34,937 kg (12% of TAC)	25	30
2004/05	29,474 kg (14.3% of TAC)	23	Minimum 28 (exact no. not available)
2005/06	23,428 kg (18% of TAC)	21 2 applications refused	34
2006/07	29743 kg (23.8% of TAC)	21	43
2007/08	24589.9 kg (22.35% of TAC)	20	37
2008/09	32826kg (31.2% of TAC)		47
2009/10	24,511.7kg (32.7% of TAC)	21	24
2010/11	29,910.8 kg (31.8% of TAC)	22	39
2011/12**	26097.7 kg (23.7% of TAC)	13	21

* 18 month fishing period as fishing periods changed from calendar year to financial year

** to April Incomplete fishing period

A number of administrative rules regulate quota trade. For example, quota may be transferred only in lots of 100 kilograms or as otherwise approved by the Director. Also, a shareholder may not acquire by any such transfer more than twice the amount of the shareholder's initial quota for the fishing period. These rules may impede a shareholder's ability to take advantage of market signals, that is, to operate more efficiently in the market. First, they may prevent requests for the transfer of smaller lots of quota. Second, they prevent a shareholder from acquiring substantial amounts of relatively risk free quota. The Committee notes the Department's intention to review the current restriction on the amount of quota that can be leased by shareholders.

4.11 Impact of illegal unreported removals

Previous reports by the Committee have discussed the loss of economic value from the fishery due to high levels of illegal catch. Illegal take is estimated to be as high as 40 per cent of legal take, which in 2011/12 represents around 44 tonnes. As most of the abalone that is caught illegally is shucked this should be converted to a meat weight, which the Department estimates is 33 per cent of whole weight. This gives a figure of 14.52 tonnes meat weight for the illegal catch. Departmental compliance officers estimate that this product is sold for around \$60/kg. Applying this price to the illegal take in 2011/12 gives an estimated value of \$871,200 that has been lost to the fishery.

As has been discussed in previous reports by this Committee, continued/increased investment in compliance activities to reduce the level of illegal catch, which could be returned to the commercial sector or could be left in the water to increase the rate of recovery of the stock, is essential.

In 2010/11 9,247 abalone were seized, which is much higher than in the previous year. Departmental compliance officers estimate that this product has an average meat weight of

64g per fish and, as noted above, it is sold for around \$60/kg. Using these figures, this represents around \$36,000 of lost value to the fishery.

The Committee is reassured that the number of seizures in 2011/12 is likely to be much lower than in 2010/11 – 2,666 abalone seized to end February 2012. The conclusion drawn from these lower seizures by NSW DPI compliance officers is that it indicates a reduction in illegal fishing, which is usually the case after a year of high abalone seizures.

4.12 Recreational and indigenous catch

As with illegal catch, there is the possibility of loss of economic value from the fishery due to high levels of recreational and indigenous catch. Current estimates of recreational and indigenous catch are unreliable. Estimates of recreational catch were previously thought to be as high as 10 tonnes, but this is now thought to be too high. Recreational Trust funded fisher surveys currently being conducted by the Department should improve the information on recreational catch, however the Department acknowledges the need to obtain more robust time-series estimates of both recreational and indigenous catch.

The Committee notes that there is a proposal to increase the recreational abalone bag limit from 2 to 5. It is important that the Department monitors the impact on recreational catch this increased bag limit has, should it be implemented.

4.13 Economic data

As the economic data available to the Committee on which to base its recommendation is lacking and the Committee is still unable to meet its statutory obligations regarding provision of economic advice to underpin setting of the TACC. In the absence of economic data, the Committee remains concerned about the possible consequences of its determination for the profitability of the industry and the financial well being of those in it.

In verbal presentations and discussions with the Committee, both the Department and Industry have shown appreciation of the need to improve the quality and quantity of the economic data they present. However, this is yet to improve.

Economic analysis (including economic yield per recruit) of the fishery is essential to provide data to: inform the setting of size limits; increase/optimize returns from the fishery; and inform the risk/catch/cost balance concerning appropriate research and monitoring strategies.

As indicated earlier in this report, authoritative comment on the economic performance of the abalone fishery is restricted to interpretation of changes in share prices and some crude calculations of net returns.

Precise estimates of the circumstances of individual fishers are, unfortunately, not possible without detailed information on the structure, conduct and performance of the industry, particularly the structure of costs and levels of debt. As discussed at length in last year's report, better information on the costs of fishing would allow for the net return from abalone fishing to be calculated more accurately. It would also place industry in a much more informed position regarding setting of the TACC in order to maximise profits, and setting of the community contribution charge such that it does not extract less, or more, economic rent⁵ than is present in, or appropriate for, the fishery. The Committee recommends that the

⁵ Economic rent is profit in excess of normal returns on capital. Estimates of normal returns on capital in commercial fisheries vary, but can be as high as 10 per cent.

Department and industry work together to devise a cost-effective and collaborative means of collecting economic data on the performance of the abalone fishery.

A project being run out of the University of Tasmania that has been submitted for funding through the Seafood CRC R&D titled 'Economic management guidance for Australian abalone fisheries' should help in providing better economic information on the NSW Abalone fishery. If the project goes ahead it will result in a database of information being available for the NSW abalone fishery which includes: price splits for size / quality / region / season; fleet structure data; cost data; lease and trade market data; and information on qualitative drivers of market demand. Importantly, through the project, protocols for ongoing economic performance reporting will be developed. Future reporting of economic performance will be possible by indexing change in the most significant factors in the fishery such as labour cost, fuel and price. This means that data can be updated yearly at little cost with interview data collected less frequently at every 3 or 4 years. Options for improving sustainable profitability will also be explored, including through alternative TAC settings, size limits and seasonal harvest strategies. The project is due to finish in June 2013.

The information collected through the University of Tasmania project could be combined with a set of more meaningful economic performance indicators than those currently in the EIS. The Committee notes that a more meaningful set of performance indicators may be developed as a result of the 2011 review of the management plan for the abalone fishery.

4.14 Community Contribution

The community contribution charge in the NSW commercial abalone fishery was based on a decision by the NSW Government to return economic rent being earned by abalone fishers to society. It was designed on the basis that in a well-managed fishery with TAC set with reference to Maximum Economic Yield, economic rent would be earned by fishers. It was assumed that the abalone fishery was, or eventually would become, such a fishery.

Economic rent is profit in excess of normal returns on capital. Estimates of normal returns on capital in commercial fisheries vary, but can be as high as 10 per cent. An estimate of economic rent in the fishery should be made to avoid too much rent, or too little rent, being appropriated from the fishery through a community contribution charge. As part of the economic rent in the fishery is attributable to the skill of the fisher, there is a strong argument for not appropriating all of the economic rent in the fishery⁶.

It is a political decision as to whether or not rent is collected from a fishery, or is left with fishers, and how much of the rent to collect. Rent should only be collected if it is cost-effective to do so. The fact that many state and Commonwealth fisheries agencies, who have attempted to collect resource rents, have later abandoned those proposals and programmes, may be evidence that it is not cost effective to collect resource rents in commercial fisheries.

Given the summary of the current status of the NSW abalone resource, as described in Section 5 of this report, the Committee believes it is appropriate to reconsider the Community Contribution Charge for the NSW abalone fishery as it is currently structured. In doing so, the following should be taken into account:

- the need to demonstrate significant rent generation in the future, noting, as mentioned in Section 4.13, that a project is being run out of the University of Tasmania that should help in providing such information for the NSW Abalone

⁶ Rents attributable to the skill of fishers are termed 'intra-marginal' rents. Intra-marginal rents should be left with fishers. Intra-marginal rents can be as high as 36 per cent of total economic rent in the fishery (ABARE, 1990)

fishery;

- that a cost/benefit analysis of determining and collecting payments should be undertaken; and
- that rent is only collected from the fishery once the full costs of appropriate management are met– this is not currently the case and is a long-term goal at best.

Such a strategy is in accordance with the approach taken by most state and Commonwealth fisheries, with the exception of Tasmania.

*The Committee **recommends** that, for the foreseeable future, the application of the Community Charge in the abalone fishery be reconsidered, and that greater emphasis be placed on the recovery of costs to ensure an appropriate level of management services, including monitoring and assessment.*

4.15 Performance indicators for the fishery

The Committee notes that the economic indicators and triggers in the proposed Fishery Management Strategy for abalone are lacking in specificity and relevance, and clear management responses. These indicators and triggers need to be revised as a matter of urgency to make them more relevant to measuring the economic status of the industry. The Committee notes that a more meaningful set of performance indicators may be developed as a result of the 2011 review of the management plan for the Abalone fishery.

*The Committee **recommends** that the current performance indicators and triggers for the abalone fishery be revised to make them more relevant to measuring the economic status of the industry.*

However, whatever the indicators and triggers for the assessment of the economic status of the industry are, the Committee believes the currently available data on the structure, conduct and performance of the industry will not be sufficient to make them operable.

4.16 Structural Change

The Department has provided some time-series information on the distribution of shareholdings to the Committee for this determination, but as the data is in aggregate form it is difficult to fully assess whether structural change has occurred.

Restructuring seems to be occurring amongst divers in the abalone fishery, with fewer divers taking a greater proportion of the catch.

A lot more restructuring, in the form of share trading, and associated reductions in the number of shareholders, needs to take place in the abalone fishery for it to improve its economic viability.

As noted in previous reports of this Committee, shareholders have appeared reluctant to exit the abalone industry, or to undertake other structural adjustments that may reduce costs, despite low economic returns from fishing.

4.17 Conclusion

Net revenues from abalone fishing appear to be improving both as a result of improvements in gross returns from abalone fishing and a fall in the cost of catching abalone. However, this is off a very low base. The Committee is reassured that restructuring seems to be occurring amongst divers in the fishery, with fewer divers taking a greater proportion of the catch.

