

TAC Committee

Total Allowable Catch Committee

Report and Determination for 2014/15

ROCK LOBSTER FISHERY

2 July 2014

Summary

State of the stocks

Data from the fishery shows that catch rates have increased during the 12 years 2000/01 to 2012/13 and most likely to 2013/14. The standardised catch rates, which take account of the gross effects of shifts in recent years from shallow (less than 30m depth) to deeper pot sets, are considered to be more realistic. Additional work on standardisation to look at the rates of increase of 'raw' and standardised catch rates has been recommended.

The population model has predicted either a stabilisation (from the enhanced recruitment scenario) or decrease (from the base case) of the exploitable biomass following the increases in TAC since 2007/08. The standardised catch rate is more consistent with a stabilisation or continued increase of exploitable biomass. The stable or increasing catch rate in the last few years is widespread across depths where significant fishing effort has been expended and some very high catch rates have been recorded in the 10-30m depth areas in the far-north coast in the last 3-4 years. This is particularly encouraging as it implies an expansion of the breeding stock back into this area after many years of depletion. The catch rates in deep water (>30m) on the central and north coasts remain high. These are maturing lobsters from southern regions recruiting to the spawning stock.

There has been considerable uncertainty about the level of recreational and unreported catch. The Committee this year has again applied the new approach adopted for 2013/14, using lower estimates of unreported catch and non commercial catch. These estimates are based on advice from Compliance Operations Branch and fishing operators, and are believed to be reasonable. While there was agreement that the recreational catch had decreased in recent years there was also a common view that it could increase again in future because continued stock recovery may attract additional recreational fishing effort.

The combination of spawning stock, puerulus monitoring and fishery monitoring is beginning to have sufficient observations and contrast to allow direct examination of the relationship between spawning stock, settlement of puerulus and recruitment of lobsters to the exploitable stock. The value and reliability of these interpretations for future management will increase greatly during the next few years as the recovery of the stock is monitored, as they will greatly help to optimise future management and the fishery.

The spawning stock has slowly rebuilt under the a range of management interventions (decreased maximum size, decreased targeting of areas occupied by mature lobsters and TACC reductions. This rebuilding has commenced in the premature lobsters in the deep-water parts of the fishery in the south, then feeding into the mature and premature lobsters in the deep water parts of the mid-north coast and now into the far-north coast. The increase in spawning stock has been particularly strong in the past few years. The increased spawning stock appears to have resulted in a trend of increasing puerulus settlement, and some increase in recent recruitment to the fishery.

The status of the lobster population was assessed using a length-based model. The model is fitted to the catch data throughout the history of the fishery, using the more recent assumptions about recreational and unrecorded catch, standardised catch rate data and size composition based primarily on observer data. Other data, including biological (e.g. growth and mortality rates, stock recruitment relationships) and fishery information (e.g. selectivity of fishing gear and discarding) are also included in the model.

There is now measurable evidence that significant rebuilding the spawning biomass has been achieved since about 2000. There is now little chance that depletion of the spawning biomass is lower than 0.25 and the median estimate is 0.36. Puerulus settlement and recruitment has increased in recent years as the spawning stock has increased. Further rebuilding of the spawning stock is predicted by model analysis to be slow under recent catch levels, but there are several reasons to expect that the model is slightly pessimistic.

The fishery data, scientific survey data and stock assessment provide reasonably consistent evidence in support of these interpretations. Consistency between the model and the catch rates has been improved by some standardisation of the catch rate data, revision of the unreported catches and incorporating an ad hoc means of representing the observed increases in recruitment. The Increased Recent Recruitment (IRR) scenario provides a marked improvement to consistency between the model and catch rate data. Under this scenario the recruitment was assumed to increase by 28% over the 14y period to 2011/12, consistent with average trends seen in the field observations. This has an effect similar to assuming a lower 'steepness' in the stock recruitment relationship, in that the recruitment systematically increases during this period of rebuilding of the spawning stock. The increase in recruitment is then assumed to stop in 2012/13 and future stock projections are made with recruitment constant at the 2012/13 level of recruitment. This is a cautious treatment because it does not assume that the recently observed trend of increased recruitment will persist as the population increases.

While the Increased Recent Recruitment (IRR) scenario provides a marked improvement to consistency between the model and catch rate data, this is still not fully correcting the situation of the large and growing discrepancy in the last two years (i.e. 2011/12 and 2012/13). If not addressed this discrepancy will undermine confidence in future assessments and projections. Further improvements to both the standardisation and treatment of recruitment should be developed and implemented.

The patterns of future recruitment will fundamentally drive the outcomes and options for future stock rebuilding and for the fishery, under two key scenarios:

- i. If the recent increase in average recruitment is statistical variability around an unchanging long-term average then the current catches are likely to be close to the maximum that is sustainable with current size limits. Further, a period of below average recruitment can be expected at some time.
- ii. If the recent increase in average recruitment is significantly driven by the increased spawning stock, as appears increasingly to be the case, then the situation is entirely different. The maximum sustainable catch will then depend on just how much the recruitment increases on average as the spawning stock continues increases, and at what spawning biomass threshold will recruitment plateau.

These questions can be determined only by observing what happens in nature as the spawning stock is increased. While it is too early to provide definitive interpretations on this the observations to date are consistent with the population having been significantly recruitment overfished, that recruitment has systematically increased as the spawning biomass has rebuild, and that the stock-recruitment relationship has lower 'steepness' than is usual in lobsters and assumed in the assessment model. Low steepness implies that the recruitment will continue to increase systematically as spawning biomass increases up to a relatively high threshold of spawning biomass.

Economic issues

While the lack of information on the net return from lobster fishing means that only tentative conclusions about the economic status of the industry are possible, the evidence available to the Committee suggests that the lobster industry in NSW is economically viable. Both quota and share prices have increased in recent years indicating a perception by industry that the future outlook for the fishery is positive. The increase in viability is a result of a number of factors including increases in stock abundance and catch per unit effort, the latter believed to have been influenced partly by an improvement in the efficiency and practices of lobster fishers.

There has been significant restructuring in the lobster fishery with fewer fishers landing a higher proportion of the catch. This structural change is desirable in order to allow for the most efficient fishers to land the majority of the catch, and to ensure the continued viability of lobster fishing businesses.

There remains limits on the maximum amount of quota that can be transferred by lobster fishers and the Committee urges the lobster industry to maintain a watching brief on the extent to which this limit becomes binding, thereby impeding the ability of quota to be transferred from less to more efficient fishers.

The Committee has made a number of recommendations in this report that are aimed at providing improvements in the economic viability of the lobster fishery in the future. These include: that the lobster industry investigate marketing approaches for New South Wales rock lobster to help with product differentiation; that lobster fishers make further efforts to report price information for quota transfers; that the Department and Industry undertake a study to investigate the relationship between length and economic yield in the lobster fishery; that analysis is undertaken on the technical efficiency of lobster fishing businesses; that data is collected on the costs of fishing; and, connected to this, that a decision is taken on whether the collection of this data is funded by industry, government or some combination of the two.

The Committee notes that the lobster industry does not see the collection of economic data as a priority at this stage, however the Committee is of the opinion that such data collection must start now. Better economic data, such as information on the costs of lobster fishing, will allow for a TACC to be set that maximises economic returns from lobster fishing. It will also facilitate better management decisions by allowing the department to better understand the impacts of alternative management options on the financial wellbeing of industry.

The Committee notes that efforts are being made to collect better recreational and Aboriginal cultural catch data. However, further efforts need to be made to obtain more robust time-series estimates of recreational and Aboriginal cultural lobster catch. The Committee recommends that this be done as soon as possible such that it can be used to develop a resource-sharing model for the lobster fishery.

The Committee's conservative determination for 2014/15 is based on strengthening the prospect of restoration of the spawning stock and maintenance of an appropriately sized available biomass, while providing a buffer for any future downturns in recruitment to the fishery or changes in targeting practices. By leaving stock in the water, this TAC strategy also offers improved prospects for the further economic recovery of the fishery, again over the longer term.

Management issues

Concerns that have been expressed in the past about the capacity of the commercial sector to take all of the allocated TACC are now largely redundant, with annual landings above 95% of the TACC for the past nine years and projected to reach similar levels in 2013/14.

Over the past ten years, the total number of shareholders in the fishery has contracted and the proportion of shareholders that hold less than the minimum shareholding has reduced. These changes suggest a general movement of shares from small (<55) to large (>100) shareholdings and is consistent with the increasing specialisation of lobster fishers. It is also now apparent that an increasing proportion of the total catch is being taken by this smaller group of operators who fish predominately for lobsters. These trends are consistent with the management objectives for the fishery and are an encouraging sign for the future. It seems to the Committee that, as noted last year, the process of restructuring the fishery is proceeding at a steady rate and with the introduction of web-based trading, further efficiencies should be recognised.

Estimating recreational participation rate and catch has been problematic in the past and there is no quantitative evidence to support the varied views on these issues. In response DPI commenced a state-wide recreational fishing survey in March 2013. This survey will use a similar methodology to the 2000-01 survey, which will enable a comparison and determine recreational participation rates and catch. A range of other recreational fisheries-related data will also be collected. The data collection phase has been completed and the data analysis should be available for consideration next year. It is expected that the report will provide limited but nonetheless useful information about recreational lobster fishing.

Aboriginal cultural fishing has been formally recognised under the *Fisheries Management Act 1994*, the relevant elements of which will provide regulation-making powers that allow limits (including bag and possession limits) and/or other management options to be applied to the special cultural fishing provisions. In 2013/14 only three cultural permits were sought and issued. Fisheries Officers report that the actual take under these permits is less than permitted.

For 2012/13 compliance rates for the fishery were again above the trigger point contained in the management plan, with the overall compliance rate for the fishery being 75%. However, this comprised a recreational compliance rate of 88% and a commercial compliance rate of 62%. Figures so far for 2013/14 suggest that the respective compliance rates of the sectors will be similar to the previous year. Further analysis presented to the Committee supports the view that the decreased compliance rate for the commercial sector is a result of improved targeting and therefore more efficient compliance effort. The figures for the commercial sector are greatly influenced by two successful operations which generated the majority of offences. The Committee is of the view that the decreased compliance rate reflects well on DPI Compliance's program rather than a dramatic shift in behaviour by the fishery. The figures support the conclusion that the majority of the licenced fishery continue to be compliant with regulations and are committed to the rebuilding and strengthening of the lobster stock.

As discussed above, expert judgement is that unreported retained catch has reduced from the 17% previously estimated and has reduced over time to around 8-10% of the reported commercial catch. The model inputs have been structured to reflect this unreported commercial catch.

All five coastal NSW marine parks include sanctuary zones over reef area likely to provide habitat for rock lobsters. These Sanctuary zones make up less than 7% of state waters. Given the small percentage of these zones in depths preferred by adult rock lobsters (generally 10 to 150m), and the migratory nature of rock lobsters, it is unlikely that existing sanctuary zones have a significant influence for the stock assessment and TACC setting process.

The Fisheries Management Strategy (FMS) specifies objectives, performance indicators and trigger points that provide a framework to measure the performance of the fishery against the objectives. No triggers were activated for 2013/14 and the biomass is currently well above the limit reference point of 25% of pre-exploitation levels. As the fishery continues to biologically improve and move away from its trigger limits, industry and government again acknowledged the need to develop targets that maximise the economic yield from the fishery and that with each the fishery moves closer to the point where a lack of target reference points will materially impact TACC-setting.. The Committee again recommends that the Department and industry work to develop to collect economic data and develop a harvest strategy. The latter should including target reference points relating to maximising economic yield, to provide guidance on TACC decisions in relation to stock rebuilding.

The contribution of management charges to total costs has contracted as a share of GVP from the fishery (from around 15% to 7%). The Committee continues to support a transparent system of cost recovery where services received by industry against management and other charges are fully justified and delivered efficiently. In considering 'management', the totality of fees applying to the fishery should be considered and consideration given developing an overall, risk-based, management package (including science and compliance) that has costs appropriate to the scale of the fishery.

Industry consultation and cooperation with the Department and the Committee continues to be working effectively. The Committee is pleased to note that the Lobster Industry Working Group met the day before the public forum, and hopes this body will continue to engage effectively as it has so far. The fact that industry generally continue to support a precautionary approach to the TACC reflects the fact that they understand and appreciate that the fishery is still in a re-building phase and/or a desire to maintain a consistent catch and return that is available from a more stable, robust stock.

Total Allowable Commercial Catch for 2014/15

The Committee was presented with a detailed Resource Assessment, based on the available fishery-dependant catch and effort information as well as data from the Fishery-Independent Survey. The assessment presents empirical measures of stock performance as well as model outputs.

Management and compliance reports were also provided.

Industry views were presented.

A detailed analysis of the Resource Assessment is set out in the stock status section of this report. From a management perspective, the key factors are:

- the spawning biomass is estimated to be well above the limit reference point of 25% of pre-exploitation levels and there are high levels of confidence around this estimate;
- in the absence of formal target reference points the implicit objective to provide stability in the fishery to allow for some further rebuilding of the spawning stock towards maximum stock productivity;

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- all measures of recruitment (peurulus settlement, catch rate of undersize and FIS catch and catch rate of undersize) indicate healthy recruitment to the fishery;
- continued support by the Committee and DPI researchers for the use of estimates for recreational and unreported catch first used in 2013/14, which have been used as inputs to the model;
- unanimous industry support for either the status quo or a slight increase in the TACC;
- the empirical measures and the model outputs show consistent positive trends – and although there is some divergence between the strength of those trends from the model outputs compared to CPUE, there are reasons why the model is overly pessimistic in this case and efforts to resolve this difference are continuing.

At this time and on this basis it is considered appropriate to maintain the Total Allowable Commercial Catch (TACC) at 150 tonnes, which corresponds to a Total Allowable Catch (TAC) of 180.3 tonnes.

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TOTAL ALLOWABLE CATCH COMMITTEE
ROCK LOBSTER FISHERY
REPORT AND DETERMINATION FOR 2014/15

1. INTRODUCTION

The Total Allowable Catch Review and Setting Committee (the Committee) is established by Section 26 of the *Fisheries Management Act 1994*. In 2014 it consisted of:

- Mr Ian Cartwright – Chairman
- Dr Keith Sainsbury – fisheries science
- Dr Jessica Hartman – natural resources economics
- Ms Kelly Crosthwaite – fisheries management

The Committee is required to determine the Total Allowable Commercial Catch (TACC) for the commercial sector of the rock lobster 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*. It is not subject to the control or direction of the Minister, but in reaching its decision, the Committee is required to have regards to:

- all relevant scientific, industry, community, social and economic factors;
- the need to ensure that the rock lobster 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 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 that the NSW Department Primary Industries (the Department) and industry provide views on the recommendations and their associated logic. This has created a dialogue on a range of issues directly related to the TACC in a whole-of-fisheries context, and enables the Committee to have a better understanding of the views of both the Department and industry. In this respect, the comments on the Committee recommendations contained in the management report this year were again particularly helpful. As stated above, however, the Committee can only make a determination on the Total Allowable Commercial Catch and the degree to which its suggestions and recommendations are accepted is a matter entirely for the Department.

To meet its statutory obligations, the Committee must consider the full extent of rock lobster exploitation. Total removals from the stocks of rock lobster are made up of:

- the quota allocated to commercial fishers;

- the legal catch of non-commercial fishers (recreational and Aboriginal) (the sum of catches taken by individuals within 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 legal and illegal components of the non-commercial fishery are currently estimated as a single figure, and the unreported commercial catches are estimated as a percentage of the actual commercial catch.

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 the 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. The rationale and measures suggested by the Committee concerning the maintenance of an adequate spawning biomass in the north of the fishery is an example of the application of the precautionary principle. It is again helpful if the Department and the Rock Lobster Industry Working Group provide feedback on the suggested rationale and measures made by the Committee in relation to the application of the precautionary principle in its Report and Determination.

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 commercial catch under the requirements of Section 31 Division 4 of the *Fisheries Management Act* 1994. Lobster 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.

In 2014 the Committee interviewed, obtained feedback from the TAC Forum and received written reports from:

- NSW Department Primary Industries, Fisheries Research;
- NSW Department Primary Industries, Commercial Fisheries Management;
- NSW Department Primary Industries, Fisheries Compliance; and
- participants in the commercial rock lobster fishery

Submissions to the Committee were provided in an open forum, with an option for the Committee to call on *in camera* submissions where appropriate. During the forum, the Committee and industry were able to ask questions of clarification. This year, no requests were received to provide submissions in camera.

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;
- the stock assessment for rock lobster provided by the Department;
- the spatial nature of the fishery, particularly in relation to the spawning biomass;
- comments and commentary provided at the TACC Open Forum; 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:

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

The Determination of the Committee for the annual TACC for rock lobster for the 2014/15 season is provided at the end of the report.

3. STATE OF THE STOCKS

3.1 Introduction

In making its determination of a TACC for rock lobster, the Committee is required to consider the current and predicted status of the stock. This section considers the major features of a range of data from fishery operations and fishery independent surveys and monitoring, and estimates of illegal unreported and recreational catches. The population assessment undertaken by DPI using a length-based model is reviewed. Finally, a number of conclusions concerning spawning stock rebuilding are drawn and a TACC for 2014/15 is recommended.

3.2 Data

3.2.1 Illegal, unreported and recreational catches

There is considerable uncertainty about the level of non-commercial (recreational) catch and unreported commercial catch.