The available data makes an authoritative assessment of the economic status of the industry and the potential economic impact of this determination difficult, however it is likely, both as a result of higher gross revenues and likely declines in fishing costs, that the economic return from abalone fishing is improving. However, any improvements in profitability must be viewed in light of the debt currently owed by abalone fishers to NSW DPI for outstanding management fees. The Committee understands that industry has been receiving a considerable subsidy for management fees and that eventual repayment of this debt will erode improvements in profitability. The Committee had warned in previous reports that measures such as the reduction or removal of management fees and charges, and the reduction of research effort, while perhaps welcome in the short run, were at least only palliative and at worst, destructive. Further, the Committee asserted that continued support of this nature would, in fact, impede necessary structural change.

The Committee is reassured that a study is being proposed that will improve economic information on the NSW abalone fishery. However, the Committee still urges the Department and Industry to work together to develop an approach to collecting better economic information on the fishery, including undertaking an economic yield per recruit study to: inform the setting of size limits; increase/optimize returns from the fishery; and inform the risk/catch/cost balance concerning appropriate research and monitoring strategies.

The Committee notes that the economic indicators and triggers in the proposed Fishery Management Strategy for abalone are lacking in specificity and relevance. These indicators and triggers should be revised to make them more relevant to measuring the economic status of the industry.

The Committee notes that the increase in the MLL to 117mm does not appear to have excluded significant areas of the fishery and that the increase in the average weight of abalone has been in excess of that anticipated due to the increase in the size limit. It is the opinion of the Committee that a further increase in the MLL to 120mm in the northern part of Region 6 and of 123mm in the southern part of Region 6 will further improve economic returns.

NSW abalone product is up against strong competition from wild caught product in the significantly larger producing states of Tasmania, Victoria and South Australia, and aquaculture product from both within Australia and from the rapidly expanding aquaculture industries in China, Korea and other overseas abalone producers. As aquaculture operations continue to expand new overseas markets and marketing initiatives for wild caught NSW abalone will need being explored.

The Committee's continued conservative determination for the TAC in 2012/13 is based on a commitment to rebuild a robust and profitable fishery. The size limit changes and regional distribution of catches recommended by the TAC Committee, in combination with the determined TAC levels, aim to: provide a larger and better protected spawning stock; have sufficient biomass to buffer the stock and fishery catch rates against periodic decreases in productivity; and increase the biological and economic yield per recruit.

5. State of the Stocks

5.1 Introduction

In making its determination the Committee considers the current and likely future status of the stock. There are two main features that provide a background and context for this year's consideration – previous conclusions about the status of the stocks and changes in the information available for assessment.

5.1.2 Previous conclusions about the status of the stocks

The abalone stocks have historically suffered from significant over-fishing and over-depletion. Recent reductions of the total catch (commercial and recreational) and recommended increases of the minimum legal size have been a response to that situation. The stock showed significant evidence of over-depletion in the 1990s and early 2000s including:

- i) serial depletion starting in the north of NSW in Region 1 (exacerbated by mortality from a severe outbreak of *Perkinsus* in at least the southern part of this region in the late 1990s) and progressing south;
- ii) recruitment overfishing (i.e. breeding stocks reduced to the extent that this results in a reduced number of young produced) in Region 2 which started in the early to mid 1990s;
- iii) Regions 3 and 4 showed patterns consistent with the onset of recruitment overfishing from the mid-1990s into at least the early 2000s;
- iv) all of the well monitored Regions (i.e. 2-6) showed an increasingly 'spiky' pattern in catch rates and recruitment, including progressively lower lows between the spikes with briefer and (in most Regions) progressively lower highs; and
- v) the fishery being highly dependent on the abalone that grow over the Minimum Legal Length (MLL) each year, with the population having substantially lost the buffering effect of multiple and well represented year-classes.

The abalone stocks have shown a pattern with periods of high and low productivity. This pattern of episodic productivity is consistent across all of the well-monitored Regions, and is reflected in peaks of the fishery catch rate in about 1988, 1995 and 2001 (Figure 8). That is, peaks in fishery productivity that are about 6-7 years apart. These peaks coincide approximately with estimated peaks in recruitment of young abalone (Figure 7), although the estimation methods cannot distinguish well between variability in the number of young abalone recruiting to the population, their growth rate or their survival – variability in all these factors could give similar consequences and they may vary together. After the catch rate peak in 2001 there was a rapid reduction in catch rate and 2005 saw the lowest levels yet seen in the fishery. While the estimates of recruitment at the time indicated that another peak was about to move into the population they also indicated that this most recent peak was extremely weak in the north (Region 2), weak in the central areas (Regions 3&4) and average in the southern areas (Regions 5 & 6). The substantial reductions in the TACC through this time sought to both limit the further depletion of the stock and to take advantage of the expected peak in productivity in the mid-late 2000s to rebuild the stock. Important 'success indicators' for improved stock condition are i) a substantial increase in the abundance and average size of commercially available abalone, and ii) that this increase persists through the next period of low productivity – expected in about 2011-2013 if past patterns are repeated.

Regions 1 and 2

Within this overall context there have been additional specific issues and analyses relating to the status of stocks in the northern part of NSW (i.e. Regions 1 and 2).

Region 1 North (north of Port Stephens, subregions A-E)

There has always been very little information available to assess the status of stocks in Region 1 north of Port Stephens. There was no Fishery Independent Survey

coverage in this area and there has been very little commercial fishing at any time since 1987 (i.e. even when there were no regulated restrictions on fishing there). It is not known whether, or to what extent, the stocks there were affected by the disease *Perkinsus* that significantly reduced stocks in the southern portion of Region 1. Special catch allocations have been made in Region 1 North over several years to allow collection of data to determine the extent of *Perkinsus* impacts, to support an initial assessment of the stocks and to estimate a sustainable catch.

Region 1 South (south of Port Stephens, subregions F-L)

This area suffered a severe outbreak of *Perkinsus* in the late 1990s. There were relatively few Fishery Independent Survey sites in the southern portion of Region 1 but they all showed the death of 50-75% of abalone of all sizes. Some areas were closed to commercial fishing in 1996 and the whole of Region 1 South was closed in 2002. The Fishery Independent Surveys subsequent to total closure showed continued low abundance and no recovery of the small or medium sized abalone, and an accumulation over time of increasingly large abalone interpreted to be the survivors of the outbreak augmented by low recruitment. The Fishery Independent Survey sites in Region 1 South were clustered in three areas - Port Stephens, Sydney and Kiama (subregions F, J and K) – so there has been concern about how representative these sites were of the whole region.

Trial fishing in 2004 showed that it was possible to take high catch rates of large abalone from targeted sites, as was expected from the Fishery Independent Survey data, but did not help to assess the status of the stock or the extent of any recovery.

In 2007 a program of trial fishing on pre-identified sites that were historically productive was conducted to test the change in status of the stock. This program allowed comparison of i) the change in catch rate in 2007 from the proportion of previously productive sites that remained productive and catch rates at those sites compared to catch rates in 1994, 1987 and 1982-85, and ii) of the current catch rates at historically productive sites compared to sites chosen by divers as being productive in 2007. The general conclusions were:

- i) about 36% of historically productive sites were still as productive as they previously were;
- ii) 70-80% of historically productive sites have catch rates that are lower than those recorded there in 1994 or 1987;
- iii) the northern subzones, between Pt Stephens and Sydney (subzones F, G and H), had very low abalone abundance and a major loss of historically productive sites;
- iv) the southern subzones, between Sydney and Wreck Bay (subzones J, K and L), had considerably higher abalone abundance and had lost fewer historically productive sites than the northern subzones, and slightly more than half of all sites fished in these southern subzones had catch rates greater than was recorded there in 1994;
- v) for almost all sites the median length of abalone taken was greater than 120mm (i.e. more than 50% of abalone were larger than 120mm length);
- vi) the diver selected sites provided slightly higher catch rates than the pre-identified historically productive sites but data from diver selected sites did not materially change the overall results or conclusions.

Overall these conclusions are consistent with the Fishery Independent Survey data. They indicate that Region 1 South supports some pockets of large and dense abalone aggregations, but that many historically productive sites still do not support dense abalone aggregations or significant numbers of small abalone, despite many years of protection from fishing. The stock of legal sized abalone in the northern subzones (F, G and H) remained very depleted in 2007, while the stock of legal sized abalone in the more southern subzones (J, K and L) has recovered to 1994 levels at more than half of the sites fished.

Region 1 was re-opened to commercial fishing in 2010.

Region 2

Region 2 was closed to commercial fishing in 2006 because of evidence of recruitment overfishing there (see Fig. 1). The average recruitment in Region 2 started decreasing in about 1995, including a decrease in the strength of recruitment in the 'pulse years'. The 1995/96 and 2001/02 pulses of increased productivity and recruitment were estimated to be very much weaker in Region 2 than in the more southern regions in those years, and were considerably weaker than was seen in Region 2 in the 1988/89 pulse. Following the closure of Region 2, special catch allocations have been made each year to allow collection of data that would support an improved assessment of the stocks there, especially in relation to the interpretation of recruitment overfishing.

Region 2 was re-opened to commercial fishing in 2010.

To address the issues of over-depletion in the fishery the TAC was reduced significantly during the 2000s. The catch reductions between 2005/6 and 2009/10 coincided with the period when, based on previous patterns, a pulse of relatively good recruitment was expected to enter the population and provide a good opportunity for recovery of the stock.

A key question for management of the fishery to recovery, and preventing a return to depletion when it is recovered, is identifying and addressing just what was wrong with the historical management settings that resulted in serial and excessive stock depletion to occur. Recognising and correcting these factors is necessary to avoid a repetition of the failures of the past and to achieve the potential from the resource. In addition to the appropriate catch level the Committee considers three other issues to be very important in this:

- i) The use of finer scale monitoring, assessment and management to better reflect the scale variability of abalone biology (especially growth and reproduction). There are ongoing discussions and efforts to improve finer scale data gathering from the fishery (e.g. GPS-linked data loggers), interpretation of these data for stock assessment, and finer scale fishery management (e.g. local catch caps). While these developments are promising and welcome they have been slow to deliver outcomes. There has been increasing fishery coverage and data collection from the data loggers in recent years. There has been very limited interpretation or analysis of these data in relation to stock condition or trends. The measures for setting and adhering to finer scale catch caps, so as to avoid overly concentrated fishing and serial depletion, have been effective in some years and locations but not in others.
- ii) The Committee and some in industry have questioned the appropriateness of the Minimum Legal Length (MLL). The fishery has a history of a relatively small MLL compared to that used in other fisheries on the same species. In NSW the MLL was 100mm in the 1970s, was increased to 108mm for most of the 1980s, was further increased to 115mm for the 1990s and most of the 2000s, and was then increased fishery-wide to 117mm from 2008. In the most southern areas of Region 6 the MLL was increased to 120mm from 2010 (some in industry have voluntarily and

successfully fished to a 120mm size limit in more northern areas also). The MLL for the same species in Victoria is 120mm in open coastal habitats east of Lakes Entrance (with voluntary industry size limits of 125mm and 130mm in some areas), in Tasmania is 127-138mm across different harvesting regions, and in South Australia is 125-130mm across different harvesting region. For several years the Committee recommended that a larger size limit be applied to the overall fishery, within which various arrangements can be applied as is cost-effective to access any areas where abalone growth is stunted. This would give both biological and economic benefits. The advantage of a higher 'default MLL' which can be selectively relaxed as appropriate, rather than low MLL everywhere, is that it protects the stocks in areas where abalone grow quickly and large from localised overfishing and sequential depletion. A major element in the argument against increase in the overall MML has been the view that NSW has many areas of stunted abalone growth - a view supported by some early research results. However by 2010 it was clear from the response of the fishery to the recent changes in the size limit that the population is not dominated by slow growing (stunted) stocks and that the earlier research results suggesting this were not representative of the overall stock or the current situation. The observed rapid increase in the individual weight of abalone caught and the very rapid recovery of catch rate following the recent increases in MLL simply would have been impossible if the population was dominated by 'stunted' stocks.

- iii) The Committee has for several years commented that the benchmarks and reference levels used in the Share Management Plan and the Fishery Management Strategy were set at levels that did not adequately protect the sustainability and productivity of the stock. Revision of these benchmarks and reference levels needs to be explicitly grounded in the biological productivity of the stock.

5.1.2 The information available for recent assessments

The information available to the Committee to assess the status of the stock has changed and diminished considerably in recent years.

- Up until and including the Committee's 2008 determination the fishery assessment was based on (i) Fishery Independent Surveys of the relative abundance of different size categories of abalone (including abalone smaller than the minimum legal size in the fishery so as to provide a 'leading indicator' of recruitment to the fishery), (ii) catch rate and weight composition from commercial fishing, (iii) integrated analysis of this information by fitting a length-based population model to estimate population size and recruitment, and (iv) prediction of the expected future trends in the status of the stocks under different possible levels of fishery catch.
- Since 2008, through various decisions of the industry and Department, the Fishery Independent Survey has not been conducted, there has been no update of the population model to assess stock status and there has been no scientific prediction of future trends of the stock. Consequently in 2009, 2010, 2011 and again this year there was no formal scientific stock assessment or prediction of future stock condition. The primary reason for this was to reduce costs, although there were also some concerns about the representativeness of the Fishery Independent Survey sites and hence the indices of relative abundance based on them.
- Collection of fine scale data on fishing effort and catch, through the use of GPS-linked data loggers, started in 2008. Coverage of the fishery has increased since then as more, and more reliable, data loggers have been provided to divers. Descriptions of the data from the data loggers have been presented to the Committee each year. However, these data were not analysed or interpreted with

respect to stock status or trends. In particular there was very limited analysis that related interpretations of the currently collected data from the data loggers to interpretations of historically collected data. Such analysis is necessary to provide perspective and context of the current interpretation of stock status. Issues of special significance in this are comparisons of the fine scale information with the historical fishery independent surveys, with trends from previous data on commercial catch rates, and for estimation of key fishery properties (e.g. thresholds for recruitment overfishing and maximum stock productivity).

The information available to assess the status of stocks is in a transition from the previous methods based on Fishery Independent Surveys, coarse scale data from commercial fishing, and population modelling to future methods that are hoped to be better and cheaper based on fine scale data reporting. However, the previous methods have been stopped before the new methods have been fully established or shown to be adequate, leaving the current period in which there is increased uncertainty about interpretation of information from the fishery and consequently about the state of the stock. Also there is now heavy reliance on commercial catch rate as an indicator of stock abundance. This reliance on commercial catch rate has well known problems, particularly in a fishery managed by individually tradable quotas where the management intent is for industry to increase catch rate through innovation and changed fishing practices. Commercial catch rate is notoriously 'hyper-stable' for abalone fisheries, because high catch rates can be obtained and maintained for a time by targeting concentrations of abalone in known patches of preferred habitat even if the overall population decreases. Such hyper-stability of catch rates has been seen in the history of the NSW abalone fishery at both the Region and Sub-Region scales. Furthermore, commercial catch rate is a 'trailing indicator' that reflects what has happened, rather than a 'leading indicator' that informs about what will happen – it contains no information about the numbers of sub-legal sized abalone that provide the future commercial stock. In principle analysis of the fine scale data now being collected could provide solutions to these problems, and a FRDC funded project is funded to address this, but to date solutions have not been demonstrated.

These are a particularly serious weakness in the current management situation where key questions relate to the robustness of the recent stock improvements and the ability to detect any lack of robustness before the stock condition deteriorates. With the limited information and analysis that is currently available it is not appropriate or possible for management measures to be based on detection and tracking of the detailed nuances of population change in response to natural variability or the effects of previous management interventions – rather management measures must be simple, robust and precautionary.

5.2 Information and analysis available in May 2012

5.2.1 Catches, catch rates and average weight

The annual commercial catch rate for each Region is shown in Fig 8. The annual catch rates have continued their strongly improvement since 2005. The catch rates in all Regions are now above historical levels and thresholds, and the catch rate in Region 6 continues the very rapid increase seen last year. Although the rate of increase has slowed somewhat during the past year in some Regions (e.g. Regions 2, 4 and 5) catch rates have remained high in all Regions, despite entering the period (about 2011-13) when lower stock productivity is expected if past productivity patterns are repeated. This is very encouraging in that it implies that the low TACs of recent years have allowed stock rebuilding and resulted in catches that are not overwhelmingly dominated by recent recruits to the fishery. Continuation of this pattern, along with corroborating changes in other indicators, will build confidence in the strength of stock rebuilding.

The current extent of stock rebuilding remains uncertain however because the catch rate is not likely to be directly proportional to stock abundance when, as now, a low TAC can be effectively targeted in high catch rate areas. For example while the catch rate in Region 6 has about doubled in the last two years it would not be biologically possible for the abalone population there to double in that time.

The monthly catch rate has been fluctuating without trend in Regions 2-5 since about 2010, having apparently stabilised at the higher level following large increases after the 117mm MLL was introduced in 2008. The recent relatively stable monthly catch rates in Regions 2-6, and simultaneous increase in the annual catch rates, was analysed using some of the finer scale data now available from the fishery but the details of the analysis were not provided and the interpretations remained unclear. The monthly catch rate has continued to increase in Region 6, interrupted by a relatively brief decrease following further increase of the MLL there to 120mm.

The arrangements to set and implement sub-Regional catch caps and limits, intended to spread the catch spatially and avoid localised depletion, are an important aspect of management to avoid future repetition of sequential depletion. Unfortunately information on the catch by these Sub-regions had not been updated since December 2011, so it was not possible to track recent performance and overall performance may be better than that in the reported period. However from the information available the arrangements were not entirely successful with some areas providing more catch than intended and others providing less. There is perhaps a perception that with the TAC low and easily taken there is no need to develop the ability to manage the catches at finer spatial scales. But setting appropriate local catch caps and fishing to those limits is necessary to prevent sequential depletion and is a key consideration in the management of the recovering stock.

The catch rates in all Regions recovered to their previous levels within 4-6 months after the increase of MLL from 115mm to 117mm in July 2008, and the catch rate in Region 6 recovered to its previous levels within 6 months after the increase of MLL from 117mm to 120mm in May 2010. Such rapid recovery of the catch rate following relatively modest increases in the MLL implies that in aggregate, across whatever local variation there is in growth rates at fine spatial scale, the stocks are on the steep and non-optimal part of the yield per recruit curve. Historically a yield per recruit analysis was published for each of slow, medium and fast abalone growth. The observed response of the abalone stocks to the recent increase in MLL would be impossible if the aggregate growth was described by the slow or medium growth rates. It would only be possible if growth on average was described by the fast growth curve and the stocks were on the steep portion of the yield per recruit curve. The rapid increase in mean weight seen in all regions (but especially Regions 4-6) is also consistent with this interpretation. From the available data and analysis it is not possible to determine what the optimum MLL is; just that it is larger than the current MLL and that the current MLL is not optimal.