In previous years the assessments and population projections assumed:

- A 25.8t recreational catch. This was based on estimates from studies and surveys several years ago. Reports from Compliance Operations Branch

consistently indicate that the recreational catch has decreased since about 1994/5.

- An unreported commercial catch of 17% of the total commercial catch was assumed to allow for unreported retained catch from the lobster fishery, unreported lobster catch in the trawl and trap fisheries targeting finfish, mortality due to ghost fishing by lost fishing gear, and predation or other mortality of commercially caught lobsters during fishing operations. Reports from the Compliance Operations Branch and the fishing operators consistently indicate that the unreported catch has considerably decreased since about 1994/5. The decrease is due to a combination of increased targeting of compliance operations, the improved economic circumstances of the fishery and active measures to reduce ghost fishing.

These estimates and judgements were discussed at length in the 2013 assessment and again this year. In the 2013 assessment two scenarios were examined, one being the previous estimates as above and the other having lower unreported commercial catch and non-commercial catch (UCNC) after 1994/5. The lower UCNC catch scenario assumes that after 1994/5:

- the recreational catch is 10% of the reported commercial catch (i.e. recreational catches that range from 10-16t), and that
- the unreported commercial catch linearly decreased from 17% of the reported commercial catch in 1994/5 to 8.5% of the reported commercial catch in 2010/11, and has been constant at 8.5% since 2010/11 (i.e. non-reported commercial catches that range from 12-19t in recent years, and is 12.75t for a TACC of 150t).

During 2013/14 DPI Fisheries Compliance found that the recreational compliance was similar to previous recent years, with no reports of major illegal catch. However three commercial operators were charged for possession of unreported (over-quota) catch which in total amounted to about 700Kg of lobsters. It is not possible to reliably determine how often during the year these operators were illegally taking such quantities of lobsters. However it is thought that the offences occurred as the season was coming to an end and quota was exhausted or in short supply, rather than there being non-reporting of this scale throughout the year. Nonetheless illegal catches of this scale would be very significant if repeated say weekly for a few months (e.g. 700Kg each week for two months would total 5.6t). This provides a very good justification for ongoing support for effective compliance in the fishery, and for strong deterrence against such non-reporting so as to protect both the stock and the interests of fishery operators who are 'doing the right thing'.

Despite these recent examples of non-reporting of commercial catch it is considered that the lower UCNC catch scenario, as above, is more credible than the higher UCNC catch scenario used previously. So this year's assessment was based on the lower UCNC catch scenario only.

While there was agreement that the recreational catch had decreased in recent years there was also a common view that it could increase again in future because continued stock recovery may attract additional recreational fishing effort. This requires monitoring.

3.2.2 Data from fishery operations

As in previous years two different time-series of data are available from the fishery.

The first series of data covers the period 1884-1958. The data from the fishery in this period is limited to catch and fishing effort and the data sources are poorly

understood, fragmentary, variable and often coarse. These data provide a valuable historical perspective for the fishery and assessment, but they are open to many interpretations. Old reports and records have been examined previously in attempts to clarify these interpretations. From these examinations it was concluded that the catches were probably reasonably accurate but that fishing effort was unreliable.

The second series of data covers the period 1969 to the present. The data for this period are better understood, are more detailed and cover a wider range of issues than just catch and fishing effort. In particular, voluntary logbooks since 1994 record the size of lobsters and the breeding condition of females, and a standardised observer program since 1998 has independently measured the size composition of lobsters caught.

Historically commercial catch rates were not formally standardised for changes in details such as the gear, area, depth or time of fishing operations; unstandardised catch rates are calculated as the total catch divided by the total effort in the area/time of interest. In the last few years catch rates are reported both in the unstandardised form and with a simple standardisation to account for the gross effects of recent shifts in fishing effort from shallow (less than 30m) to deeper pot sets. The deeper sets use much larger pots and longer soak-times, and have greater catch per pot-lift, than shallow sets. The standardised catch rates are considered to be a more realistic reflection of lobster abundance than the unstandardised catch rates, and the standardised catch rates are used in the 'base case' interpretation.

The estimated total catches for the selected UCNC catch scenario are shown in Figure 3.1. The total catch, effort and catch rates since 1969/70 are shown in Figure 3.22. The detailed catch, effort and catch rate by area and depth since 1997/8 are shown in Figure 3.3. These figures provide data from the most recent complete catching year (2012/13) and a preliminary estimate of the catch rate in the current incomplete catching year (2013/14). Although data from 2013/14 is incomplete it comprises almost all of the available TACC (115t of the 150t). The remaining fishing period includes the season when high catch rates are traditionally obtained from depths greater than 30m on the mid-north coast (see Fig 5.3) and so the annual catch and aggregate catch rate for 2013/14 are expected to be slightly higher than the incomplete figures indicate.

Both unstandardised and standardised catch rates (Fig 2) show similar trends, though as expected the absolute values are smaller for the standardised catch rate. Catch rates have increased during the 12 years 2000/01 to 2012/13, and most likely to 2013/14. The standardised catch rate has rapidly increased in the last 2 years; there has been further increased concentration of the fishery in deep water and this may be responsible for this although the standardisation is intended to account for such changes in the operation of the fishery. The population model has predicted either a stabilisation (from the enhanced recruitment scenario) or decrease (from the base case) of the exploitable biomass following the increases in TAC since 2007/08. The standardised catch rate is more consistent with a stabilisation or continued increase of exploitable biomass. The stable or increasing catch rate in the last few years is widespread across depths where significant fishing effort has been expended (Fig 5.3). Some very high catch rates have been recorded in the 10-30m depth areas in the far-north coast in the last 3-4 years. This is particularly encouraging as it implies an expansion of the breeding stock back into this area after many years of depletion. The catch rates in deep water (>30m) on the central and north coasts remain high. These are maturing lobsters from southern regions recruiting to the spawning stock.

Overall the catch and catch rate data support interpretations that the stock is broadly increasing in recent years, having increased significantly from the low levels in 2000-2002. Inshore catch rates of small lobsters show an overall increasing trend, with

fluctuations that are at least partly in response to patterns of recent puerulus settlement, and deeper catch rates of maturing lobsters showing a high and perhaps increasing recruitment into the spawning stock.

The differences between the unstandardised catch rate (i.e. the catch rate experienced by fishers) and the standardised catch rate (i.e. the index of exploitable stock abundance intended to correct for gross changes in fishery operations) are somewhat perplexing and strongly suggest that there is a need to develop a more comprehensive method of standardisation. The steady increase in the unstandardized catch rate since the low catch rates in 2000-2001 is interpreted as being due both to the increase in stock abundance and to on-going increase in the efficiency of fishing. Increase in fishing efficiency is expected from operational changes reported by fishers in response to improved stock and economic conditions; these include transfer of fishing effort from inshore small traps to offshore large traps, upgrading of vessels, upgrading the technology for recovering pots in deep water and high currents, and greatly reduced effort required to take the TACC so that fishing in marginal weather/locations or locations is avoided. Until the last 2 years (2011/12 and 2012/13) the standardised catch rate increased more slowly than the unstandardized catch rate, as expected if the standardisation was accounting for some of the increases in operational efficiency as intended. However in these last two years the standardised catch rate has increased more rapidly than the unstandardized catch rate. The causes of this change of behaviour in the catch rate data should be investigated, and a new standardisation methodology developed as appropriate.

3.2.3 Fishery reference points

While target and limit reference points have not been formally agreed for the fishery the TACC has operated with implicit target and limit reference points for several years. These are:

Target reference point. A depletion to 0.5 of the unfished biomass has been used for reporting. Performance against this reference point has been reported for both total biomass and spawning biomass. Because the stock has been well below 0.5 of the unfished biomass since the Share Management arrangements were introduced this reference point has not been highly relevant operationally. But as the stock is recovered an appropriate target reference point should be considered and selected. This is now becoming a more urgent and relevant need - now that the stock is recovered above the limit reference point judgements about the target and how quickly to achieve it is beginning to influence TAC decisions. The target reference point should include socioeconomic as well as biological considerations.

While there is uncertainty in the interpretations the early indications are that this lobster species has a relatively low 'steepness' in its stock-recruitment relationship. If true the implication is that recruitment decreases with spawning biomass from a relatively high threshold of spawning biomass. With low 'steepness' the recruitment will continue to increase on average as the spawning stock rebuilds back to that relatively high threshold. Consequently recruitment would continue to increase to relatively high spawning biomass instead of quite quickly 'plateauing' as spawning biomass increases. Knowledge of this threshold is relevant to setting the target reference point. With the information available currently it can be concluded that this threshold is at or above the current spawning stock size, implying that the overall productivity of the stock is greater than or equal to the current productivity. Only as the stock recovers more fully will it be possible to determine how much greater than the current productivity the maximum productivity actually is. It will be necessary to slightly 'over recover' the stock to know the abundance at which maximum productivity occurs. In setting target reference points for this fishery the maximum

biological productivity, and consequently some aspects of economic productivity, is not yet known and so an adaptive approach is likely needed.

Limit reference point. The 2007 Fishery Management Strategy (SMP) identifies stock depletion to 0.25 of the unfished biomass as a level of depletion that is of concern in relation to biological productivity and that would trigger a review of management. The Committee treats this as a limit reference point, to be avoided with high probability and below which urgent corrective action is required. In the past the Committee has used median depletion to 0.3 of the unfished level as the limit reference point. These two different limit reference points are consistent and equivalent when applied with different requirements for the probability that the reference point is achieved. The limit reference point used by the TACC was a median 0.3 depletion, which gives a 50% probability that the actual population was above the 0.3 depletion level. The standard error of estimated depletion in recent assessments is about 0.05. So a median depletion estimate of 0.3 implies (approximately) and a 95% probability that the true population is above 0.2 depletion and a 84% probability that the true population is above 0.25 depletion. Put slightly differently, the Committee uses a limit reference point that is depletion to 0.25 of the unfished level with a 84% probability that the true population is above this level of depletion. This is approximately equivalent to the median estimate of the depletion being above 0.3, as used by the Committee.

Performance against the limit reference point has been reported for both total biomass and spawning biomass, with most importance and priority being given to the spawning biomass.

There is good evidence from the directly measured puerulus settlement and indices of spawning biomass that the average puerulus recruitment has systematically increased as the spawning biomass has increased. And conversely that depletion of the spawning stock in the 1980s, 1990s and early 2000s was sufficient to reduce settlement levels and cause recruitment overfishing. An increase in average settlement has been seen as the spawning biomass increased to its current level of about 0.3 of the unfished biomass. It is clear from this that depletion below 0.3 results in significantly reduced puerulus settlement. This provides strong justification for avoiding greater depletion with very high probability, which is achieved for the limit reference point as applied by the Committee. However the available data do not yet allow comparisons with settlement from spawning stocks that are larger than 30% depletion, and hence whether even at this level there is settlement impairment. Also while increased numbers of lobsters recruiting to the fishery at 104mm have followed the increased puerulus settlement the exact relationship between these is not yet clear. It will require further observations of settlement, recruitment to the fishery and spawning biomass to allow confident interpretation.

3.2.4 Fishery independent surveys and monitoring

In this fishery independent measures of spawning stock are particularly important because a maximum legal size is enforced that is intended to reduce fishing on a significant part of the spawning stock. This management measure protects the older mature animals from fishing because they contribute strongly to egg production. But it also has the consequence that commercial catches do not fully reflect the spawning stock.

Two fishery independent monitoring programs have been established, one focused on measuring the spawning stock and the other on measuring settlement of post-larval lobster (puerulus) that grow and recruit to the fishery about 2-3 years later. The spawning stock surveys using standardised pot sets in the northern areas started in 1998/99. The puerulus surveys starting in 1995/96. The combination of spawning

stock, puerulus monitoring and fishery monitoring is beginning to have sufficient observations and contrast to allow direct examination of the relationship between spawning stock, settlement of puerulus and recruitment of lobsters to the exploitable stock. The value and reliability of these interpretations for future management will increase greatly during the next few years as the recovery of the stock is monitored, as they will greatly help to optimise future management and the fishery.

Puerulus settlement in the northern areas is typically low on average (about a tenth of the settlement in the south), but it is important in supporting the inshore fishery. In the past low settlement in the north has resulted in undesirable transfer of fishing effort onto the deeper spawning stock. Settlement in the northern areas in the past 3y has been variable but overall strong by historical standards.

In the southern areas the puerulus settlement has on average been increasing since about the mid-2000s. Settlement in the past 3y is more than double the settlement in the mid-2000s. The subsequent recruitment of lobsters to the fishery has increased by about 25% over the same period. These relationships should become clearer as more observations are made, but it suggests that puerulus settlement in the south (where most settlement occurs) has increased considerably as the spawning biomass has increased, and that this has resulted in a noticeable (but smaller) increase in recruitment of undersized lobsters to the fishery.

The size composition of the catch from standardised trap surveys on the mid-north and far-north coast is shown in Figure 3.4. This is the area the area occupied by the mature lobsters. This size composition was updated in 2012/13 as part of monitoring every second year, and is not updated this year. These surveys indicate that the number of mature females in the population has increased from the low point in about 2003/04. The increase was very slow until about 2007/8, but has been rapid in the last few years and there are now high catch rates for a wide size-range of mature lobsters.

A composite index of the spawning biomass from direct observations is shown in Figure 3.5. This shows the very low levels reached in 2001/2, a slow rebuild through the 2000s, and rapid increase since 2010.

Overall this direct monitoring of the spawning stock is very encouraging with respect to the strength of rebuilding and it greatly increases confidence in assessing the status of the stock. It directly demonstrates that the decreased maximum size limit, decreased targeting of the areas occupied by mature lobsters and TACC reductions in the mid to late-2000s, and continued restraint in setting more recent TACCs, is allowing rebuilding of the spawning biomass. The spawning stock has slowly rebuilt under the management interventions, with rebuilding first occurring in the pre-mature lobsters in the deep-water parts of the fishery in the south, then feeding into the mature and premature lobsters in the deep water parts of the mid-north coast and now into the far-north coast. The increase in spawning stock has been particularly strong in the past few years. The increased spawning stock appears to have resulted in a trend of increasing puerulus settlement, and some increase in recent recruitment to the fishery.

3.3 Analysis

3.3.1 Stock assessment

The status of the lobster population was assessed using a length-based model. This model explicitly represents the length and associated age structure in the population, as well as the sexual difference in some key parameters such as growth and hence availability to the fishery. It allows calculation of the size of the mature stock, it can

represent the effects of strong or weak year-classes as they pass through the population, and it can incorporate changes in size selectivity in the fishery

This model was fitted to the catch data throughout the history of the fishery corrected by the low UCNC assumptions about unrecorded catch, to the standardised catch rate data since 1969, and to the size composition of 160-200mm lobsters in the years 1999/2000, 2000/01, 2001/02, 2008/09 and 2009/10. The limited size range was used because it is expected to be less subject to changing fishery practices and the limited period was used because the size composition of the catch in those years were collected by observers. The model also incorporates a great deal of other information that is available. For example it includes detailed biological information (e.g. growth rate, maturity schedule, percentage berried females, natural mortality rate, relationship between mature stock and recruitment) and fishery information (e.g. selectivity of the fishing gear, discarding of lobsters near the legal size limits, and the mortality of discarded lobsters).

Sensitivity of the model was examined for two interpretations of the recent recruitment. The base-case interpretation uses the previously assumed stock-recruitment relationship with high 'steepness', and implies that recruitment remains relatively high on average for spawning stock biomass down to 10% of the unfished biomass but then decreases rapidly below this biomass. An alternative 'increased recent recruitment' (IRR) scenario was developed in which the recruitment between 1997/8 and 2012/13 was higher than predicted by the base-case. Under this scenario the recruitment was assumed to increase by 28% over the 14y period to 2011/12, consistent with average trends seen in the field observations. This has an effect similar to assuming a lower 'steepness' in the stock recruitment relationship, in that the recruitment systematically increases during this period of rebuilding of the spawning stock. But in this scenario it is assumed that the increase in recruitment stops in 2012/13 and future stock projections are made with recruitment constant at the 2012/13 level of recruitment. This is a cautious treatment because it does not assume that the recently observed trend of increased recruitment will persist, as it would if a lower 'steepness' was simply assumed to apply.

The model fit to the length frequency data is good, including both to the 1999-2002 period of high fishing mortality with a steep gradient in the length frequency distribution and to the later 2012/13 period of lower fishing mortality with a shallow gradient in the length frequency distribution. However the model fit to the catch rates becomes increasingly poor in the last few years, with the model increasingly underestimating the catch rate. The base case systematically underestimates the catch rate since 2005/6. The IRR scenario matches the catch rate well through to 2009/10, and so this scenario is an improvement. But neither scenario can match the rapidly increasing catch rate observed in 2010/11 and 2011/12. Two possible reasons for this discrepancy, that are not mutually exclusive, are:

- that increases in recruitment since 2010 are stronger even than the IRR scenario represents, which implies that the model is underestimating recent stock recovery, and
- that operational increases in fishing efficiency since 2010 are greater than the method of catch rate standardisation can correct for, which implies that the catch rate is exaggerating the recent stock recovery.

This provides a growing uncertainty in the assessment of the status of the stock and in stock projections, and this should be addressed. At this time the interpretation of continued stock recovery during the past 2-3y is reasonable; at worst, giving weight to the second interpretation above, the stock has been stable. The IRR scenario, while somewhat ad hoc in its implementation, has strong empirical support and is accepted here as a feasible representation of the population. In future a more formal

modelling structure that can accommodate systematic trends in recruitment should be developed and applied (e.g. a model with estimated annual recruitment deviations and/or a fitted stock-recruitment relationship).

3.3.2 Present stock levels

The key population and depletion estimates for the base-case (i.e. standardised catch rate, low Unreported Catch and Non-commercial Catch (UCNC) and average recruitment according to the high steepness stock-recruitment relationship used in previous assessments) and for the Increasing Recent Recruitment (IRR) scenario (i.e. standardised catch rate, low Unreported Catch and Non-commercial Catch (UCNC) and increased recruitment to match the average trend observed in the field during the 14y period 1997/8 to 2011/12). The IRR assessment is considered to provide the most credible assessment of the two.

	Median	5% limit	95% limit
Unexploited total biomass (K)			
Base-case	6,095	5,832	7,420
IRR	6,101	5,833	7,451
2013-14 total biomass			
Base-case	2,484	1,842	3,817
IRR	2,913	2,076	4,265
2013-14 total biomass/K			
Base-case	0.41	0.31	0.52
IRR	0.48	0.36	0.59
Unexploited spawning biomass			
Base-case	2,336	2,235	2,844
IRR	2,339	2,236	2,856
2013-14 spawning biomass			
Base-case	790	542	1,279
IRR	907	604	1,387
2012-13 spawning biomass/unexp. spawning biomass			
Base-case	0.34	0.24	0.45
IRR	0.39	0.27	0.50

Key features of the assessment are:

- the spawning biomass has increased measurably and steadily over the past 5y;
- the spawning biomass has rebuilt to above the limit reference point (median estimate of spawning stock depletion in the IRR assessment being 0.39 with a 95% confidence interval from 0.27 to 0.50).

This indicates that the management measures of the past several years have had the desired effect of rebuilding the stock.

The increased recent recruitment scenario gives a better fit to the available data than the other model assumptions but it still under-predicts the observed catch rates in the last 2 years. This deviation appears to be growing and if not rectified will cast

significant doubt on the overall interpretation of stock status and trends in future assessments.

3.3.3 Predictions of future stock levels

Predictions for the base-case assessment and the IRR scenario were made of the change in the biomass that would occur after 5y of catch at various levels. The changes in spawning biomass and exploitable biomass are calculated by the predicted biomass in 2019/20 divided by current biomass in 2013/14. These are:

Predicted proportionate change in spawning biomass after 5y of various constant future catches		
Total Catch (t)	Catch rate and unreported catch assumptions	Increase in spawning biomass ($SB_{2019-20}/SB_{2013-14}$); Median and the 95% confidence interval
150	Base-case	1.02 [1-1.06]
	IRR	1.13 [1.09-1.18]
175	Base-case	0.96 [0.92-1.01]
	IRR	1.08 [1.02-1.12]
200	Base-case	0.89 [0.83-0.99]
	IRR	1.03 [0.95-1.08]

Predicted proportionate change in exploitable biomass (104-180mm length lobster) after 5y of various constant future catches		
Total Catch (t)	Catch rate and unreported catch assumptions	Increase in exploitable biomass ($B_{2019-20}/B_{2013-14}$); Median and the 95% confidence interval
150	Base-case	1.03 [1.00-1.05]
	IRR	1.07 [1.05-1.11]
175	Base-case	0.89 [0.84-0.95]
	IRR	0.98 [0.92-1.01]
200	Base-case	0.75 [0.64-0.88]
	IRR	0.88 [0.77-0.95]

The IRR assessment is considered to provide the most credible interpretation. With catches at about the current level (i.e. TACC of 150t and a total catch of 180t) the spawning biomass is predicted to remain at about the current level, the median depletion of the spawning biomass is predicted to remain above the limit reference

point, and the stock available for harvest is predicted to decrease slightly from current levels. The model predictions are very similar to those made last year. They are expected to be slightly pessimistic because the IRR assumes that future recruitment will remain constant at the 2011/12 level, rather than to increase with increasing spawning biomass.

3.4 Conclusions

Management decisions in the past several years have been aimed at stock rebuilding. There is now measurable evidence that significant rebuilding the spawning biomass has been achieved since about 2000. There is now little chance that depletion of the spawning biomass is lower than 0.25 and the median estimate is 0.36. Puerulus settlement and recruitment has increased in recent years as the spawning stock has increased. Further rebuilding of the spawning stock is predicted by model analysis to be slow under recent catch levels, but there are several reasons to expect that the model is slightly pessimistic.

The fishery data, scientific survey data and stock assessment provide reasonably consistent evidence in support of these interpretations. Consistency between the model and the catch rates has been improved by some standardisation of the catch rate data, revision of the unreported catches and incorporating an ad hoc means of representing the observed increases in recruitment. The Increased Recent Recruitment (IRR) scenario provides a marked improvement to consistency between the model and catch rate data. However this is still not fully correcting the situation, and there is a large and growing discrepancy in the last two years (i.e. 2011/12 and 2012/13). If not addressed this discrepancy will undermine confidence in future assessments and projections. Further improvements to both the standardisation and treatment of recruitment should be developed and implemented.

The patterns of future recruitment will fundamentally drive the outcomes and options for future stock rebuilding and for the fishery. If the recent increase in average recruitment is statistical variability around an unchanging long-term average then the current catches are likely to be close to the maximum that is sustainable with current size limits. Further, a period of below average recruitment can be expected at some time. However if the recent increase in average recruitment is significantly driven by the increased spawning stock, as appears increasingly to be the case, then the situation is entirely different. The maximum sustainable catch will then depending on just how much the recruitment increases on average as the spawning stock continues increases, and at what spawning biomass threshold will recruitment plateau. These questions can be determined only by observing what happens in nature as the spawning stock is increased. While it is too early to provide definitive interpretations on this the observations to date are consistent with the population having been significantly recruitment overfished, that recruitment has systematically increased as the spawning biomass has rebuild, and that the stock-recruitment relationship has lower 'steepness' than is usual in lobsters and assumed in the assessment model. Low steepness implies that the recruitment will continue to increase systematically as spawning biomass increases up to a relatively high threshold of spawning biomass.

At this time it is considered appropriate to maintain the Total Allowable Commercial Catch (TACC) at 150t, which corresponds to a Total Allowable Catch (TAC) of 180.3t. This provides some stability in the fishery and is expected to allow for some further rebuilding of the spawning stock towards maximum stock productivity. Future TACC decisions would benefit from greater clarity about target reference points and the desired time to reach them; both of which include strong economic as well as biological considerations.

The conversion between TAC and TACC uses the same method and unreported catch assumptions as applied last year. The TACC is equal to the reported commercial catch (RCC) and the TAC is equal to the reported commercial catch plus the unreported commercial catch plus the recreational catch. In keeping with the low unreported catch scenario used in the base case stock assessment and projections the recreational catch (RC) is assumed to be 0.1 of the total (reported and unreported) commercial catch and the unreported commercial catch (UCC) from 2010/11 is assumed to be 0.085 of the total commercial catch (RCC+UCC). That is

$$UCC=0.085 (RCC + UCC) =0.085 RCC/(1-0.085)$$

and

$$\begin{aligned} TAC &= RCC + UCC + RC \\ &= RCC + UCC + 0.1 (RCC+UCC) \\ &= RCC + 0.085 RCC/(1-0.085) + 0.1 [RCC + 0.085 RCC/(1-0.085)] \\ &= 1.202 RCC \end{aligned}$$

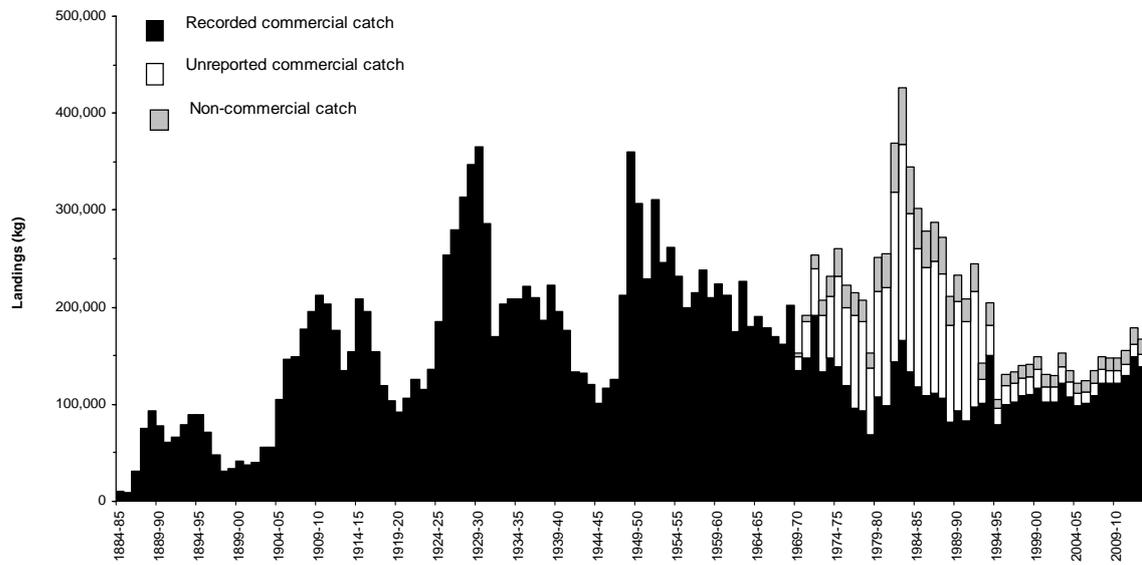
so that $TACC = RCC = TAC/1.202$.

There are several issues that would benefit from focused attention by the Department and industry. In particular:

- Redevelop the methods to standardise the catch rate for past and on-going changes in the operational details of the fishery.
- Modification of the population assessment model to better account for and estimate recruitment dynamics.
- Develop the longer-term target for the stock and fishery. The profitability of the fishery and cost-effectiveness of fishery assessment and management should be factors in these considerations. There should also be explicit consideration of how best to adaptively explore the productive potential of the stock given that there are indications that maximum productivity could occur at higher biomass than was expected under previous assumptions about the stock-recruitment relationship.

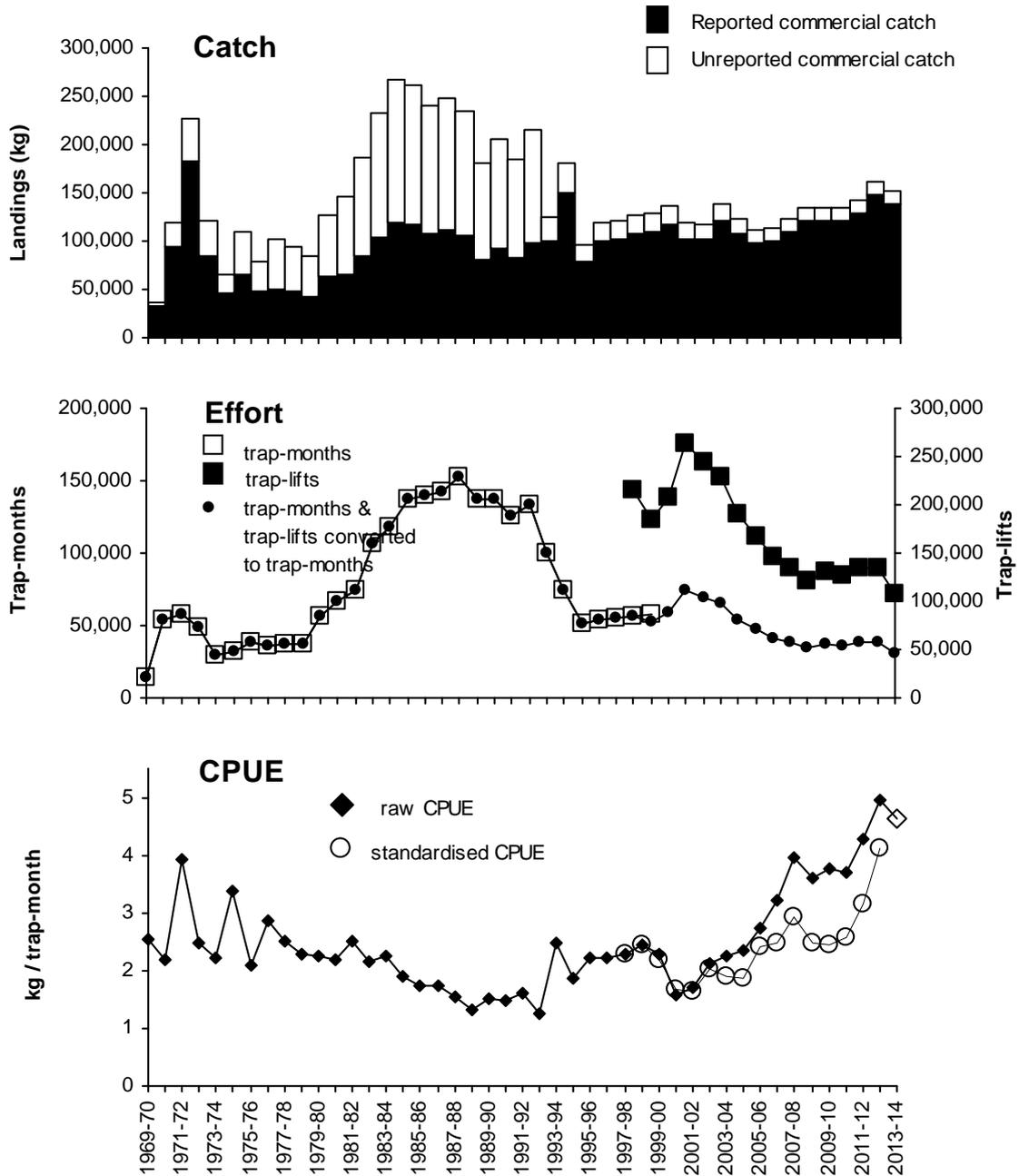
Consideration should be given to reporting only on the fishery indicators for the 2015 TACC meeting, and for diverting the research and management effort to addressing these issues. The indicators are expected to provide an adequate picture of the state of the resource in 2015, particularly because the full set of fishery independent monitoring will be available that year.

Figure 3.1. The landed catch since the start of the fishery.



The reconstructed catch assuming a relatively low Unreported Catch and Non-commercial Catch (UCNC) since 1994/5.

Figure 3.2. Commercial catch, effort and catch rate since 1969/70 when reliable effort is available. The open square shows the incomplete 2013/14 year.



3 3. Commercial catch, effort and catch rate by area and depth since 1997/8 when detailed reporting became mandatory. The spawning stock is mostly found in the far north coast (28-30+) and mid-north coast (31-32) at depths greater than 10m and especially depths 10-30m. Open circles are for the incomplete 2013/14 year.

■ Catch □ Trap lifts ● CPUE (kg/trap-lift)

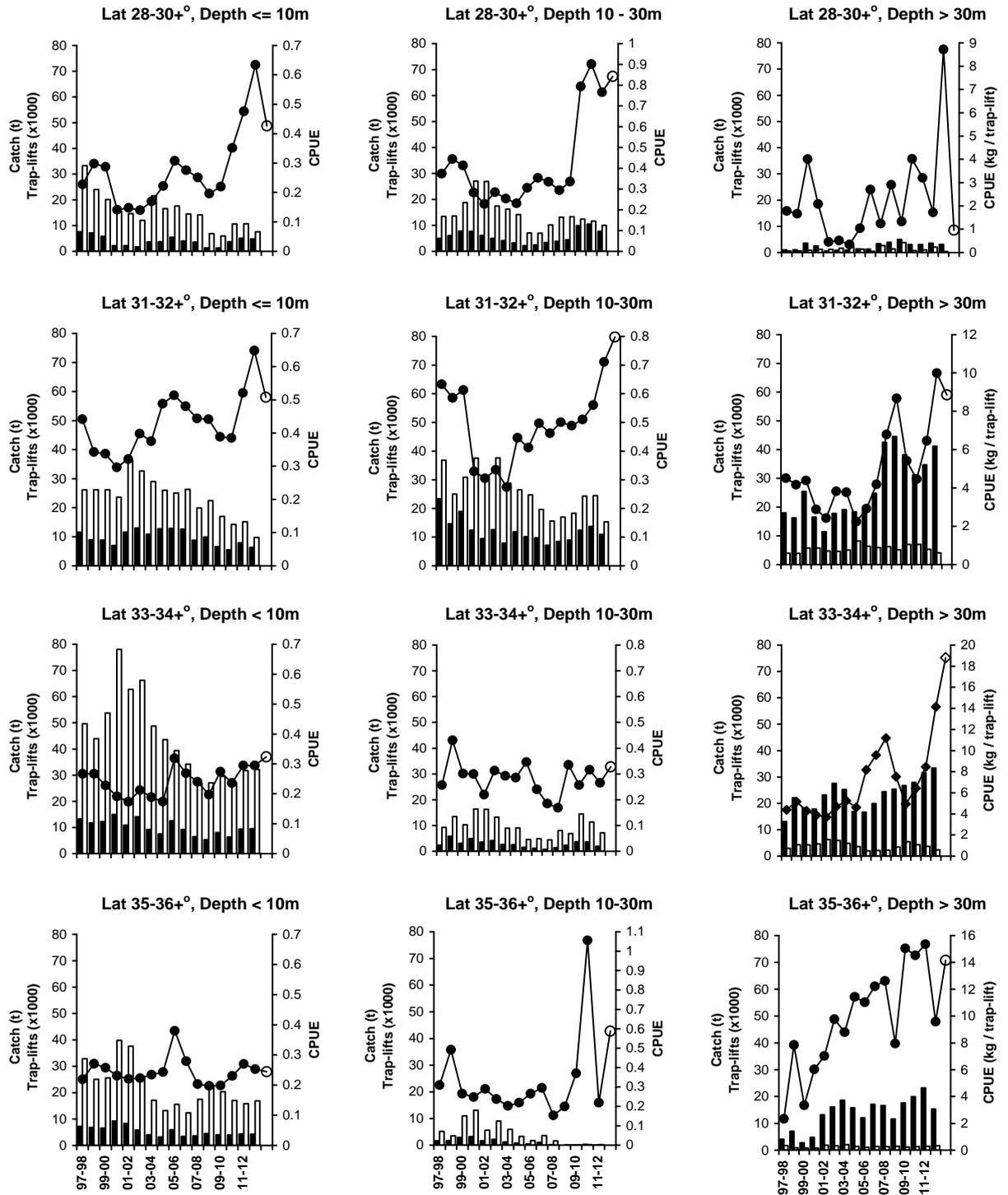


Figure 3.4. Size composition of lobsters in the commercial catch of the combined mid- and far-northern areas, from data provided by logbooks and augmented by observers. The dashed line is the maximum legal size. These data are updated every second year and have not been updated this year.