The average weight of abalone caught increased substantially in all Regions after the MLL was increased to 117mm. There has been further steadily increase in the average weight since 2008 in Regions 4, 5 and 6 and this continued into 2011. But the average weight has remained approximately constant since 2008 in regions 1, 2 and 3. The average weight in the commercial catch is a coarse and insensitive indicator, and several different interpretations are consistent with the same trend in average weight. The simplest interpretation is to assume that there is no significant size selectivity by the fishery - implying that the size composition of the populations in Regions 4, 5 and 6 continues to rebuild, whereas there has been very limited rebuilding of the population size composition in Regions 1, 2 and 3. But interpretations could change with different assumptions about fishery targeting practices. Also industry has suggested that a different method of recording weights

in the northern Regions might further complicate interpretation. Fine-scale information from the data-loggers was used to examine the spatial location of catches and catch rates in some of the subregions of Region 6. This showed that the area fished had increased between 2010 and 2011, with previously fished areas still being fished rather than abandoned, and that in key subregions fishing effort had expanded into deeper water reportedly targeting larger abalone. This illustrates the difficulty of relying on commercial catch and catch rate information alone and this analysis of the fine scale data did not provide conclusions about the sustainability of the fishing.

Interpretations would be greatly improved by complimentary sampling of the length composition from the commercial catch, by accounting for changes in fishery targeting, and by surveys to measure population size composition.

An analysis was presented to the Committee that compared the mean length for some years in the 1990s with 2010 and 2011 from subregions in Region 1 South, Region 2, Region 3 Region 4 and Region 6. Details of the data used and its analysis were not provided. The analysis appears to show no change in the mean length in the samples from Region 1 South, Region 2 and one part of Region 6 (subregion Z), and a small increase in Regions 3, 4 and one part of Region 6 (subregion Y3). Such analysis is potentially very informative and useful. Interpretation of the current analysis is hampered by a lack of technical detail available. Further the lack of change in mean length for Regions 1 South and 2 are consistent with the lack of change in mean weight recorded there, but the small or negligible increase in mean length appears for the more southern Regions is inconsistent with the large increase in mean weight reported. There are many possible interpretations of this inconsistency, illustrating the high level of uncertainty in assessment of the current status of the stock and its response to recent changes in the TAC and MLL. One such interpretation is that the mean lengths have not changed and that the observed increases in mean weight are primarily due to operational changes in the fishery (e.g. selective targeting of fishing effort) rather than stock recovery.

Anecdotal observations from industry are unanimous in reporting that there are numerous undersized abalone in the population, and while all report significant improvement in the stock during the last few years there are conflicting views about the robustness and stage of the recovery so far.

5.2.2. Illegal, unreported and recreational fishing catches

The level of illegal, unreported and recreational catch, and trends during the history of the fishery, remain very uncertain.

In July 2005 the permitted recreational bag limit was reduced from ten abalone per day to two, and since then there has been both extra focus on compliance and increased penalties for illegal recreational fishing. Reports from recreational fishers, industry, management and compliance all agree that this substantially reduced the recreational catch. The Committee considered that the recent recreational catch was likely to be in the vicinity of 5-15t. The Committee was informed this year that recreational fishers consider the catch to be less than 10t and that a proposal to increase the recreational catch to five abalone per day will be considered by management. The Committee noted that reducing the bag limit in 2005 was intended to substantially reduce the recreational catch, that at the time of the bag limit reduction it was suggested that the commercial and recreational catch should increase again together as the stock recovered, that at the time of the bag limit reduction the commercial catch was 120t and that the commercial catch had been further reduced further without further reduction in the recreational catch. In the present circumstances of stock condition and stock assessment capability it was considered appropriate to have any reduction in

recreational catch contribute to stock rebuilding, and for the recreational bag limit to be re-considered when the commercial catch increases above 120t.

In previous years, the illegal and unreported catch was assumed to be 40% of the legal and reported catch in 1987 – that is 102t from Regions 2-6. The absolute quantity of illegal catch is very unclear. General impressions from compliance officers and industry are that the illegal catch probably was about 100t per year in the past, that it was likely to have been below 100t but above 50t in 2008, and to be in the vicinity of 20-40t per year since then. The introduction of indictable offences for abalone theft, the targeting of poaching syndicates by compliance officers, and the development of improved methods to permit indigenous catch are all thought to have improved the situation. In the present circumstances of stock condition and stock assessment capability it was considered appropriate to have any reduction in illegal catch contribute to stock rebuilding.

5.2.3 Management information

Management informed the Committee of its commitment to introduce on 1 July 2012 a MLL of 120mm in the northern part of Region 6 (subregions Y31 and Y32) and of 123mm in the southern part of Region 6 (subregions Z1-5).

Management expressed interest and support for a comparative survey in Region 1 South, building on the previous surveys.

5.2.4. The 2012 industry workshop

The Committee reviewed and considered the documents from the 2012 industry workshop. The Committee gave particular attention to the criteria for assessment of each subregion, the industry recommendation about the TACC and the appropriate catch from each subregion (Table 2). This was useful input to the Committee. Apparently, and somewhat surprisingly, size limits were not discussed.

It is clear that considerable effort was put into the workshop and accompanying information that was supplied to the Committee for the re-determination of the 2011-12 TACC and for the 2012-13 determination. It is hoped that once a more formal monitoring and assessment framework for the fishery is developed and agreed as per our recommendation in Section 3.3.2 above, that there will be further integration of the industry workshops into the formal TAC setting process.

To improve this input further the Committee suggests:

- That the reporting areas used are aligned with those used in the past and with those used by the Departmental reports, or conversely that all reports use the new area groupings and historical data are re-tabulated and re-presented in these groupings.
- That more explanation be provided about the workshop assessment of each sub-region and the basis for the conclusions reached.
- That the criteria for assessing the status of each area be further developed, over time and as part of the broader development of the management framework with management, to make more use of indicators from fine scale monitoring and to use benchmarks that reflect long-term optimal resource use and overfishing limits.
- That input to the Committee be accompanied by a technical description of the data and any key analysis conducted, rather than just having the results provided as a PowerPoint presentation. For example the analysis of trends in mean weight and mean length would usefully have been accompanied by such technical elaboration.

5.3 Conclusions

There is no doubt that there has been substantial improvement in the state of the stock in recent years, starting in about 2006 but particularly since about 2009. The TAC reductions and increased MLL have succeeded in this regard and the population has accumulated stock 'on the bottom' from a period of low TAC and high productivity. There are spatial differences in stock recovery – slow in Regions 1, 2 and 3; faster in regions 4 and 5; fastest in Region 6. There is also no doubt that this accumulation could be caught in the next few years through a higher TAC. But the central questions are (i) the extent of the recovery in relation to the key fishery properties (e.g. thresholds for recruitment overfishing and maximum stock productivity), (ii) the robustness of the recovery so far to fluctuation in stock productivity, and (iii) identification of the past management settings that allowed the historical overfishing to occur so that they are not repeated as TACs are increased again during stock recovery.

The information and analysis available does not provide convincing examination or confident conclusions in relation to these central questions. As in recent years the Committee has available very limited information and analysis for its decisions, and there is a high level of uncertainty about the true status of the stocks and their responses to recent changes in the TACC and MLL. The TAC Committee has previously pointed out the problems that have flowed from dismantling the earlier system of monitoring and stock assessment before a replacement system was developed, tested and adopted. The Committee has also previously suggested that some relatively simple analyses be provided that would be expected to help interpretation. In particular some 'per recruit' analyses for yield, legal biomass, spawning biomass, mean length and mean weight would be a usually expected minimum analysis in the current circumstances. And the existing population model should be used to provide scenarios of the expected changes in these same abalone stock indicators given the recent changes in TACC and MLL.

Overall the situation is not greatly changed from the Review provided by the TACC in April 2012 and the overall conclusions drawn there still apply. It is concluded that there should be no further change in the TACC for Regions 1, 2, 3, 4 and 5 at this time, though the suggested survey in Region 1 South does provide a good basis for specifically allocating some research quota there. Region 6 continues to indicate strong stock recovery through the indicators available. The fine scale data suggests that the spatial pattern of exploitation in Region 6 is systematic expansion rather than serial depletion. There is widespread industry opinion that the sub-legal abalone are abundant in Region 6 and that higher catches would be sustainable. Furthermore management has committed to an increase in the MLL in Region 6, which will provide greater protection for the stock.

The TAC Committee remains committed to rebuilding a robust and profitable fishery. The size limit changes and regional distribution of catches recommended by the TAC Committee, in combination with the determined TAC levels, have three aims:

- to provide a larger and better protected spawning stock;
- to have a sufficient biomass to buffer the stock and fishery catch rates against periodic decreases in productivity; and

- to increase the biological and economic yield per recruit.

It should also be noted that this approach was put forward in some industry submissions and supported by the Department's management report.

The information available in relation to each of these aims is very limited by the monitoring and analysis provided, and this limitation continues to require a precautionary approach to fishery management. Given the clear dissatisfaction voiced by the industry members of ABMAC, the TAC Committee believes it is important that the TAC Committee's strategy towards size limits is clear. The table below seeks to increase an understanding of the logic and limitations behind the TAC Committee's past and current MLL recommendations.

Aim	Main information available that is relevant	Comments
A larger and better protected spawning stock	Size/weight composition of the catch. Catch rate.	Clearly some improvement and this is continuing. Extent and robustness unclear. Cannot accurately determine the size of the current stock or the impact of higher catches.
Sufficient biomass to buffer the stock and fishery catch rates against periodic decreases in productivity	Catch rates, especially monthly catch rates through last about 18 months when productivity decrease expected.	Monthly catch rates fluctuating but without decrease in regions 2-5; continued increase in region 6. So far rebuilding appears to have provided a sufficient buffer at this TAC level.
Increase the biological and economic yield per recruit	Size/weight composition of the catch. Catch rate.	Rapid increase in mean weight and recovery of catch rate observed after increases in MLL; implies we are on the steep, non-optimal, part of the yield per recruit curve; earlier slow-growth assumptions not correct for bulk of the stock; while increased MLL is indicated the available information does not estimate the optimum.