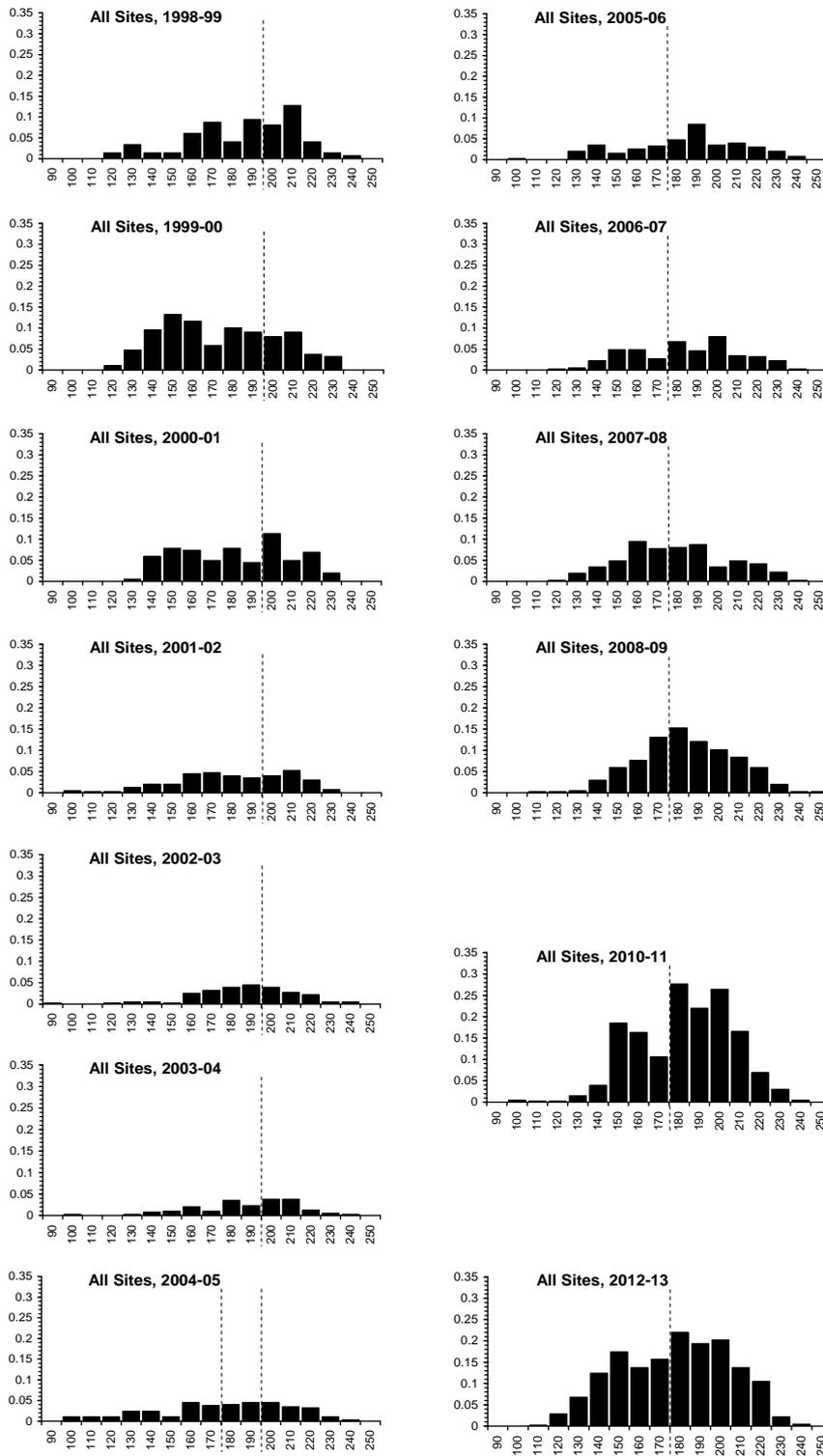
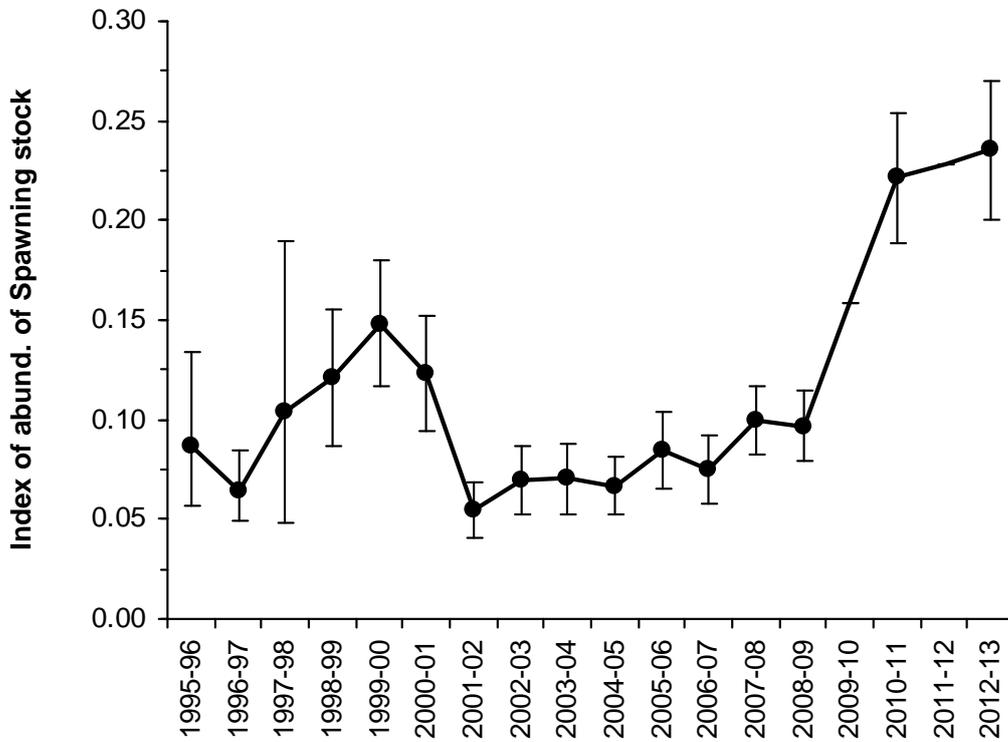


Figure 3.5. Index of abundance of spawning stock from direct observations. The index is based on commercial catches of berried female lobsters for the period up to 1997-98 and on fishery-independent surveys since 1998. These data are updated every second year and have not been updated this year.



4. ECONOMIC CONSIDERATIONS

4.1 Introduction

In this section of the report, the economic status of the NSW rock lobster industry is described; consistent with the requirement that the Committee have regard to economic and social issues in making its determination.

Economic considerations focus on gross returns to the industry rather than net returns due to the absence of information on fishing costs. Further, this analysis is undertaken for the rock lobster fishery only and does not consider returns from other types of fishing to individual enterprises (fishing businesses), which can be quite significant, especially in the far north of the fishery. A summary of quota and share market prices is presented as an indicator of both short and long run industry profitability. Analysis of other data affecting the economic performance of the fishery, such as export prices and catch per unit effort, is also presented.

The absence of timely and relevant data on fishing costs means that it is not possible to make a complete analysis of the economic performance of the NSW rock lobster industry. Focussing on gross returns alone means that changes in costs, and the impact of this on profitability, is not taken into account in determining economic performance.

4.2 Volume and value of production

The volume of reported catch of rock lobster in 2012/13 was 138.8 tonnes, a fall of 6 per cent from 2011/12 where 148.3 tonnes was caught (Figure 4.1). It should be borne in mind, however, that this fall in catch is as a result of accounting related to a change in the fishing period from 1 August 2012 to 31 July 2013 which resulted in a 13 month fishing period in 2011/12 (1 July 2011 – 31 July 2012). Catch in 2012/13 accounted for around 99.1 per cent of the TACC. The ability of industry to catch virtually the full TACC over a number of consecutive years, with less effort, suggests that recovery of the stock continues, as is suggested elsewhere in this report.

The value of reported catch fell by 8 per cent between 2011/12 and 2012/13, from \$8.3 million¹ to \$7.6 million in real terms. Again, it should be noted that volumes caught in 2011/12 are based on a 13 month fishing period in this year. Based on data to 8 April 2014, it is expected that the value of production will increase slightly in 2013/14 due to both higher catches and expected higher beach prices (4.2).

¹ This value is lower than that reported in the July 2012 report of this committee due to beach prices being recalculated based on correct CPI figures.

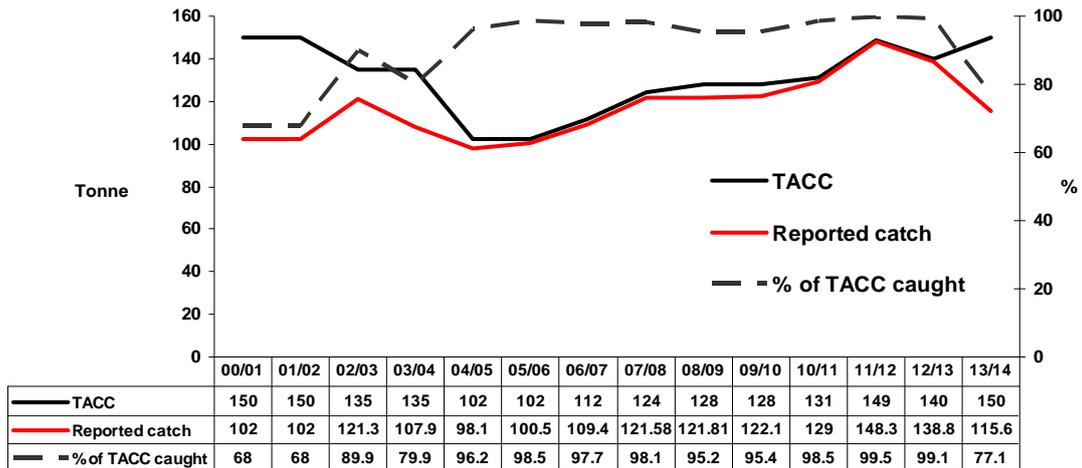


Figure 4.1: Catch, TACC and per cent of TACC caught, 2000/01 to 8 April 2014

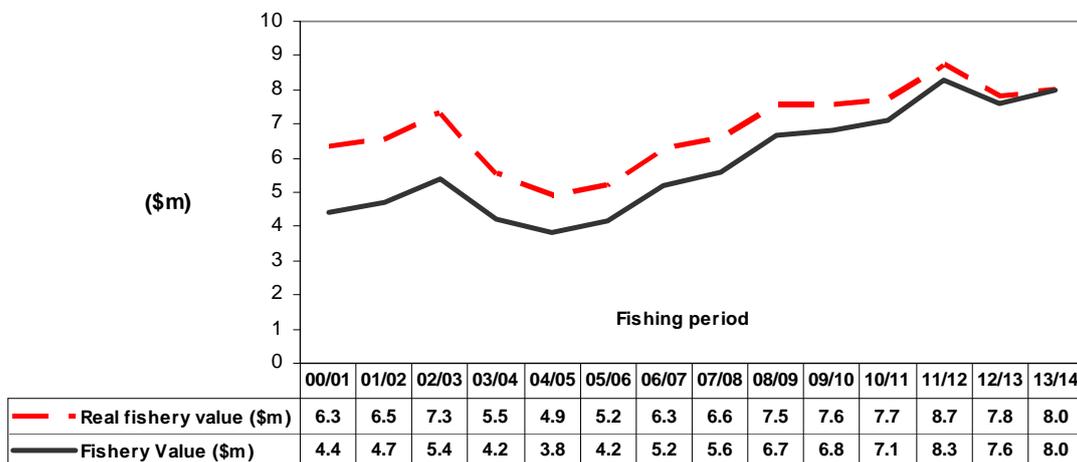


Figure 4.2: Value of production, 2000/01 to 8 April 2014

4.3 Prices

Beach prices have been relatively stable for the last five years to 2012/13 (Figure 4.3). For the first eight months of 2013/14 the average beach price has been \$69.00/kg, suggesting that the final price for the year will be higher than the previous year. During 2013/14 (to 8 April 2014) there has been a significant price peak observed in August, and to lesser extent November. Interestingly, rock lobster prices appear to have remained high during periods of significant supply, for example in October 2013 (Figure 4.4). This suggests that at particular times of the year the market can absorb a significant quantity of lobster at high prices.

Prices are based on daily average prices of lobster landed at the Sydney Fish Market. These prices provide only a guide as to price movements for lobster in NSW as a significant quantity of lobster (around 40 per cent) is sold through other registered fish receivers and restricted registered fish receivers in Sydney and along the NSW coast. Price information for lobster sold through these outlets is not publicly available; however anecdotal evidence suggests that prices all along the coast follow the Sydney Fish Market Price (NSW DPI, 2004).

Fishers reported that strong prices for lobster landed at the Sydney Fish Market was due to less Southern Rock Lobsters coming onto the local market to compete with eastern product.

Prices for rock lobster on domestic markets have increased in recent times as a result of production limitations in the major rock lobster producing states.

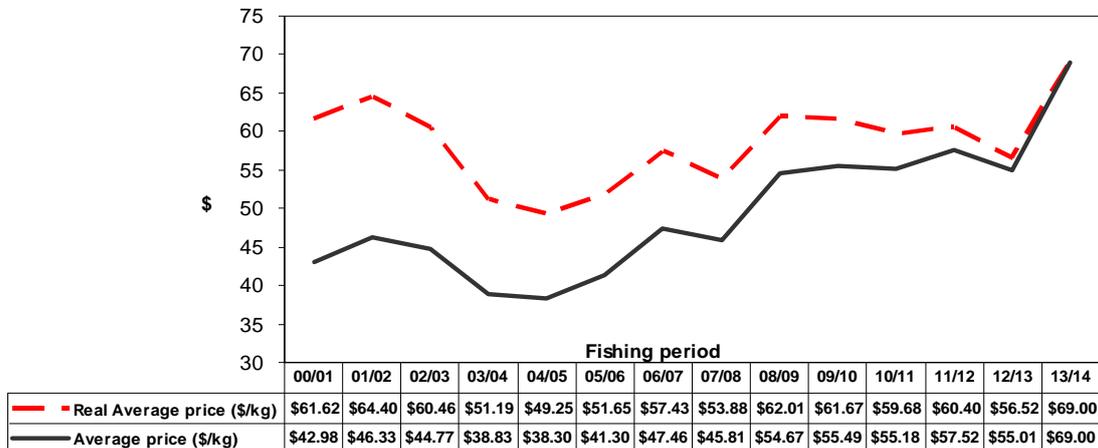


Figure 4.3: Beach prices in real and nominal terms, 2000/01 to 8 April 2014

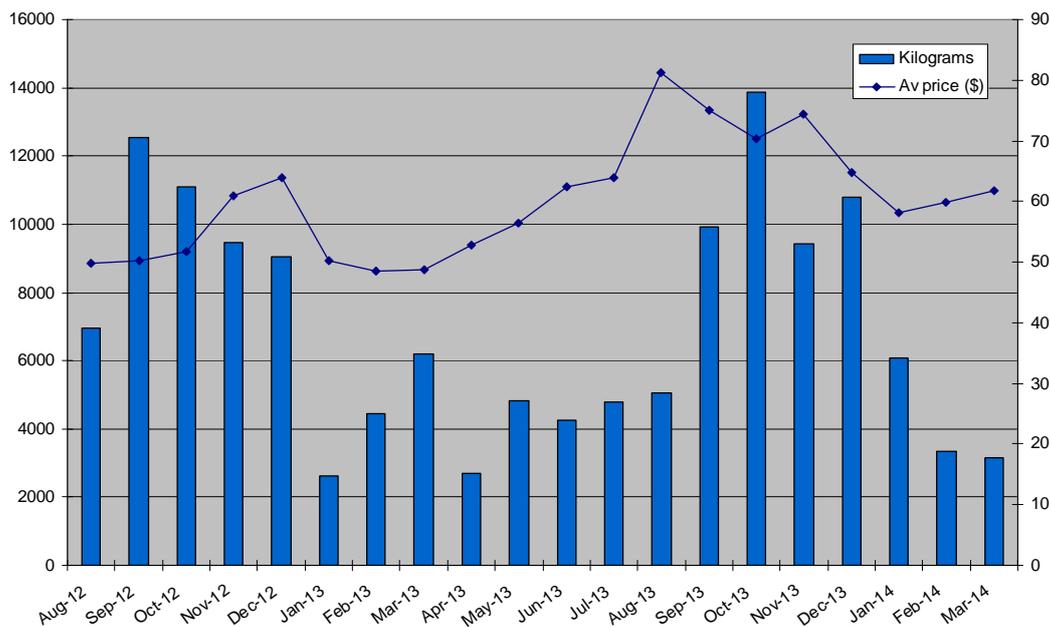


Figure 4.4: Average estimated beach price (in nominal terms) and weight by month, August 2012 to March 2014

4.4 Catch per unit effort

Catch per unit of effort (CPUE) has increased markedly over the period since 2001/02. Catch rates achieved during 2012/13 were higher than in 2011/12, and are at the highest level for the last 44 years (noting the uncertain quality of the data in the early years of the fishery). CPUE for the current fishing year (2013/14) is likely to be similar to that for 2012/13.

Higher catch rates reflect a number of factors including greater stock abundance, a reduction in the number of trap lifts by deep water fishers at times when stock is less

abundant and an increase in the size of vessels and the size of traps used (all of which contribute to more effective targeting of effort).

4.5 Rock lobster markets

NSW is a minor contributor to the total output of lobster in Australia, with the bulk of production coming from Western Australia, South Australia and Tasmania. In 2012/13 total Australian production of rock lobster was 9,200 tonnes, an increase of 6 per cent from 2011/12 (ABARES 2014). This is the first time it has increased since having fallen over a number of years following the 2003/04 peak of 19,000 tonnes. In more recent times production has declined as a result of large reductions in catches in Western Australia and South Australia in response to falling stock levels and the introduction of Individual Transferable Quotas (ITQ's). Production is forecast to continue to rise in 2014/15 and 2015/16 (ABARES 2014)

NSW product competes to some extent with Western Australian and South Australian product at the Sydney Fish Markets, however there is very limited promotion of NSW product to differentiate it from its competitors. Better branding of NSW product at the Sydney Fish Markets may help consumers wishing to buy local product to identify these lobsters. The Committee urges industry to investigate marketing approaches for NSW product. As part of this investigation, the potential benefits to NSW lobster product from gaining Marine Stewardship Council export approval could also be considered.

NSW product attracts higher prices during the first quarter of the financial year, as other states are not producing lobster at this time. Industry also reports that there is a premium paid for larger sized southern rock lobsters over NSW lobsters at the Sydney Fish Markets. The Committee believes that it is worth investigating the factors behind this premium.

The Committee recommends that industry investigate marketing approaches for New South Wales lobster to help with product differentiation.

Only a small proportion of rock lobster from NSW is exported. The largest markets for Australian exports of rock lobster are Hong Kong and China, closely followed by Japan. Southern rock lobster is usually the preferred product choice in China, Hong Kong and other parts of Asia owing to its highly uniform size and bright red colour when cooked (SRL 2012). However, as production of southern rock lobster has fallen these markets have had to turn to other sources of supply, resulting in strong demand for NSW product. At the 2014 meeting with industry, one fisher reported exporting as much as 80 per cent of their rock lobster in 2013/14 (to the middle of May 2014).

The export volume of rock lobster increased by 13 per cent between 2011-12 and 2012-13, after having fallen in consecutive years between 2008/09 and 2010/11. Prices received for rock lobster in 2012/13 increased slightly as compared to 2011/12, mainly as a result of depreciation in the Australian dollar against the US dollar and Japanese Yen (ABARES 2014). ABARES (2014) have forecast that the Australian dollar will depreciate against both the US dollar and Japanese Yen over both the short and medium term resulting in expected higher prices for rock lobster over this period. Future prices for Australian rock lobster exports will also depend on the extent to which suppliers from other countries are able to substitute product to compensate for an expected continued shortfall in the volume of rock lobster exports from Australia.

Those fishers who currently don't export much, or any, of their production may be able to take advantage of any higher prices on international markets by exporting a greater proportion of their catch. An understanding of the size preference / price relationship on Chinese and Hong Kong markets would be useful in the context of

understanding the opportunity for exported product from NSW to satisfy increased demand on these markets.

In order to improve marketing opportunities for NSW rock lobster a group of fishers are forming a marketing cooperative to sell lobsters directly. This initiative will also allow them to remove the commission they pay if they sell lobsters through a cooperative. This is discussed in more detail below.

The Committee is pleased that the Department is keeping abreast of developments in the Chinese tariff situation, as despite the fact that only a small proportion of NSW rock lobster is exported, this situation constrains current and future exports of NSW rock lobster.

The Department advises that the Australian lobster industry is collectively making an effort to export directly to China and not go through Hong Kong. However, it also appears that when the Chinese government cracks down on illegal importing - via Hong Kong - the goods get sent through to Vietnam instead, to dodge the tariffs, and vice versa.

Negotiations on the free trade agreement with China are continuing. It will take time before an agreement is reached – there is no quick fix.

4.6 Management charges

Management charges in the lobster fishery increased slightly in real terms, by 2 per cent, in 2013/14 to \$51.57 per share (Figure 4.5). A significant decrease in management charges between 2009/10 and 2010/11 was due, in part, to no dedicated lobster compliance salaries being recovered in 2010/11; which was also the case in 2011/12, 2012/13 and 2013/14.

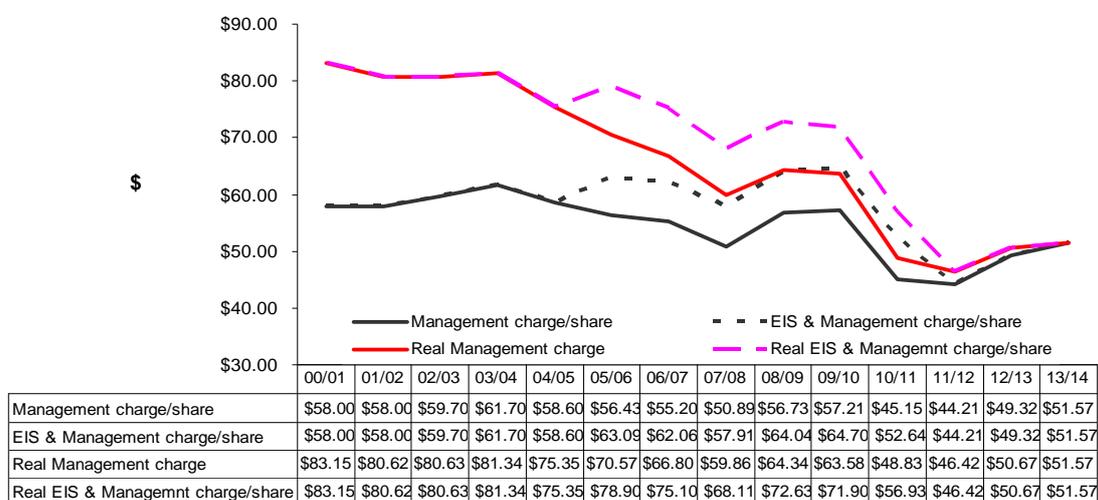


Figure 4.5: Management charge/share, nominal and CPI adjusted value (real price) for each fishing period from 2000/01 to 2013/14.

4.7 Income from fishing

Traditionally, nearly all lobster fishers have held endorsements in several different fisheries, though the extent to which they have gained income from each of them has varied. According to reports from the lobster industry, which are borne out by landings data, there is a trend towards specialisation in the lobster fishery, particularly among larger shareholders.

Currently around half of all lobster fishing businesses hold shares in other fisheries. A breakdown of the types of endorsements held is provided in Table 4.1

Table 4.1: Endorsements held by lobster fishing businesses in 2012/13

Fishery	Number of Fishing Businesses
10 - Ocean Trawl	4
2 - Lobster	58
30 - Ocean Trap and Line	48
40 - Ocean Haul	36
60 - Estuary General	40
70 - Estuary Prawn Trawl	2

The most common endorsement to be held in conjunction with a lobster endorsement is Ocean Trap and Line, which is used for the purpose of fish trapping.

Given the trend towards specialisation in the lobster fishery, it is likely that changes in returns from lobster fishing will have a significant impact on the economic performance of the fishing business as a whole. The current restructuring of the NSW fishing industry is also expected to have an effect on fishing business that hold a range of shares in different fisheries, including rock lobster. Currently good returns from lobster fishing, combined with an increased abundance of lobsters in regions where this has not always been the case, is also likely to bring about the impetus for increased specialisation in lobster.

For many fishers, holding endorsements in other fisheries is a way of keeping something up their sleeve should returns from lobster fishing fall. When fishers do actively fish other endorsements, it is often the case that this is what they have always done.

In order to inform fishers about the benefits of increased specialisation in lobster fishing, as well as the optimal size for a lobster fishing business in order to maximise profits, it is suggested that the department undertake technical efficiency analysis of lobster fishing businesses².

The Committee recommends that the department undertake technical efficiency analysis to inform the optimum size and structure of lobster fishing businesses.

4.8 Fisher net income

Without an understanding of the changes in fishing costs over the last few years, it is difficult to ascertain the extent to which increases in gross revenue from lobster fishing have resulted in higher net incomes. It is reasonable to assume that net incomes have risen over the past few years, as a result of both higher gross incomes and lower costs. Costs have fallen in response to substantial improvements in catch per unit effort, and reportedly also as a result of the efficiencies associated with several fishers upgrading to larger boats (e.g. less engine hours).

As reported above, a group of fishers are forming a cooperative to sell lobsters directly. The Committee was advised at their 2013 open meeting with industry, that lobster fishers pay a fee in the order of 7 – 8 per cent of gross returns to sell product

² See for example: Stephan and Vieira, 2013; McWhinnie and Otumawu-Apreku, 2013; Tingley et al 2005; Kompas et al, 2003; Eggert, 2000.

through a cooperative, which is on top of the similar size fee they pay to sell product through the Sydney Fish Market. Forming a marketing cooperative will allow those fishers that are part of the cooperative to reduce costs by avoiding paying the cooperative fee.

In order to better understand the impact of changes in the types of costs reported above on the economic performance of the lobster fishery, and to inform a technical efficiency analysis of the lobster fishery, it would be helpful to have information on the costs of fishing. As recommended in a number of past determinations, in order to collect cost data, a survey should be conducted, similar to that which has been run by EconSearch in the South Australian Rock Lobster Fishery.

The NSW Abalone Fishery was the subject of a survey, also run by EconSearch, as part of a project funded by the Australian Seafood CRC. This survey provided the Committee with useful information on which to base its determination for the abalone fishery for 2013/14.

At the Committee's 2013 open meeting with industry, the department provided an estimate of the costs of collecting economic information in the NSW lobster fishery. These costs are broken down below:

- Telephone survey (30 fishing businesses) = \$20,000
- Face-to-face survey (30 fishing businesses) = \$30,000

This information should be collected every three years. In the years in between, economic indicators, cost and income data, can be updated by the department based on ABS and fishery data. Labour costs are inflated using the labour price index, and fuel costs are inflated using the cost index for petrol. Average income is adjusted based on fishery GVP. EconSearch could undertake a similar update, and produce a report, for around \$6,000.

Examples of reports on indicators presented by EconSearch for the South Australian Southern and Northern Zone Rock Lobster Fisheries (and other fisheries) can be downloaded from the Econsearch website (www.econsearch.com.au).

The Committee is pleased that the Department is encouraging the lobster industry to collect economic data. The Committee believes that sound economic data is an essential part of the decision making process and a vital complement to biological data as part of an appropriate harvest strategy.

As recommended by the Committee in past determinations, the issue of funding for the survey (government, industry or some combination), should be resolved as a matter of urgency.

The Committee notes that industry is wary of economic surveys; that collection of economic data is seen as a priority for the future; and that it wants to remain focussed on building biomass and ensuring ongoing security of the resource. However, the obvious question that arises is to the level to which the stock should be rebuilt to, and as discussed above, what is the optimum size and structure of a lobster fishing business in order to maximise returns from fishing.

The Committee is of the view that an early start on the collection of economic data would allow the lobster industry time to put in place necessary data collection processes and create a meaningful times series, so that it is well placed to use information from the surveys in the future. The need for this type of information is supported by comments made by industry at the Committee's 2013 open meeting with industry where a number of assertions were made about the impact on economic performance of changes in the costs of lobster fishing, without any solid data to back this up. It is noted that a research report on the WA rock lobster industry

demonstrates the value in collecting and utilising economic information as this information was used to measure higher profits at lower levels of effort and inform TACC decisions.³

The Committee is pleased that the department has acted on part of its previous recommendation to gather information on the process involved in collecting economic data and the costs of collecting this data. The Committee is still of the opinion that it would be beneficial for industry to hear from EconSearch first hand on the benefits of collecting information on the economic performance of the NSW lobster fishery.

The Committee repeats its recommendation that a survey of the costs of lobster fishing be undertaken.

In order to better appreciate the benefits of conducting a survey the Committee also recommends that the Department and industry invite EconSearch to present information to industry on the process involved in, and benefits of, collecting economic data.

4.9 Shares

In 2012/13 there were 100 shareholders in the lobster fishery who were eligible for a lobster fishing endorsement. Of these, 86 reported fishing. In the current fishing period, 2013/14, the number of shareholders reduced to 99, and the number of shareholders who reported fishing fell to 78. The number of shareholders in the fishery has fallen over time from 174 shareholders at the commencement of the Share Management Plan in 2000.

Between 2006/07 and 2008/09 the number of shareholders in the fishery, and the total number of shares, declined significantly from 142 shareholders and 10,051 shares to 106 shareholders and 9,727 shares. The reduction is mainly due to shares surrendered through the Batemans Bay and Port Stephens-Great Lakes Marine Parks buy out programs.

The number of shares per fisher ranges between 10 and 350 shares. The average number of shares per shareholder has increased from 89 in 2010/11 to 98 in 2013/14. This has increased from 54 in 1996/97. There has been an increase in the number of shareholders who hold large shareholdings and a reduction in the number of shareholders who hold small shareholdings (Figure 4.6). There has also been a redistribution of shares from small to large shareholders. In the most recent fishing period, 2013/14, there has been an increase in the number of shareholders who hold >200 shares, suggesting a continuing consolidation to larger shareholders.

Changes in the structure of the fishery have resulted in fewer fishers landing a higher proportion of the total reported catch. In 2012/13, 50 per cent of reported catch was landed by 17 fishing businesses, while 75 per cent of catch was landed by 35 fishing businesses. Preliminary data for the current season indicates that 14 fishing businesses have landed 50% of the catch, and 32 fishing businesses have landed 75% of the catch.

The transferability of quota is helping to facilitate the change towards fewer fishers landing a higher proportion of the catch; however there are high transaction costs associated with transferring small parcels of quota that is resulting in some quota remaining unfished at the end of the season. In addition, industry report that the high price of quota relative to the price at which lobsters can be sold is deterring fishers

³ Australian Seafood CRC project 2009/714.10, See www.seafoodcrc.com/western-rocklobster-research-projects/2009-714-10-decision-support-tools-for-economic-optimisation-of-western-rocklobster.html

from transferring quota and they are, instead, choosing to discard catch. The proposed implementation of an on-line quota transfer system should assist in lowering the transaction costs associated with quota transfers.

Under current management arrangements for the lobster fishery, individual fishers are prevented from owning more than 350 shares in the fishery. This limits the further restructuring and economies of scale that can be achieved in the fishery. The Committee supports the proposal to amend the maximum shareholding to 40 per cent of the total number of shares in the fishery as consistent with other NSW share managed fisheries.

There is the greatest abundance of shareholders and shares in the Port Stephens Fisheries District (Figures 4.7 and 4.8). There are also a large number of shares and shareholdings in the Illawarra Fisheries District. Taken together, Figures 4.7 and 4.8 suggest that the shareholders with the largest shareholdings are concentrated in the south of the fishery.

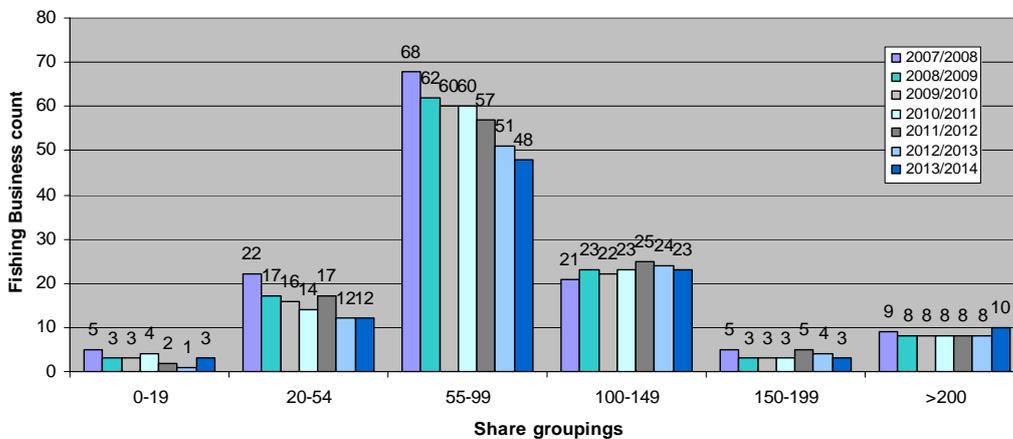


Figure 4.6. Distribution of shareholders by share grouping for the 2007/08 to 2013/14 fishing periods. # 2013/14 data as at 14 April 2014.