Because of the spatial variability of abalone life history parameters, increasing the yield per recruit implies different MLL in different areas. If the MLL is too small even moderate TAC levels can result in both growth and recruitment overfishing in areas where growth is fast and reproduction begins at larger size, which are the most productive parts of the population, resulting in sequential depletion. Conversely there are mechanisms that allow for targeted harvest of abalone in areas of slow growth rate that would be mostly below the MLL needed to protect the faster growing areas. The TAC Committee has consistently recognised the need for different MLLs in different areas but has argued for higher overall MLLs, adequate to protect fast growing areas, augmented by specific arrangements to provide harvesting access to slower growing areas. In the absence of adequate MLL protection for the fast growing portions of the stock this is provided for by a low overall TAC, but this alone is an inefficient tool and does not allow the fishery to reach its biological and economic potential.

In the circumstances it is decided that the TAC for 2012/13 and should be increased to 120t, with all of the increase in Region 6 and an additional 1.5t research quota available in Region 1 South. In making this judgement the Committee is very aware of countervailing interpretations that are possible, the increasing dependence of the fishery on Region 6 (and key subregions within it), and that the information and analysis available is weak for detecting any problems in time for management correction. Consequently the Committee recommends that there is increased monitoring, analysis and management focused on Region 6 during 2012/13. This could include detailed analysis and interpretation of the fine scale data in relation to stock status and trends, increased sampling for length and weight distributions in the catch, re-sampling of the Independent Survey sites, and close monitoring with effective action to keep catches within the intended subregional caps.

The Committee recommends that the commercial catch taken from each area should not exceed:

Region 1 North (subregions A-H)	2t
Region 1 South (subregions F-H)	1.5t research quota available in addition to the TACC for Fishing Surveys or Structured Fishing to a design acceptable to the Department to monitor stock condition and recovery)
Region 1 South (subregions J, K &L)	4t
Region 2	6.5t
Regions 3 and 4	36.5t
Regions 5 and 6	71t
Total TACC 120t	

Figure 7 The pattern of recruitment estimated from the fitted population model in 2008 (the last year of its application) for the base case interpretation and various alternatives to test sensitivity of the analysis. The recruitment pattern is not sensitive to these alternatives. In Region 2, there has been a decreasing trend in recruitment since about 1990. The average recruitment in Regions 3, 4 and 5 and 6 since about 1990 is lower than in the earlier period, with an increasingly 'spiky' pattern or recruitment through time showing with different Regions showing different mixtures of lower lows, more persistent lows and briefer highs.

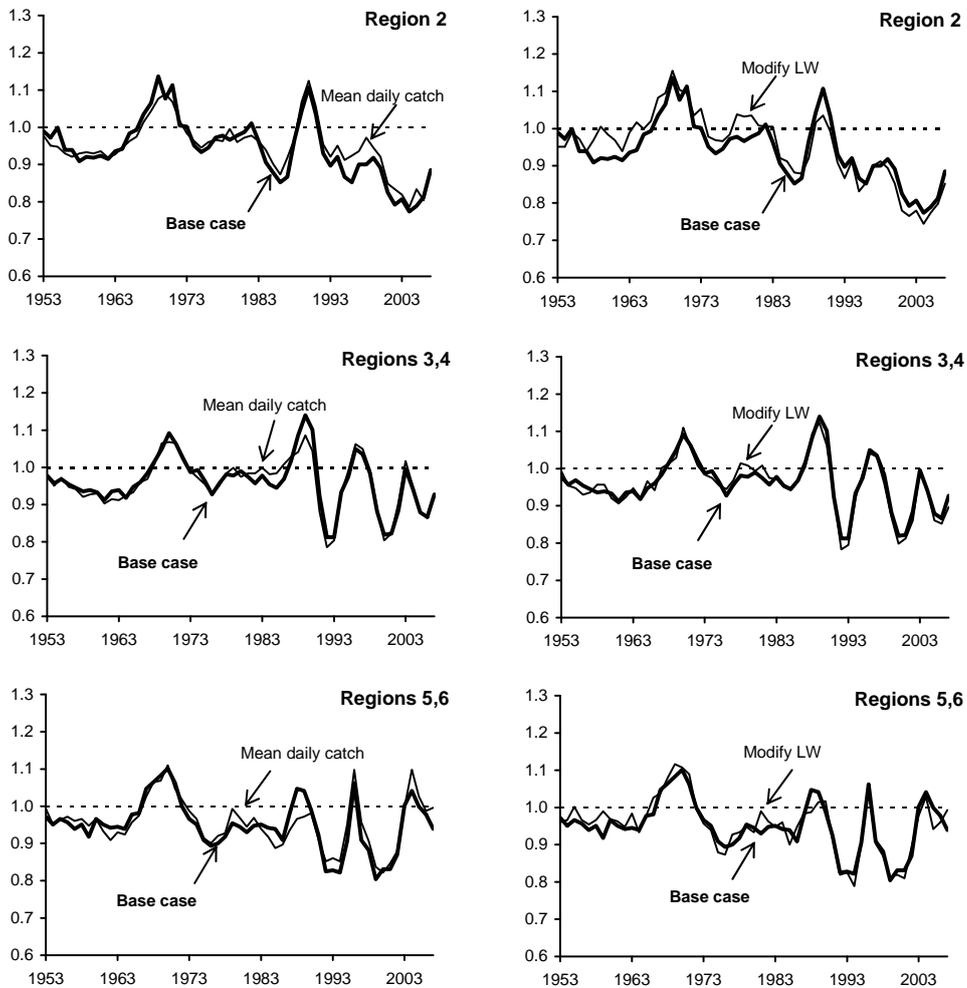


Figure 8 Annual catch (histograms) and CPUE relative to 1994 (lines) for each region of the fishery since 1987. Dashed lines represent the value of mean CPUE in 1994, and dotted lines are +/- 15%. The white histogram bars and open circles for recent years in regions 1 and 2 indicate the years in which substantial components of these regions were closed to routine commercial fishing and the data came from Fishing Surveys or Structured Fishing and so are not necessarily directly comparable. Note: the catch rate for Region 6 in 2011 is off scale at 50.27 kg/hr.

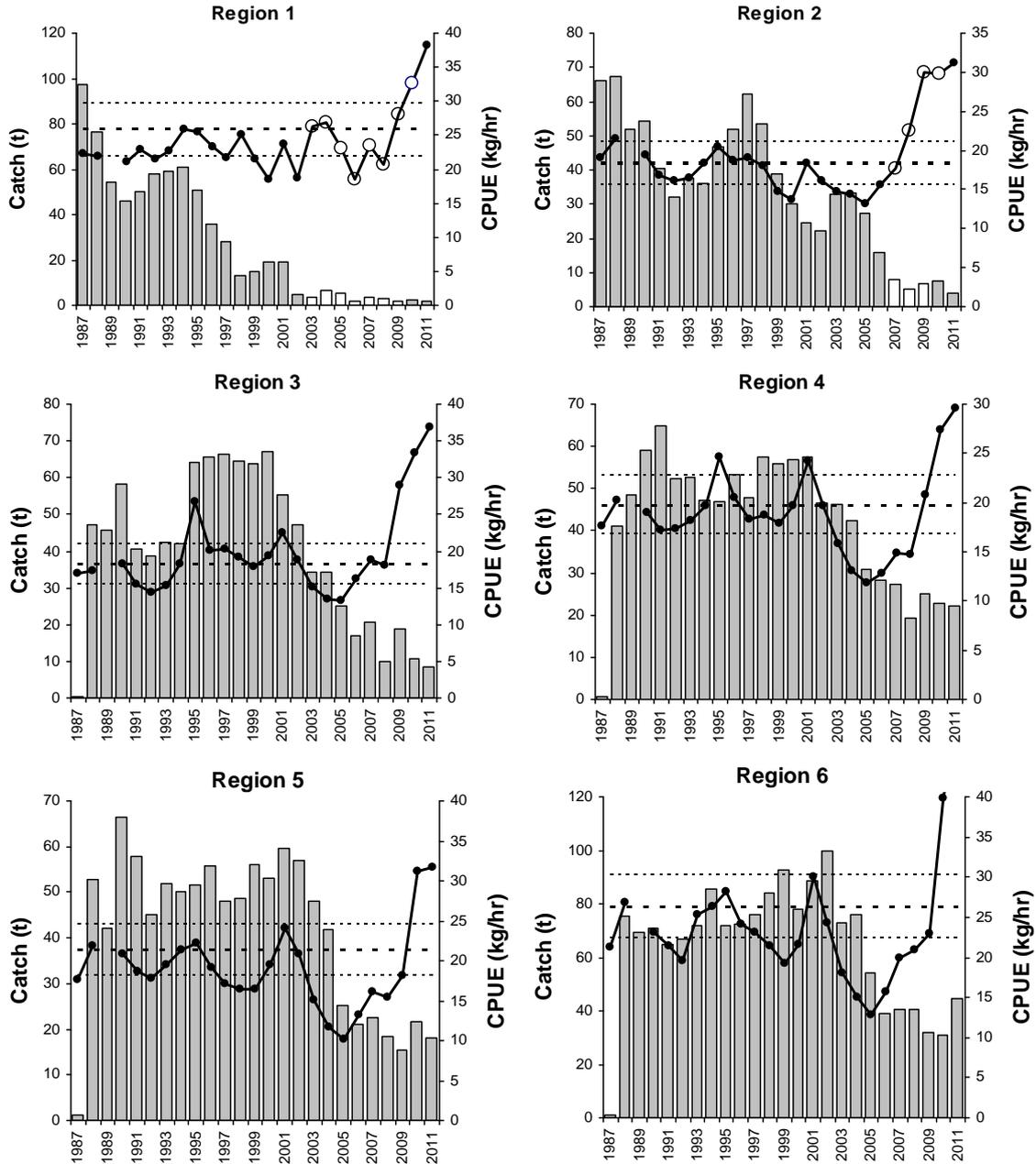


Figure 9 Mean monthly CPUE (kg/hr) for each region of the fishery since 1998. Vertical dashed line indicates the increase in MLL from 115 to 117 mm in July 2008.

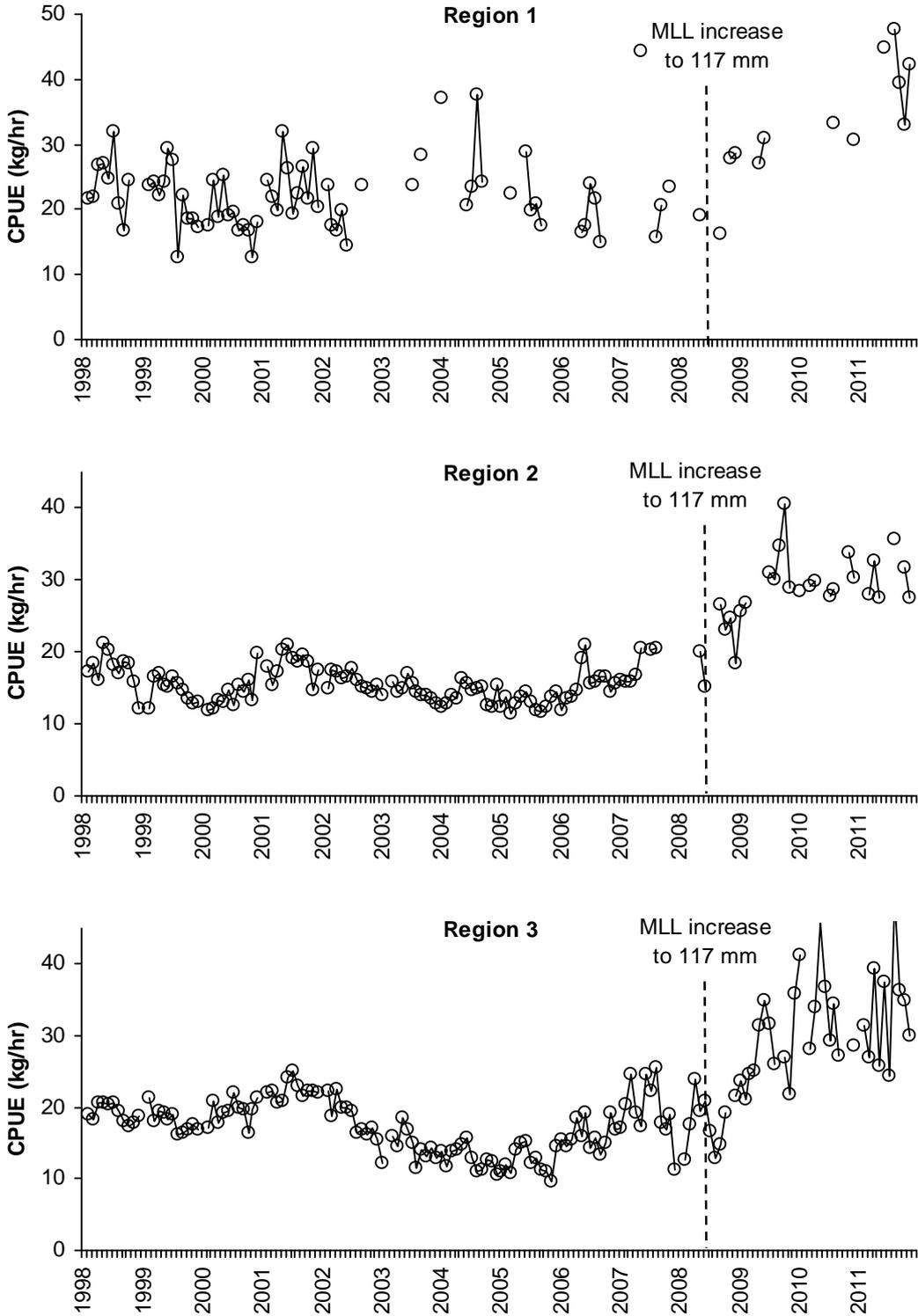


Figure 9 continued. Mean monthly CPUE (kg/hr) for each region of the fishery since 1998. Vertical dashed line indicates the increase in MLL from 115 to 117 mm in July 2008 and an increase in MLL from 117 mm to 120 mm in Zones Z1-Z5 (region 6) in May 2010.

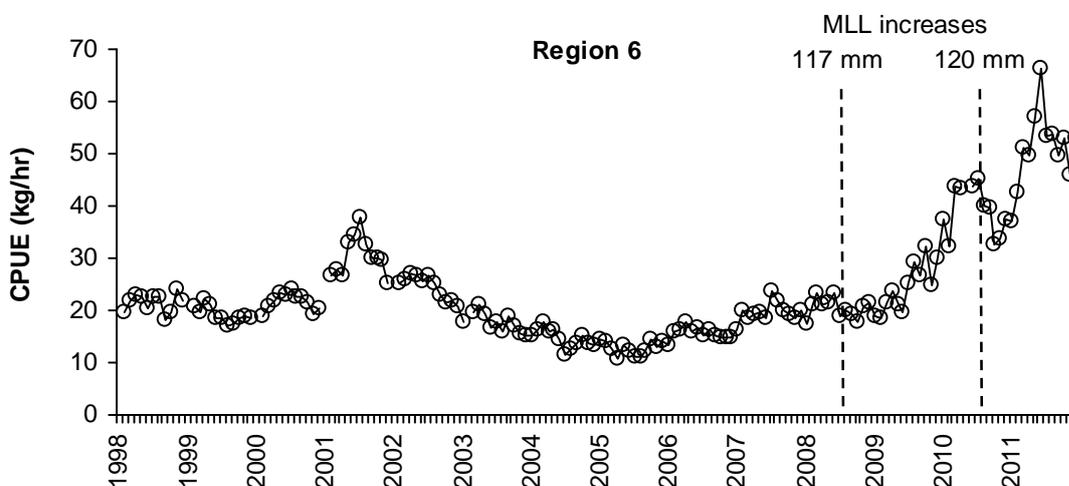
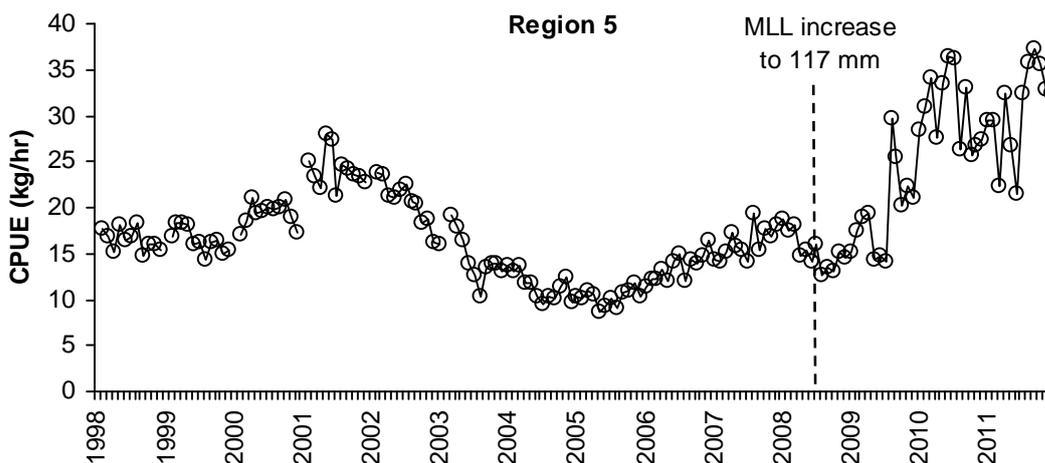
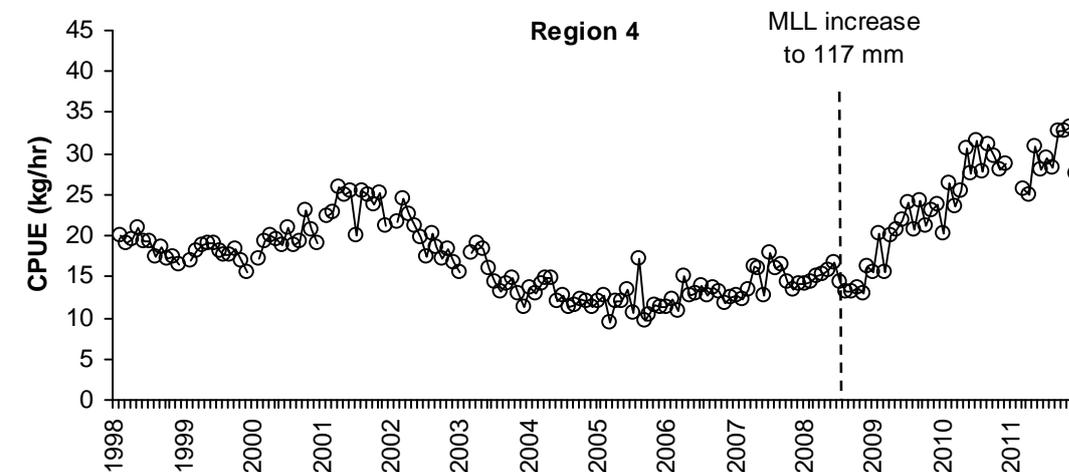


Figure 10. Monthly mean weight of individuals caught for regions 1-6 since 1999.