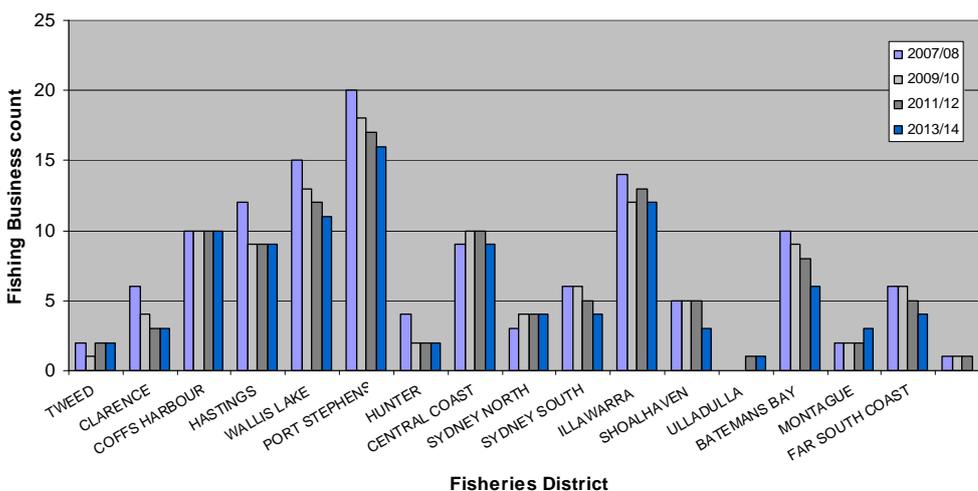
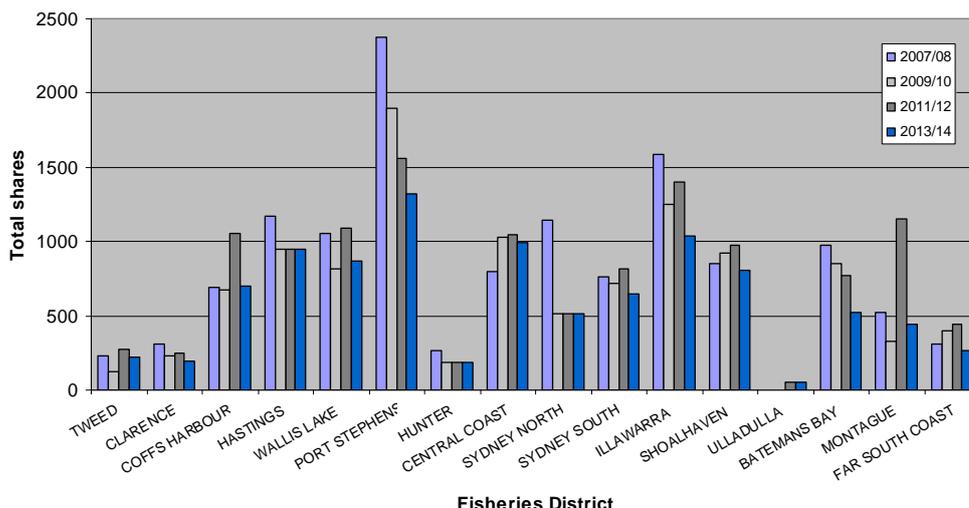


Figure 4.7: Number of shareholders per Fisheries District in 2007/08 to 2013/14 fishing periods. # 2013/14 data as at 14 April 2014.



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figure 4.8. Number of Shares held in each Fisheries District for each fishing period from 2007/08 to 2013/14. # 2013/14 data as at 8 April 2014.

The Department has indicated, and the Committee agrees, that structural change in operations, promotes stewardship and allows for greater efficiency in both fishing effort and the administration of the fishery. The ultimate result of restructuring is to improve the long-term economic sustainability of the fishery. The Committee remains of the opinion that market forces, particularly through the market for shares, rather than regulatory intervention, offer the best way to achieve the benefits of restructuring. In this regard, care must be taken that regulation of the share market does not impede desirable structural change.

4.10 Share trading, transfers and values

In accordance with the *Fisheries Management (Lobster 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 lobsters. Industry reports that the reason for the minimum size of package is as a result of the need to reduce the incentive for illegal activity that tends to occur at smaller shareholdings.

In 2012/13 there were four share transfers processed for a total of 116 shares transferred. This equated to a total value of \$338,400 and an average price of \$2,975 per share. In the current fishing period there have been 9 share transactions processed for a total of 344 shares (as of 15 April 2014). This equates to a total value of \$708,000 and an average price of \$2,501 per share. Significant variability exists in share price, with 6 of the current season transactions trading in excess of \$3000 per share.

Share transfer prices provide an indication of the economic health of the lobster fishery, and of expectations of industry participants on the future outlook of the fishery. In this sense, price rises between 2004/05 and 2008/09 can be interpreted as reflecting improved economic conditions and rising expectations concerning the future economic and biological health of the industry. During this time share prices almost tripled in real terms (Figure 4.9). Share prices have trended upwards in more recent times, however not to the extent that would be expected given the positive outlook for the fishery. Given the structure of the industry (e.g. family and other links between shareholders), the extent to which average share prices reflect 'true' market values is not clear.

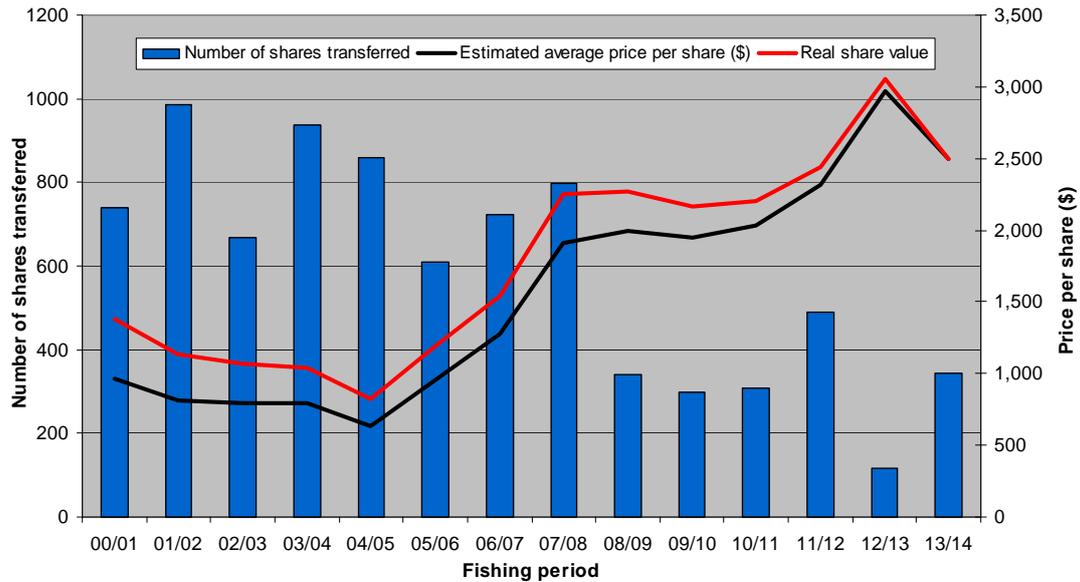


Figure 4.9. Number of shares transferred, estimated share price and CPI adjusted (real share price) by fishing period from 2000/01 to 15 April 2014.

Despite the issues with transferring quota reported above, lobster fishers have been reluctant to make a permanent and larger commitment to the fishery by purchasing additional shares.

4.11 Quota

Quota is allocated to shareholders in proportion to their shareholding. The Department reports that there is no longer a minimum quota transfer volume. Quota can only be transferred within the current fishing period and cannot be transferred between fishing periods. Under the Share Management Plan, shareholders may not acquire, by any such transfer, more than twice the amount of the shareholder's initial quota for the fishing period. According to the Department, this clause was included in the Plan to encourage shareholders to buy shares, in order to promote restructuring of the industry, rather than allowing small shareholders to buy large quantities of quota without a longer-term commitment to the fishery. The benefits of this policy must be set against the cost of the loss of flexibility it imposes on the industry. The Committee urges industry to maintain a watching brief on the extent to which this limit becomes binding, thereby restricting the ability of fishers to take advantage of favourable catching conditions/stock abundance by leasing in quota.

4.12 Quota transfers and values

The amount of quota transferred in 2012/13 was the same as in 2011/12, 48.9 tonnes (Table 4.2). This was an increase from 2010/11 when it was 39.3 tonnes. Fishers indicate that the ability to lease quota helps improve efficiency by providing them with greater flexibility in handling fluctuations in catches. The restrictions on the amount of quota that can be transferred could, however, impede full attainment of these efficiency gains. Further, industry reports that the high fee paid on quota transfers is inhibiting trade in small parcels of quota. The Committee notes that the on-line system, which was scheduled to start in June 2012 but has now been delayed, will assist in reducing transactions costs associated with quota transfer and should, therefore, increase the efficiency of these transfers.

Table 4.2: Total quota transferred (t), number of quota transferors and transferees, amount of TACC transferred (%) and the average price paid for quota (\$/kg) in each fishing period from 1996/97 to 8 April 2014.

Fishing Period	TACC (t)	Number of shares	Quota (kg/share)	Change (%)
2000/01	150	10,234	14.7	N/A
2001/02	150	10,234	14.7	0.0%
2002/03	135	10,051	13.4	-9.1%
2003/04	135	10,051	13.4	0.0%
2004/05	102	10,051	10.1	-32.4%
2005/06	102	10,027	10.2	0.2%
2006/07	112	10,027	11.2	8.9%
2007/08	124	9,727	12.7	12.3%
2008/09	128	9,727	13.1	3.1%
2009/10	128	9,727	13.1	0.0%
2010/11	131	9,727	13.4	2.3%
2011/12	149	9,727	15.3	14.1%
2012/13	140	9,727	14.3	-6.5%
2013/14	150	9,727	15.4	7.7%

The largest businesses, in term of numbers of shares held, were most likely to transfer quota into the business, and the smallest shareholders were more likely to transfer quota out of the business.

In past reports, the Committee suggested that the trend (between 2000/01 and 2007/08) in the number of quota transferors significantly exceeding the number of transferees indicated progressive reallocation of quota from smaller to larger operators. However, since this time, the margin with which quota transferors has exceeded transferees has declined, suggesting a slowing in reallocation of quota from smaller to larger operators.

There is a relationship between the percentage of TACC caught and the percentage of quota transferred, albeit an imperfect one. License holders are likely to be more willing to lease (invest) in additional quota where there is a strong expectation that the additional quota will be caught under a constraining TAC. For example, in 2000/01 when the percentage of TACC caught was around 68 per cent, the percentage of quota transferred was only 11 per cent. Conversely, since 2004/05 when the percentage of TACC caught has been close to 100 per cent, the proportion has been around 30 per cent.

In the current fishing period to 8 April 2014, only 28 per cent of quota transferees provided data on the price of quota transfers. The available information (which fishers indicate for the current fishing year is representative of average quota prices) indicates that quota prices in 2013/14 were roughly the same as in 2012/13, and higher than in 2010/11. This reverses a downward trend in quota prices that had been observed since 2007/08. Higher quota prices are possibly an indication of an improvement in the short run profitability of the fishery.

In past determinations, the Committee has observed that the price per kilogram of transferred quota is strongly related to the levels of reported catch (and perhaps more significantly, catch rate and beach price) for a given fishing period, much more so than are share prices. When catches and catch rates are high, the price of quota has tended to increase as the demand for quota rises.

Unfortunately, information on the price at which quota is transferred is not reported for all transfers. Given the advantage of having access to it, this information should be reported and made generally available. The Department and the Lobster Industry Working Group have investigated the feasibility of requiring fishers to provide price information and it was found that this is not possible. As such, information on quota trading will continue to be provided on a voluntary basis.

In last year's determination, the Committee recommended that the Department and the Lobster Industry Working Group encourage fishers to make further efforts to report price information for quota transfers.

The Committee notes the Departments response to its recommendation: that once legislative amendments have been completed, an on-line system for transferring quota will be operational which will facilitate better reporting of quota transfer prices. However, even with the on-line system, reporting of prices for quota transfers is optional. As such, the Committee is still of the opinion that fishers should continue to be encouraged to provide information on the price of quota transfers.

The Committee repeats its recommendation that the Department and the Lobster Industry Working Group encourage fishers to make further efforts to report price information for quota transfers.

4.13 Impact of illegal and unreported removals

Earlier in this report the Committee noted that industry had decided not to fund a dedicated compliance officer. As discussed in previous reports by the Committee, illegal activity results in lost economic value to the fishery that could be reduced through the use of a dedicated compliance officer. The Departmental scientist estimates that illegal take is around 8.5 per cent of total take in the fishery, which in 2012/13 represents around 14 tonnes. At prices prevailing in 2012/13 illegal take in the fishery is estimated to be worth \$791,280 in real terms.

The Committee is pleased that the Department is attempting to make a more accurate estimate of the extent of illegal take. However, estimates of illegal take provided to the committee by the Department still vary. Given that illegal take is factored into TACC decisions, a more accurate estimate of illegal take should be pursued. In previous reports the Committee suggested that the return on investment to determine the real extent of illegal catch (which may or may not result in an increase in TACC) would be high.

In previous determinations the Committee recommended that the estimate of illegal and unreported removals from the rock lobster fishery be refined and that a joint Industry/Departmental working group be established to assist with this task. The Committee notes the Departments response to this recommendation, but considers the response to be inadequate. As such, the Committee reiterates its response in this year's determination.

In previous determinations the Committee recommended that Industry consider investing more heavily in compliance activities to assist in reducing illegal catch in the fishery. The Committee notes the Department's response to this recommendation, i.e. that at a LobMAC meeting held in 2010, industry representatives advised that they would only pay operating costs for compliance in

the budget and would no longer pay for a salary to bring them in line with other NSW quota managed fisheries.

The Committee repeats its recommendation that the estimate of illegal and unreported removals from the rock lobster fishery be refined and that a joint industry/Departmental working group be established to assist with this task.

4.14 Recreational and Aboriginal cultural catch

As with illegal catch, there is the possibility of lost economic value from the fishery due to high levels of recreational and Aboriginal cultural catch. It is especially difficult to get a handle on how many lobster are being taken through cultural permits. Departmental compliance officers report that the number of requests for permits has decreased and the actual catch is only a fraction of the total permitted.

In previous determinations the Committee recommended that the Department continue to invest resources in obtaining more robust time-series estimates of recreational and Aboriginal cultural catch.

The Committee is pleased that a state-wide recreational fishing survey has commenced which will improve the Department's understanding of recreational fishing in NSW. However, the Committee is still concerned that it will be very difficult to get data on recreational lobster fishing through the survey, due to the recreational lobster fishery having low participation rates and an inability to identify which recreational licence holders were taking rock lobster. As suggested at the 2011 Committee meeting, the Department could, as a starting point in collecting better data on the level of recreational lobster take, amend conditions on the recreational fishing licence to require that people identify whether they are taking, or intend to take lobster.

The Committee is also pleased that a new lobster tag has been developed, as a tool for compliance, for use with Section 37 permits issued for Aboriginal cultural and ceremonial fishing.

The Committee repeats its recommendation that the Department continue to invest resources in obtaining more robust time-series estimates of recreational and Aboriginal cultural catch.

The Committee is pleased the Department is attempting to make a more accurate estimate of the extent of recreational catch. Current figures provided by the Departmental scientist estimate recreational catch at around 10 per cent of total take in the fishery, which in 2012/13 represents around 16 tonnes. At prices prevailing in 2012/13, 16 tonnes of catch is worth \$904,320.

As the lobster stock continues to increase in abundance, there is a risk that a great number of animals could be taken by the recreational and Aboriginal cultural sectors and through illegal take, reducing the additional catch that could be taken by commercial fishers. In previous determinations, the Committee recommended that the Department direct funding towards developing a resource-sharing model for the lobster fishery, as is currently occurring in the WA lobster fishery.

The Committee is pleased that a policy for resource sharing in NSW Fisheries will be developed by the recently established Ministerial Fisheries Advisory Council.

4.15 Economic data

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. The Department should also be concerned about the implications of having poor economic data on which to assess the impacts of management decisions it makes on the financial well being of industry. As has been

emphasised in previous reports of this Committee, the Department should place more importance on the gathering of economic data to underpin management decisions in the fishery and setting of the TACC. Economic data would also place the Lobster Industry Working Group in a much more informed position regarding the review of the share management plan for the lobster fishery. It would also be helpful in assisting the Department to develop a more meaningful set of economic performance indicators for the fishery.

In past determinations the Committee recommended that the Department place more importance on the gathering of economic data in order to better understand the options for, and impacts of, fisheries management decisions on the financial well being of industry. The Committee notes the Department's response to this recommendation, i.e. industry wants to remain focussed on building biomass and ensuring ongoing security of the resource and that gathering of economic data is not considered a priority at this stage. The Committee also notes that in past informal communication, the Department has indicated that it is not in a position to expand its support of the Committee in its endeavours to meet its statutory obligation regarding the economic circumstances of the industry.

The Committee repeats its recommendation that the Department place more importance on the gathering of economic data in order to better understand the impacts of management decisions it makes on the financial wellbeing of industry.