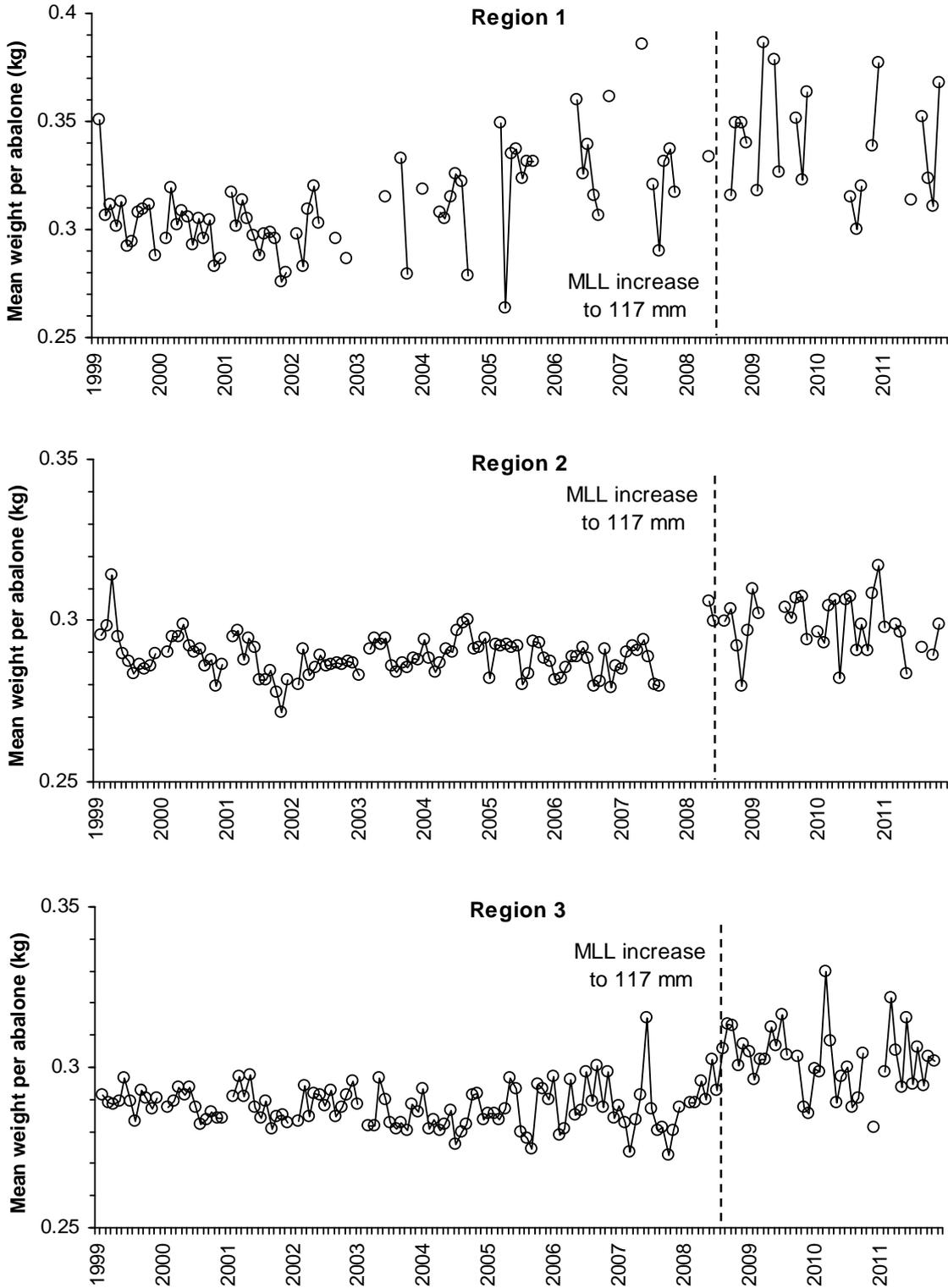


Figure 10 continued.

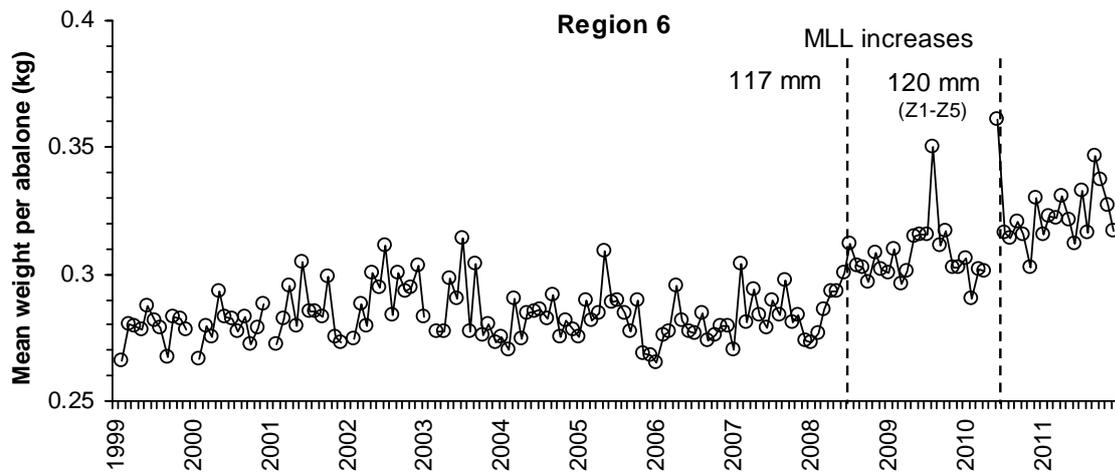
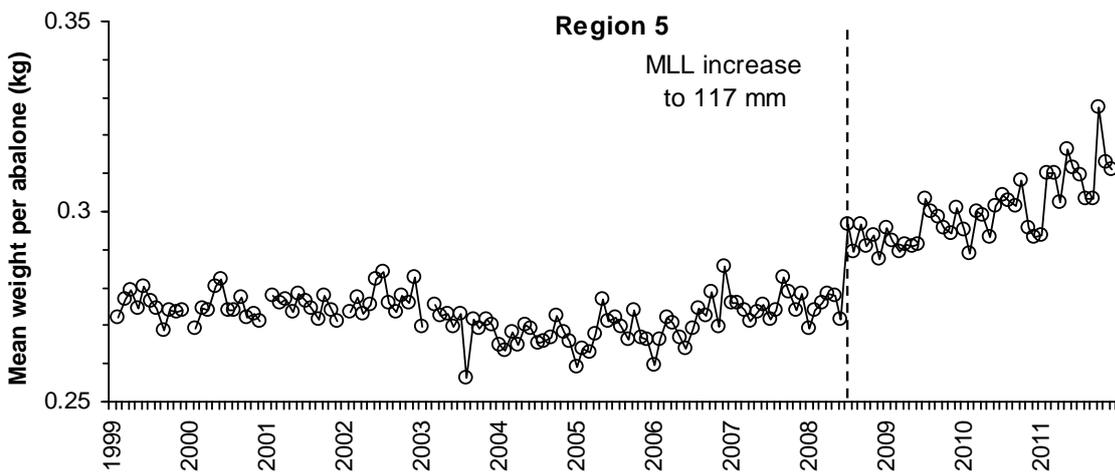
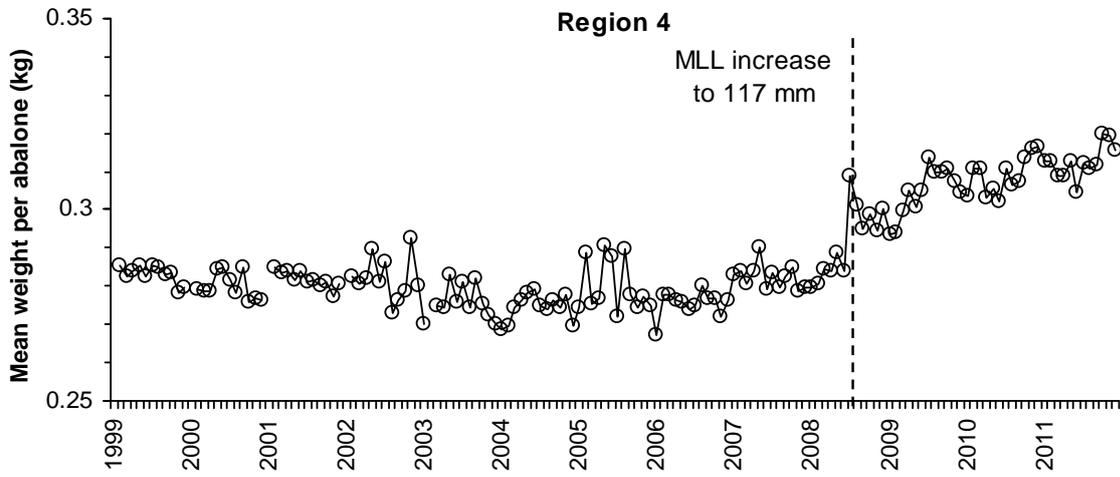


Table 2. Past catches, current, likely and target catches for 2011-12 Fishing Period and planned catches for 2012-13 within 21 Blocks. Target catches for 2012-13 considered and agreed by consensus at the industry workshop on the 8 March 2012 are shoe in red, and after the workshop in blue.