Better economic data would place industry in a much more informed position regarding setting of the TACC in order to maximise profits. The level of the TACC at which profits (net returns) from lobster fishing are maximised for the fishery as a whole is known as maximum economic yield (MEY). At MEY the TACC is lower than it would be if it was set with reference to stock abundance only, i.e. at maximum sustainable yield (MSY). The TACC is currently set with reference to MSY.

Data on net returns from lobster fishing may be incorporated into the current biological model used to estimate the status of the stock, and set the biological MSY. Using the model, net returns could be estimated for different rates of stock recovery. It would also be possible to undertake technical efficiency analysis to inform the optimum size and structure of lobster fishing businesses.

As discussed earlier in this report, in order to collect information on the net return from lobster fishing, a survey of the costs of lobster fishing should commence as soon as possible and should be repeated every three years (with annual updates) to ensure that fishers are able to maximise economic returns from fishing over time.

Earlier in this report the possibility of a price premium being paid for larger sized lobsters on the Sydney Fish Markets was raised as an issue that warranted further investigation. The Committee repeats its recommendation that the Department and Industry undertake a study to look at the relationship between length and economic yield in order to understand the impact of the size composition of lobster in the catch on the economic return of fishers. The Fisheries Research and Development Corporation could possibly fund this study.

The Committee repeats its recommendation that the Department and Industry undertake a study to investigate the relationship between length and economic yield in the lobster fishery.

4.16 Community Contribution

The community contribution charge in the NSW commercial lobster fishery was based on a decision by the NSW Government to return economic rent being earned by lobster fishers to society. It was designed on the basis that in a well-managed

fishery with TAC set with reference to MEY, there is potential for economic rent to be earned by fishers.

Economic rent is profit (after accounting for all costs, including the full costs of management) in excess of normal returns on capital⁴. 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 fishery.

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.

The current community contribution charge in the lobster fishery of \$115 per shareholder was set to change in February 2012, though no decision has been taken as yet. The community contribution charge was then to be based on estimates of net returns and economic rent in the fishery from a study by Hassall and Associates in 1999. Undoubtedly, net returns in the fishery have changed since this study was undertaken. It is imperative that more up to date information on net returns from fishing is collected prior to commencement of the new community contribution charge. However, even before this is done, the NSW Government should demonstrate the appropriateness of collecting a resource rent charge and should undertake a cost/benefit analysis of determining and collecting payments in order to demonstrate whether it is cost effective to collect a resource rent charge from the fishery.

The Committee recommends that the application of the Community Charge in the lobster fishery be postponed until such time as the NSW Government can demonstrate the appropriateness and cost effectiveness of collecting a resource rent charge.

4.17 Conclusion

While the lack of information on the net return from lobster fishing means that only tentative conclusions about the economic status of the industry are possible, the evidence available to the Committee suggests that the lobster industry in NSW is economically viable. Both quota and share prices have increased in recent years indicating a perception by industry that the future outlook for the fishery is positive. The increase in viability is a result of a number of factors including increases in stock abundance and catch per unit effort, the latter believed to have been influenced partly by an improvement in the efficiency and practices of lobster fishers.

There has been significant restructuring in the lobster fishery with fewer fishers landing a higher proportion of the catch. This structural change is desirable in order

⁴ Economic rent is comprised of three types of rent: entrepreneurial rent, quasi-rent and resource rent. As in any business some operators are more skilful than others and will therefore earn more profit. Rents attributable to the skill of fishers are described as entrepreneurial rents. Entrepreneurial rents should be left with fishers. Entrepreneurial rents can be as high as 36 per cent of total economic rent in the fishery (ABARE, 1990). In the short-term fishers may earn large surpluses over costs, which may provide prima facie evidence of substantial resource rents. However, there are some circumstances where such surpluses can occur but they are not true rents. These are referred to as quasi-rents. One example is where a fishery is developing or recovering and there may be under-investment in the fishery. Another example is where there is a short-term but unsustainable increase in price due to, for example, exchange rate fluctuations. However, some profits will be obtained because the natural resource being used (i.e. the fishery) has a value. These profits are described as resource rents and are also a component of economic rent.

to allow for the most efficient fishers to land the majority of the catch, and to ensure the continued viability of lobster fishing businesses. However, the current management arrangements for the lobster fishery, which prevent shareholders from owning more than 350 shares in the fishery, limits the extent to which further restructuring can occur. The Committee notes, and supports, the amendment of the maximum shareholding to allow shareholders to hold up to 40 per cent of the total number of shares in the fishery.

There remains limits on the maximum amount of quota that can be transferred by lobster fishers and the Committee urges the lobster industry to maintain a watching brief on the extent to which this limit becomes binding, thereby impeding the ability of quota to be transferred from less to more efficient fishers.

The Committee has made a number of recommendations in this report that are aimed at providing improvements in the economic viability of the lobster fishery in the future. These include: that the lobster industry investigate marketing approaches for New South Wales rock lobster to help with product differentiation; that lobster fishers make further efforts to report price information for quota transfers; that the Department and Industry undertake a study to investigate the relationship between length and economic yield in the lobster fishery; that analysis is undertaken on the technical efficiency of lobster fishing businesses; that data is collected on the costs of fishing; and, connected to this, that a decision is taken on whether the collection of this data is funded by industry, government or some combination of the two.

The Committee notes that the lobster industry does not see the collection of economic data as a priority at this stage, however the Committee is of the opinion that such data collection must start now. Better economic data, such as information on the costs of lobster fishing, will allow for a TACC to be set that maximises economic returns from lobster fishing. It will also facilitate better management decisions by allowing the department to better understand the impacts of alternative management options on the financial wellbeing of industry.

The Committee notes that efforts are being made to collect better recreational and Aboriginal cultural catch data. However, further efforts need to be made to obtain more robust time-series estimates of recreational and Aboriginal cultural lobster catch. The Committee recommends that this be done as soon as possible such that it can be used to develop a resource-sharing model for the lobster fishery.

The Committee's conservative determination for 2014/15 is based on strengthening the prospect of restoration of the spawning stock and maintenance of an appropriately sized available biomass, while providing a buffer for any future downturns in recruitment to the fishery or changes in targeting practices. By leaving stock in the water, this TAC strategy also offers improved prospects for the further economic recovery of the fishery, again over the longer term.

5. MANAGEMENT CONSIDERATIONS

5.1 Introduction

This section of the report provides background information on the New South Wales rock lobster fishery, focusing on the commercial component. The Department has been the key information source for data on the fishery, through its submission to the Committee. In the context of TACC setting, the status and effectiveness of the current management regime and areas where improvements could be made are considered. Some overall conclusions are drawn.

5.2 Components of the fishery

5.2.1 Commercial

Rock lobsters have been commercially harvested in New South Wales since the 1800s. The fishery is based almost exclusively on the Eastern rock lobster (*Jasus verreauxi*). Occasional landings of southern rock lobster and painted rock lobster occur, but these amount to less than 1% of the catch.

Sustainable management of the commercial fishery for Eastern rock lobster is more challenging than is the case with other Australian lobster fisheries because the larger, mature lobsters that make up the breeding stock of the fishery are found in the north of the state. In southern waters, smaller immature lobsters that have yet to breed are harvested.

The NSW commercial fishery for rock lobster is very small by comparison to similar fisheries in other States. Total annual landings for all lobsters in Australia exceed 15,000 tonnes, with the NSW catch making up about 1% of the total. While other lobster fisheries are strongly dependent on export markets, the NSW fishery has an established market within the State and only small quantities are exported, although there is anecdotal information that an increasing number of NSW lobsters are being exported live to the Chinese market. Eastern rock lobsters are clearly sought after by consumers (particularly by the Chinese community) and attract and maintain relatively high prices and strong demand on local domestic markets. The price has increased in the past year to date compared to the previous year (at this stage estimated around 20% based on incomplete data).

Since 1994, the setting of an annual Total Allowable Commercial Catch (TACC) and the allocation of transferable, individual fishery catch quota (shares) to licence holders have been the most important management measures for the fishery. The total commercial catch in the fishery is effectively constrained by the annual TACC. Concerns that have been expressed in the past about the capacity of the commercial sector to take all of the allocated TACC are now largely redundant, with annual landings above 95% of the TACC for the past nine years. Industry representatives were confident that, as in recent years, nearly all of the 140t TACC would be taken before the end of the season in July 2014.

The quota system is augmented by minimum and maximum size limits, a prohibition on taking berried females and gear restrictions. The 2004 decision to reduce the maximum size for lobsters from 200 to 180 mm continues to yield dividends in terms of adult spawning stock and protection, which is a priority management objective for the fishery. The minimum size limit was reviewed in 2005 and maintained at 104mm.

Minimum quota holdings also apply. 55 shares must be held before a shareholder is eligible for an endorsement to fish, although shareholders who held less than 55 shares at the time that the quota system was introduced are also eligible. Over the past ten years, the total number of shareholders in the fishery has contracted, leaving 42% less shareholders in the fishery since 2000 (174 down to 99 in 2013/14). Similarly, the proportion of shareholders that hold less than the minimum shareholding of 55 shares has reduced by 86% in 2012/13 (94 to 13). There has been a slight increase in 2013/14 but this reflects the ongoing consolidation from smaller to larger shareholdings, with two business moving into the >100 and >150 categories respectively. Overall, the figures suggest a general trend of share reallocation from small (<55) to large (>100) shareholdings and is consistent with the increasing specialisation of lobster fishers (in comparison to the traditional business structure of most fishers operating in more than one commercial fishery).

It is also now apparent that an increasing proportion of the total catch is being taken by this smaller group of operators who fish predominately for lobsters. In the 2012/13 season, 17 fishers landed 50% of the catch, and 35 fishers landed 75% of the catch. Preliminary data for the current season indicates that 14 fishers have landed 50% of the catch and 32 fishers have landed 75%, suggesting a continuing consolidation to larger shareholders. This is consistent with the management objectives for the fishery and is an encouraging sign for the future. Transfers in shareholdings seem to have stabilised over the last three years.

It seems to the Committee that the process of restructuring the fishery is proceeding at a steady rate and with the introduction of web-based trading, further efficiencies should be recognised

5.2.2 Recreational

There are about one million people in New South Wales who partake in some form of recreational fishing. A licence is required, although there are exemptions to that requirement. In total the recreational sector pay approximately \$12,000,000 in licence fees. Recreational fishing for rock lobster is restricted to the use of a single pot (which may be used in waters less than ten metres) or to take by hand (i.e. diving) without any assistance from scuba or hookah equipment. A daily bag and total possession limit of two applies, and recreational fishers are subject to the same minimum and maximum size restrictions as the commercial sector.

Estimating the number of people who target rock lobsters and what they catch is the subject of regular and ongoing discussion at the TACC setting forum. Anecdotal information suggests that the use of recreational pots is contracting in popularity, with recreational diving for lobsters becoming more popular. The Committee have noted comments made in the recent past by commercial fishers that recreational fishers appear to be enjoying improved rock lobster catches in NSW and that tight restrictions on commercial harvest may not result in the intended gains to the rock lobster stock due to increasing recreational fishing harvest. There is no quantitative evidence available which would support or refute either contention. Currently, the 2000-01 National Recreational and Indigenous Fishing Survey (NRIFS) data are the only reliable state-wide estimates of recreational effort and catch for both freshwater and saltwater fisheries in NSW. Updated measures are required.

In response to this need, DPI commenced a statewide recreational fishing survey in March 2013. The 2013-14 survey has used a similar methodology to the 2000-01 survey, which will enable the measurement of any changes in the recreational fishery that may have occurred since that time and will improve our understanding of recreational fishing in NSW.

The survey is designed to provide reliable estimates of:

- fishing participation rates of NSW residents among various subgroups (e.g. age, gender, area of residence)
- state-wide and regional annual catch (harvest and release), fishing effort (days and hours fished) and catch rates for many popular species
- other recreational fishing-related data (e.g. boat ownership, fishing club membership)
- fishers' awareness and opinions on various fisheries-related issues

The survey has been conducted in 2 main phases:

1. Screening Survey – March to May 2013, households across NSW were randomly selected and asked a short questionnaire to determine if anyone in the household was a recreational fisher. The screening survey is designed to

measure fishing participation and identifies intending fishers for Phase 2: the Diary Survey.

2. Diary Survey – recreational fishers who report an intention to fish in the coming 12 months (as identified in the screening survey) were invited to participate in the Diary Survey – starting 1 June 2013 until the end of May 2014. The diary phase is designed to deliver regional and state-wide catch estimates for the major recreational species in NSW.

The sample size for the 2013/14 survey is a much greater sample size than the 2000/01 survey and will greatly increase accuracy of catch estimates of species with lower catch. There are some limitations on the data relating to rock lobster that will be produced by the survey given the small sample size of divers within the survey.

Nevertheless, the estimates from this survey are expected to provide information for the management of rock lobster, both in terms of stock assessment (with the input of more reliable estimates of recreational catch) and in terms of resource sharing. Goal 4 of the fishery Management Strategy for the NSW Lobster fishery is about sharing access to the resource by the various interest groups (predominately the commercial and recreational sectors). Being able to quantify the relative shares of the resource will be a significant first step in making resource sharing arrangements.

In the meantime, the stock assessment for the fishery continues to make assumptions about the recreational catch for input into the model. Currently the estimate of recreational and unreported commercial catch is 10% of the reported commercial catch each year since 1994/95. Therefore, assumed non-commercial catches have been in the range 10-16 t during the past 19 years and approximately 15 t in 2012-13.

5.2.3 Aboriginal

In 2010, Aboriginal peoples' connection to the fisheries resource was formally recognised in fisheries legislation through the introduction of a new object to the *Fisheries Management Act 1994* (the Act). Aboriginal cultural fishing is also now articulated in the Act as distinct from recreational and commercial fishing.

At the same time, section 21AA was inserted into the Act but has not commenced. That section provides regulation making powers that allow limits (including bag and possession limits) and/or other management options to be applied to the special cultural fishing provisions. The regulations that may be made under section 21AA cannot be made without first consulting the Aboriginal Fishing Advisory Council (AFAC). That consultation has commenced with AFAC and a broader cross sector working group to develop proposals which seek to balance sustainability with the needs of Aboriginal people, recreational fishers and the commercial industry.

In the meantime, an interim compliance policy is in place to capture the spirit of this yet to be commenced provision of the Act. The current interim compliance policy allows an Aboriginal person to take double that of the prescribed recreational bag / possession limit (other than for abalone, for which the extended limit is 10) to provide for cultural needs where elders, the incapacitated, or other community members are unable to fish for themselves. The arrangements apply by increasing an individual fisher's limit – it is not an accumulated limit related to the number of people that the fish are being provided for. Under the interim arrangements, the shucking of abalone, rock lobster and turban shell is also permitted within 100 metres of the high water mark but only if the fish are consumed in this area.

The policy applies to cultural fishing in State waters, including appropriate zones of the NSW marine parks. All other fishing activity and possession of fish and/or fishing gear must comply with the current fisheries legislation.

If Aboriginal people wish to access the fisheries resource for larger cultural events that exceed the amended daily bag and possession limits provided for under the policy, an application for an Aboriginal cultural fishing authority under section 37(1)(c1) of the Act can be made. Section 37 permits provide defences against some aspects of the fisheries laws, subject to conditions. In 2013/14 only 3 cultural permits have been sought and issued to date. Fisheries Officers report that the actual take under these permits is less than permitted.

5.2.4 Illegal take

A key objective of the Share Management Plan for the fishery is to minimise the number of offences that occur in the fishery. The FMS specifies a trigger of 70% compliance rate. For 2012/13 compliance rates were above the trigger point, with the overall compliance rate for the fishery being 75%. However, when broken down into commercial and recreational compliance, the rates for 2012/13 differ significantly. The commercial compliance rate is 62% (down by 19% on previous period) and the recreational compliance rate is 88% (same as previous period). The incomplete 2013/14 period suggests that there will be similar rates for both commercial and recreational as 2012/13.

Reporting on compliance rates and/or detection rates is notoriously difficult as improvements in the targeting of compliance effort can lead to more offences being detected, which can appear as higher levels of non-compliance when reported statistically. In fact, the use of an intelligence-led approach should lead to a higher rate of detections. Therefore, crude 'compliance rate' information is difficult to draw conclusions from without also being supported by further analysis and qualitative explanations.

Data on the number of hours dedicated to rock lobster compliance indicate increasing levels of targeting in both sectors, particularly commercial:

- for the commercial sector in 2012/13, 1722 patrol hours were undertaken in the rock lobster fishery, 522 of these were targeted (~30%);
- for the commercial sector in 2013/14 so far, 1080 hours have been undertaken, 650 if these were targeted (~60%);
- for the recreational sector in 2012/13, 2959 hours were undertaken in the rock lobster fishery, 1069 targeted (~36%); and
- for the recreational sector in 2013/14 so far, 2064 hours have been undertaken, 778 targeted (~37%).

Further data presented in the Compliance report in relation to time spent per interaction verify that, unsurprisingly, the hours spent with non-compliant individuals is far greater than the time spent with compliant individuals. For recreational fishers, interactions with non-compliant individuals take more than 10 times longer than average. And for the commercial sector, interactions with non-compliant individuals took more than three times longer than average.

The Compliance Report provided that the two main reasons for the spike in commercial offences in 2012/13 were, firstly there were two major compliance operations targeting two commercial fishers in the Far North Coast Zone who were found committing multiple offences. They account for almost 70% all the commercial offences detected. The second reason was that Fisheries Compliance conducted a desktop audit on fisher's adherence with the timely submission of daily log sheets. It

was found that many fishers were not complying with the Regulations in regards to this and the appropriate compliance action was taken.

Other issues have been of particular interest in relation to the commercial sector:

- Catch validation (reconciling catch with quota returns)
- Holding over of lobsters in traps until following quota year

Compliance effort has been and continues to be applied to these areas in which significant non-compliance has been found or is suspected. The success of initiatives to discourage and prevent these activities is of direct relevance to the TACC setting process.

In relation to the non-commercial sector, issues relating to bag and size limits, possession limits, unlawfully using traps and the recreational fishing fee are the offences most frequently detected by FOs.

As with the commercial sector, most recreational fishers ensure they comply with the rules and regulations, however there are also instances of persons intentionally targeting lobsters for financial gain. Fisheries officers will continue to target these persons. Further, intelligence has been received indicating that some recreational fishers are selling indictable quantities of lobster to retail outlets and more commonly the public. Compliance efforts will continue to identify these persons and police their activities.

The Department's Statewide Operations and Investigations Group (SOIG) continues to complement the fisheries compliance operations rolled out through the 18 coast districts. In common with other fisheries jurisdictions, the Department is placing additional effort into targeting areas suspected of high levels of non-compliance, as identified by intelligence. The Committee is very supportive of this approach, and notes the high level of cooperation between industry and compliance officers in the supply of intelligence.

These combined efforts have resulted in the position where Compliance managers estimate that the illegal take and sale of lobsters is 'low and stable'. It is felt that the majority of commercial fishers support the direction management is taken in this fishery and are committed to complying with the laws and the rebuilding and strengthening of the lobster stock. It is further believed that these figures have been achieved over time to a strong compliance program and the commitment of many of the fishes. The strong compliance program has been reinforced by now even stronger penalties and the share forfeiture scheme.

Up until the 2010 assessment an unreported catch of 17% of the total commercial catch was assumed to allow for unreported retained catch from the lobster fishery, unreported lobster catch in the trawl and trap fisheries targeting finfish, mortality due to ghost fishing by lost fishing gear, and predation or other mortality of commercially caught lobsters during fishing operations. In 2010 consistent input from the Compliance Operations Branch and the fishing operators concluded that this figure was too high. Expert judgement was that the unreported retained catch was probably about 10%. The model inputs have been structured to reflect this unreported commercial catch that decreased at 0.5% per year from 17% of the reported commercial catch in 1994/5 and that has been constant at 8.5% since 2010/11 (i.e. non-reported commercial catches that range from 12-19t).

The Committee discussed in the public forum whether it was possible to ascertain if the type of illegal commercial activity that has been detected in recent large operations is ongoing, and whether any quantities of unreported catch could be ascribed to this type of activity. It was considered that there is no way of quantifying the impact of illegal activity beyond the detected offences, but that Compliance still consider that the overall level of unreported catch is 'low' (see also section 5.2.1). The Committee therefore supports the continued use of the 'low' estimates in the resource assessment model.

5.3 Marine Parks

All five coastal NSW marine parks include sanctuary zones over reef area likely to provide habitat for rock lobsters. In four of these parks lobster shares were purchased in amounts estimated to be proportional to catch from grounds lost to the fishery (507 shares in total). In response the TACC and management charges were adjusted accordingly.

The existence of sanctuary zones raises two primary considerations for the rock lobster stock and fishery management: 1) the extent to which these areas reduce fishing mortality by an amount that allows juveniles to make an appreciable contribution to the adult spawning stock, and 2) the degree to which the spawning biomass protected from fishing mortality within sanctuary zones makes a significant contribution to recruitment.

Sanctuary zones make up less than 7% of state waters and cover a range of estuarine and marine habitats including those with mud, sand and rocky substrates. Well under half the area of sanctuary zone would include habitat suitable for rock lobsters and these areas would cover a range of depths from the intertidal to around 80 metres.

Evidence from a range of published studies indicates that there would be an increase in the number and size of lobsters in sanctuary zones; however these increases may decline over time due to the effects of intraspecific competition and foraging and migration into fished areas. It is expected that juvenile rock lobsters settling in sanctuary zones may benefit from protection for a period, but would then enter the fishery as they reach sexual maturity, forage more widely and move into deeper waters.

The Committee considers that given the relatively small size of sanctuary zones in NSW, the small percentage of these zones in depths preferred by adult rock lobsters (generally 10 to 150m), and the migratory nature of rock lobsters it is unlikely that the presence of existing sanctuary zones has a significant influence for the stock assessment and TACC setting process.

5.4 Management framework

5.4.1 Fishery Management Strategy

The *Fisheries Management (Lobster Share Management Plan) Regulations 2000* set out the arrangements that are in place for the day-to-day operation of the commercial fishery. The fishery Management Strategy (FMS) for the NSW Lobster fishery provides detailed information on management arrangements for the fishery.

The FMS specifies objectives, performance indicators and trigger points that provide a framework to measure the performance of the fishery against the objectives. The performance indicators provide a measure of whether the objectives are being achieved and the trigger points signify a potential problem with the fishery and a review of the FMS is required. No triggers were activated for 2012/13.

A core objective in terms of TACC setting is that biomass is maintained above 25% of pre-exploitation levels. As discussed in detail in the Resource Assessment and the stock status section of this report, exploitation rates are estimated to be comfortably above this limit reference point.

As the fishery continues to biologically improve and move away from its trigger limits, industry and government acknowledge the need to develop targets that maximise the economic yield from the fishery. The Committee is strongly of the view that a modern harvest strategy should be incorporated into the FMS and that in particular, target reference levels should be specified (in addition to the existing limit reference levels). There is a wide range of international, national and State instruments and policies that establish the use of limits *and targets* as standard practice in harvest strategy design. The Committee and industry members had a good discussion about the benefits of specifying economic objectives and building a framework for meeting those objectives within an agreed timeframe, as this can materially impact how TACCs are set. Up until now, the industry has, understandably, focussed on building biomass. The Committee is strongly of the opinion that the secure biological status of the fishery provides the opportunity to now consider more specific economic objectives.

The Committee again recommends that the Department and industry work to develop a harvest strategy, including target reference points relating to maximising economic yield, to provide guidance on TACC decisions in relation to stock rebuilding.

In this context, more detailed economic data is considered a worthwhile investment to inform the development of, and measurement of, economic objectives. As discussed in the economics section of this report, the options presented by the Department are recommended by the Committee.

The Committee repeats its recommendation that the Department place more importance on the gathering of economic data in order to better understand the impacts of management decisions it makes on the financial wellbeing of industry.

5.4.2 Quota trading

As discussed last year, the Committee has drawn attention to industry concerns about the high transaction costs for quota leasing which inhibits the transfer of small amounts of quota at the end of the fishing season. The inability to fish right up to the full TACC due to small 'residual' holdings of quota being shared among all quota holders is not unusual in quota fisheries. It appears that this matter is now being dealt with through the web-based FishOnline/Fisher Direct program, which will assist by having all quota for lease or sale in one place, providing an open and transparent market for leasing and transferring quota. This initiative is very much in line with previous Committee recommendations and should provide very useful for increasing industry returns since online transfers will not incur a transaction charge.

The Department reports that full implementation of the FishOnline self-service system (Fisher Direct component) is still dependent on legislative amendment and capacity building. The system is in operation internally however external facing aspects are yet to be fully realised. The Department is building industry capacity in use of external components of the FishOnline system as circumstances allow. The initial pilot group that has been using the system is now being expanded. The existing pilot group includes a small number of lobster fishers for services such as: Submit General catch and effort reports; View fishing business information, licence

details and catch history; and Advertise 'for sale' and 'for trade' items on the FishOnline Noticeboard (also currently uploaded to DPI website).

- Submitting non-quota catch and effort records (eg when using trap & line fishery endorsements)
- Catch and effort history inquiries
- Quota balance inquiries
- Nominated fisher history inquiries
- Fishing business inquiries
- Boat Licence details
- Advertise 'for sale' and 'for trade' items.

The Committee recommends that the Department continue to implement the FishOnline system through to completion.

5.4.3 Management Costs

Category 1 share management fisheries are subject to cost recovery of government services. Charges for management services provided by the Department are payable in proportion to the shareholding. Implementation of full cost recovery in the fishery was staged over three fishing periods from the 1998/1999 fishing period, as indicated in Table 5.1.

Table 5.1: TACC (t), total reported catch (t), average ERL price (\$/kg), value of the reported catch (\$m), management charge per share (\$) and management charge as a proportion of GVP (%) for each fishing period from 1998/99 to 2012/13. Management charge includes the EIS charge. # 2012/13 data as at 21 May 2013.

Fishing period	TACC (t)	Reported catch (t)	Price (\$/kg)	Value (\$m)	Mgt charge (Incl. EIS) / share	Mgt charge (incl. EIS) / GVP (%)
1998/99	125	110.0	34.76	3.8	38.00	10.0
1999/00	140	117.0	39.16	4.6	48.00	10.4
2000/01**	150	102.0	42.98	4.4	58.00	13.2
2001/02	150	102.0	46.33	4.7	58.00	12.3
2002/03	135	121.3	44.77	5.4	59.70	11.1
2003/04	135	107.9	38.83	4.2	61.70	14.7
2004/05	102	98.1	38.30	3.8	58.60	15.4
2005/06	102	100.5	41.30	4.1	63.09	15.2
2006/07	112	109.4	47.46	5.2	62.06	12.0
2007/08	124	121.6	45.81	5.6	57.91	10.4
2008/09	128	121.8	54.67	6.7	64.04	9.4
2009/10	128	122.1	55.49	6.8	64.70	9.3
2010/11	131	129	55.18	7.1	52.64	6.2
2011/12	149	148.3	57.52	8.5	44.21	5.0
2012/13	140	119.9	53.76	6.4	49.32	7.4

Fishing period	TACC (t)	Reported catch (t)	Price (\$/kg)	Value (\$m)	Mgt charge (Incl. EIS) / share	Mgt charge (incl. EIS) / GVP (%)
2013/14	150	117.9	63.17	7.4	51.57	6.7

*** Commencement of full cost recovery

The contribution of management charges to total costs has contracted as a share of GVP from the fishery (from around 15% to currently 7%). The Committee continues to support a transparent system of cost recovery where services received by industry against management and other charges are fully justified and delivered efficiently. In considering 'management', the totality of fees applying to the fishery should be considered.

There remain significant costs in running this fishery, particularly in the areas of research and compliance. It is important that both areas are properly resourced, given that the fishery remains in the recovery stage.

As the stock recovery continues, the fishery will be faced with options concerning the frequency (and cost) of stock assessment and level of monitoring. Elsewhere in this report recommendations are made for consideration in terms of where to direct research and management effort in the short term. In addition, it would be appropriate to review costs and look at ways of developing an overall longer-term management package (including science and compliance) that has costs appropriate to the scale of the fishery. This review could be usefully done in conjunction with the design of a harvest strategy for the fishery, as previously discussed.

Decisions on targets and the TACC will need to be made on the basis of balancing i) a lower risk, more conservative TACC (with associated loss in gross revenue), and ii) lower assessment costs vs. maintaining a higher TACC (higher gross revenue) with higher assessment costs. The net benefit will depend on the level of costs necessary to provide an acceptable level of risk.

5.4.4 Industry Consultation

Section 2.1 and Appendix 1 of this report detail the industry consultation processes that are in place for the fishery and lists the details of submissions that were made by the commercial sector to the Committee.

The Committee continues to be confident that the open forum process that has now been in place for several years is working effectively and appears to have the ongoing support of commercial fishers. The Committee finds the level of discussions at the open forum to be very positive and constructive.

The Committee understands that the Lobster Industry Working Group is established and met prior to the open forum. The Committee hopes this body will continue to engage effectively as previous groups have.

The fact that industry generally continue to support a precautionary approach to the TACC reflects the fact that they understand and appreciate that the fishery is still in a re-building phase.

The Committee recommends that the Rock Lobster Industry Working Group discuss the TAC determination and accompanying report and recommendations, and provide feedback.

5.5 EPBC Act Assessment of the NSW Rock Lobster fishery

In January 2012, the NSW Department of Primary Industries provided an application to the Department of Sustainability, Environment, Water, Population and Communities for assessment, seeking continued export approval for the NSW Lobster fishery

The application was assessed for the purposes of the protected species provisions of Part 13 and the wildlife trade provisions of Part 13A of the EPBC Act and approved until 30 March 2017. Important factors taken into consideration were management arrangements and precautionary measures currently in place for the fishery including annually reviewed total allowable catch limits, limited entry, mandatory tagging of commercially harvested lobsters, recreational bag limits, minimum and maximum size limits, prohibition on the take of berried females, area closures and gear restrictions.

5.6 Total Allowable Commercial Catch for 2013/14

The Committee was presented with a detailed Resource Assessment, based on the available fishery-dependant catch and effort information as well as data from previous Fishery-Independent Surveys. The assessment presents empirical measures of stock performance as well as model outputs.

Management and compliance reports were also provided.

A detailed analysis of the Resource Assessment is set out in the stock status section of this report, including recommendations for improving the precision of the stock assessment going forward, particularly in terms of the treatment of recruitment in the model.

Nevertheless, from a management perspective, the key factors are:

- the spawning biomass is estimated to be well above the limit reference point of 25% of pre-exploitation levels and there are high levels of confidence around this estimate;
- all measures of recruitment (peurulus settlement, catch rate of undersize and FIS catch and catch rate of undersize) indicate strong recruitment to the fishery; and
- there is unanimous agreement that the estimates for recreational and unreported catch can safely be regarded as 'low' and that the 'low' option has therefore been used as input to the model.

There is a growing discrepancy between the empirical data and the model in terms of quantifying the impact of recent recruitment to the fishery. While this does not detract from the overall conclusion that the biomass is continuing to rebuild, it will materially impact stock assessments and therefore TACC decisions going forward. Effort should therefore be directed to understanding the stock-recruitment relationship with more certainty as a short term priority, to inform future decisions about the fishery's potential and rates of rebuilding.

On this basis, the TACC can safely be maintained at current levels and should be set at 150t for 2014/15.

5.7 Conclusion

The Committee continues to be impressed by the high level of co-operation between the Department and the commercial sector for both the research and compliance programs. The engagement and work of industry representatives formerly via LobMAC and now through the Rock Lobster Industry Working Group, also merits mention, as it did last year. The communication and interaction between the Department, industry and the Committee is excellent in this fishery. The Committee

acknowledges the way in which its recommendations are considered and feedback provided.

The Committee notes the industry's advice to the Committee which, in summary, provided that shareholders take a cautious approach to stock rebuilding and that they would be comfortable with the current TACC or, if supported by the science, a small increase. Benefits of maintaining the TACC in terms of stock rebuilding and business planning were acknowledged.

Recreational lobster fishing continues to be popular and the Committee looks forward to receiving better quality information on the status of this activity with the results of the Statewide survey.

To conclude, the Committee would again like to emphasise that a change in the management approach to the fishery should be seriously considered. Such an approach should recognise the need to consider targets for the fishery that incorporate economic, rather than solely biological considerations. This will materially impact TACC decisions in the near future if a harvest strategy is not developed with specific target reference levels to guide decision-making.

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 rock lobster that may be taken in the Rock Lobster Fishery during the period 1 August 2014 to 31 July 2015, should be **150 tonnes**.



Ian Cartwright
Chair



Keith Sainsbury
fisheries scientist



Jessica Hartman
fisheries management



Kelly Crosthwaite
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
12.4.2014	Section 31(1)	TAC Committee called for public submissions on the appropriate level of the annual TACC for Lobster for 2013/14.
12.4.2014	Section 284 (1b)	The advertisement was placed in the Sydney Morning Herald, the Daily Telegraph.
29.4.2014	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 Lobster Shareholders ■ All Members of the NSW Lobster Fishery Working Group ■ NSW DPI Fisheries Offices
14.4.2014	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.</p> <ul style="list-style-type: none"> ■ NSW DPI – Commercial Fisheries Management, Research and Compliance Reports. ■ Daniel and Noel Gogerly, Lobster fishers, Nth Coast*
21.5.2014		<p>The submissions were collated and analysed, and the TAC Committee heard formal presentations and received views and opinions at the TACC Open Forum meeting held on 21.5.14. The following made presentations, provided information to the Committee or attended the Open Forum:</p> <p>DPI Doug Ferrell (Management - Manager Resource Planning) Nicholas Giles (Management - Fisheries Manager) Geoff Liggins (Science and Research) Tony Chen (Fisheries Compliance) Andrew Field (Fisheries Compliance) Marcus Miller (Science and Research) Giles Butler (Science and Research)</p> <p>Industry Scott Westley Daniel Stewart Peter Offner Noel Gogerly Daniel Gogerly Lee Monin Ron Firkin</p>

*NB This submission was confidential. Identification of this authors should be withheld from the copy of the Report and Determination when posted on the DPI website

Appendix 2* Summary of submissions and the issues

Submission provided by	Issue(s)
Daniel and New Gogerly*	Notes that the abundance of lobsters continues to improve, with the numbers of "schoolie" lobsters this year being phenomenal and the large number of oversize and spawning lobsters suggesting the stock is very healthy. Reduced effort significantly to catch quota bringing traps home from the shallow water before the end of the season. Suggests that the stock is very healthy and improving at a rapid rate and suggests an increase to the TACC of 10%,
Industry and Investment New South Wales	Research, compliance and management reports.

*NB This submission was confidential. Identification of this authors should be withheld from the copy of the Report and Determination when posted on the DPI website