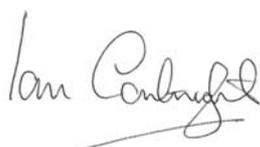
Block	2005-07	2008-10	2011	2011-12 Fishing period							Over target if		2012-13 Fishing period			
	min-max	min-max		to date	if 94 t	if 110 t	target	review	+30%	94 t	110 t	Change	Target	if 120 t	if 130 t	
01 Tweed A-E	0.0-0.0	0.2-1.0	0.0	0.0	0.0	0.0	0.5	3.0	0.7	-0.5	-0.5		2.0	0.0	0.0	
02 Port Stephens F-J	0.0-0.0	0.0-1.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.0	0.0		2.0	0.0	0.0	
03 Kiama K-M	0.0-0.0	0.7-2.1	0.0	1.5	2.4	2.9	2.1	3.0	2.7	0.3	0.8		3.0	3.1	3.4	
04 Ulladulla N	1.4-7.5	0.6-1.6	0.5	0.3	0.5	0.6	1.6	3.0	2.1	-1.1	-1.0		2.0	0.6	0.7	
05 South Brush P	3.7-10.9	3.7-5.4	3.8	1.7	2.8	3.2	5.4	6.0	7.0	-2.6	-2.2		5.0	3.5	3.8	
06 Batemans Q	1.8-5.4	0.0-1.2	0.0	0.0	0.0	0.0	0.0	2.0	0.0	0.0	0.0		1.0	0.0	0.0	
07 Moruya R-S	3.1-7.5	0.9-4.4	0.3	0.2	0.3	0.3	1.0	2.5	1.3	-0.7	-0.7		1.0	0.4	0.4	
08 Narooma T	5.6-10.0	2.8-4.4	1.6	1.1	1.8	2.1	3.8	4.5	4.9	-2.0	-1.7		4.0	2.3	2.5	
09 Bermagui U1-3	7.4-9.0	4.4-9.3	4.8	2.9	4.6	5.4	7.8	8.0	10.1	-3.2	-2.4		7.8	5.9	6.4	
10 Bunga U4-V2	7.6-9.8	3.7-8.3	5.0	2.9	4.7	5.5	6.9	8.0	9.0	-2.2	-1.4		6.9	6.0	6.5	
11 Moon Bay V3-W1	7.9-10.1	7.1-8.3	8.5	5.7	9.3	10.8	7.7	8.0	10.0	1.6	3.1		7.7	11.8	12.8	
12 Turingal W2-X1	6.6-8.0	5.5-6.7	7.4	4.5	7.3	8.5	6.7	7.0	8.7	0.6	1.8		8.5	9.3	10.1	
13 Long Beach X2	4.3-5.8	2.9-3.1	1.9	1.5	2.4	2.9	3.1	4.0	4.0	-0.7	-0.2		3.1	3.1	3.4	
14 Eden Y11-21	8.1-10.8	6.1-9.6	7.3	3.9	6.2	7.3	9.6	10.0	12.5	-3.4	-2.3		8.0	7.9	8.6	
15 Saltwater Y22-23	4.9-8.1	3.9-6.2	5.0	2.9	4.8	5.6	7.2	8.0	9.4	-2.4	-1.6		6.0	6.1	6.6	
16 Bittangabee Y24	6.9-7.5	5.2-5.7	5.1	2.5	4.1	4.8	6.7	7.0	8.7	-2.6	-1.9		6.0	5.2	5.7	
17 Greencape Y31	7.5-10.3	5.9-8.6	7.4	5.0	8.0	9.4	8.6	9.0	11.2	-0.6	0.8		10.3	10.3	11.1	
18 City Rock Y32	4.1-7.4	3.6-4.4	5.5	4.0	6.5	7.6	4.6	5.0	6.0	1.9	3.0		8.2	8.2	8.9	
19 Wonboyn Z1-3	8.5-12.3	4.3-7.6	6.7	3.7	6.0	7.0	6.3	7.0	8.2	-0.3	0.7		7.0	7.6	8.3	
20 Saltlake Z4	7.5-12.5	5.2-10.3	6.4	4.4	7.0	8.2	8.6	9.0	11.2	-1.6	-0.4		9.0	9.0	9.7	
21 Howe Z5	10.3-12.4	8.7-13.0	16.4	9.5	15.3	17.9	11.7	12.0	15.2	3.6	6.2		16+	19.5	21.2	
Total	119-162	93-97	93.7	58.3	94.0	110.0	110.0			-16.0	0.0			120.0	130.0	

The Determination

The Total Allowable Catch Setting and Review Committee, pursuant to Division 4 of Part 2 of the Fisheries Management Act 1994, determines that the total allowable commercial catch of abalone that may be taken in the Abalone Fishery during the period 1 July 2012 to 30 June 2013 should be **120 tonnes**. In making this determination, the Committee strongly recommends that the following distribution of catches be adhered to.

This determination is conditioned on the introduction of the proposed increases in MLL for region 6 being implemented on July 1 or shortly thereafter. This is in keeping with the proposal by the TACC Committee to increase size limits in its re-determination of the 2011/12 TAC earlier this year, which was subsequently supported for implementation by the Department for the 2012/13 fishing period. This undertaking by the Department was material to the considerations of the Committee in making the above TAC determination. If this change is not implemented in a timely manner, the Committee considers that a re-determination of the TAC may be necessary.

Region 1 North (subregions A-H)	2t Recommended MLL 120mm
Region 1 South (subregions F-H)	0t (1.5t research quota available in addition to the TACC for Fishing Surveys or Structured Fishing to a design acceptable to the Department to monitor stock condition and recovery)
Region 1 South (subregions J, K & L)	4t Recommended MLL120mm
Region 2	6.5t
Regions 3 and 4	36.5t
Regions 5 and 6	71t With the increase of 11t to be taken from Region 6. Recommended MLLs: For Region 6: i) 123mm for the area south of Wonboyn (Z1-Z5) ii) 120mm for the area between Green Cape Lighthouse and Disaster Bay (Y31 – Y32)



Ian Cartwright
Chairperson



Keith Sainsbury
fisheries scientist




Jessica Hartman
fisheries management

Bill Talbot
natural resource economist

Appendix 1. Details of public consultation

The TAC Committee undertook a comprehensive program of public consultation with stakeholders and the community. The details of this process are summarised in the table below, which chronologically records the stages of consultation undertaken by the TAC Committee and gives effect to the procedural requirements with reference to relevant sections from the *Fisheries Management Act 1994*.

Date	Fisheries Management Act	Consultation Stages
15.2.12	Section 31(1)	TAC Committee called for public submissions on the appropriate level of the annual TACC for Abalone for 2012/13.
15.2.12	Section 284 (1b)	The advertisement was placed in the Sydney Morning Herald, the Daily Telegraph and made available at NSW DPI Head Office and Fisheries Offices.
6.2.12	Section 284 (1b)	<p>Individual calls for submissions were also sent to particular interest groups who the Committee considered would be interested in providing a collective standpoint, either due to their direct involvement in the abalone industry or due to their interest in conservation issues. These groups included the following:</p> <ul style="list-style-type: none"> ■ All NSW Abalone Shareholders ■ All Members of the Abalone Management Advisory Committee ■ NSW Regional Industry Convenor ■ NSW Fishermen's Co-operatives ■ Nature Council NSW Conservation ■ NSW DPI Fisheries Offices
19.3.12	Section 284 (1b)	The TAC Committee allowed a period of at least 30 days for public consultation.
	Section 31 (2)	<p>The TAC Committee gave regard to the following submissions. The respondent included the following:</p> <ul style="list-style-type: none"> ■ NSW DPI – Commercial Fisheries Management, Research, and Compliance. ■ Abalone Shareholders ■ Members of the Abalone Management Advisory Committee
1.5.12		<p>The submissions were collated and analysed, and the TAC Committee heard formal presentations regarding views and opinions at the meeting held on 1.5.12. The following made presentations, or provided information to the Committee:</p> <ul style="list-style-type: none"> ■ Cameron Westaway – Senior Fisheries Manager, DPI ■ Robert Peever – Investigator, Special Operations, DPI ■ Matthew Ives – Scientist Fisheries Modelling & Assessment, DPI ■ Doug Ferrel – Manager Resource Planning, DPI ■ Duncan Worthington – Abalone Council of NSW ■ Individual submissions

Appendix 2. Summary of submissions and the issues⁷

Submission provided by ^{*8}	Issue(s)/Recommendations
George Chung, Tony Fry, Steve Hunter, Dennis Luobikis and Jim Miller.	Suggests that entire industry was very disappointed with previous TAC Committee determination. Considers, incorrectly, that industry advice is completely ignored and disregarded, and this has somehow prejudiced the actions taken by the Department on matters 'agreed' with industry. Considers that TAC Committee is not adhering to the requirements of the Management Plan or Fisheries Management Strategy in making determinations and associated recommendations. Suggests recommendations on size limits are divisive and that the Committee, incorrectly, supports blanket size limits. Claims that much of the coast is unfished due to the low TAC and that there is considerable hardship as a result of the low TAC against a backdrop of more abalone on the south coast than at any time in the past 40-45 years. Suggests it is time for new approaches and change to abalone TAC setting in NSW. Notes that an industry workshop agreed to a full year TAC of about 120-125 tonnes, a change in the fishing period and a separate TAC for the Northern and unfished (?) areas.
George Chung	Concerned that the TAC Committee ignored the opinion of the majority in industry members of AbMAC, both in terms of the TAC determination and recommendation to increase size limits. Also considers that the TAC Committee has never employed the size limit as prescribed in the 2007 FMS. Suggests that the need of the market should drive abalone fisheries management and outlines market opportunities in Japan and China in support of the adoption of smaller size limits. Requests that TAC Committee adopt the quota increase as recommended by the industry workshop and to not provide broad size limit recommendations.
Greg Finn	Suggests linking TAC increments directly to voluntary size limit increases. Reiterates recommendation of 120mm for Y32/32 and 123mm for Womboyn south (Z1-Z5). Supports workshop outcome of 3 tonnes for Region 1 North and states intention of fishing at 120mm. Notes an abundance of re-recruit fish in that area. Supports Duncan Worthington's recommendation of 1 tonne in Region 1 south (F1-G2) and states intention of fishing at 120mm.

⁷ Some submissions were lengthy and detailed. The table above seeks to summarise main points for information. The Committee did not use the table to inform their deliberations, but referred to full submissions.

⁸ This report is provided to the Minister as background to the Determination. The Committee is aware that after submission, this report is also circulated to industry and other stakeholders. Some names and submissions were made in confidence and have been removed from this version.