B4.5 Risks to economic viability

The aim in this section of the EIS is to describe the potential risks to economic viability from the current operations of the Lobster Fishery as presented in sections B4.1 - B4.4. Given that the Lobster Fishery is managed through a system of individual transferable quotas, it is free from many of the problems that have been identified for fisheries managed through input controls, such as efficiency losses through input substitution and effort creep. However, there are still several risks to economic viability, both internal and external, that may affect the economic viability of operators in the Lobster Fishery. A risk analysis is used to identify those aspects of the existing operations of the Lobster Fishery that could impact on the economic viability of operators. Risks that are defined as being within the existing operation of the fishery can be addressed through management responses within the Fishery Management Strategy (FMS) (Chapter D), and potentially mitigated through this process. The extent to which risks are mitigated through management responses in the FMS is addressed in Chapter E, Section E3.3. Risks external to the existing operational regime within the fishery, such as the effect of external market factors, on operators' viability can not be specifically addressed through management responses within the commercial Lobster FMS. In practice, however, these external factors need to be considered when weighing up the overall significance of risks in the fishery.

B4.5.1 Risk analysis procedure

A broad range of risk analysis, risk assessment and risk management procedures exist for assessing risks to the environment. However, a similar set of procedures does not appear to have been developed for assessing risks to economic viability (Fletcher *et al*., 2002). Generic risk analysis principles have been developed (Standards Australia/Standards New Zealand, 1999) that could be used to assess the risks to economic viability. However, it is thought that a more thorough risk analysis, as has been done in Section B2 of this EIS, may be more appropriate. Given this, a similar procedure to that outlined in Section B2.1 will be applied to assess the risks to economic viability in the Lobster Fishery. In particular, the risk analysis framework described in Section 2.1, and presented in Table B2.1, will be applied. However, the process of developing a qualitative risk matrix, as presented in Figure B2.2, is not warranted for this economic risk assessment.

B4.5.2 Context for the risk analysis

The guidelines for the Environmental Impact Assessment of the Lobster Fishery issued by the Department of Infrastructure, Planning and Natural Resources require assessment of the likelihood and consequence of risks affecting the economic viability of operators in the Lobster Fishery. The risks being assessed can be defined in the following context: (a) the likelihood that the current activities of the Lobster Fishery will lead to lower incomes from lobster fishing; and (b) the consequence that the economic return from lobster fishing will be lowered to unsustainable levels, i.e. below normal returns[13]. Some of the risks identified as affecting the viability of operators may be short term in nature, and hence, may not result in sustained lower incomes from fishing. In addition, it is noted that short-run fluctuations in economic viability are deemed to be part of the normal operation of a business, and should be accounted for as part of the business planning process.

[13] Where normal returns are the returns that are necessary to keep labour and capital engaged in fishing, and include a return on skills.

B4.5.2.1 Accounting for uncertainty in risk analysis

Uncertainty in risk analysis, due to lack of information, or poor quality information, can lead to different types of erroneous conclusions about risk, which may have different implications depending on the scenario. A useful analogy is found in the field of statistical hypothesis testing, where such statistical errors are known as Type I (incorrectly concluding that a statistical null hypothesis has been falsified when it is, in fact, true) and Type II (failing to disprove a statistical null hypothesis when it is, in fact, false). More generally, a Type I error would mean erroneously concluding that there has been a real change in some variable of interest (relative to a pre-existing value or some other reference level), while a Type II error would mean falsely concluding no change when there has, in reality been a change.

The consequences of Type I and II errors depend on the context in which the error is made. In most experimental biological research, Type I errors are considered more serious, because they could lead to incorrect claims of significant results, and thus a waste of time, resources and ultimately loss of reputation through pursuing an incorrect hypothesis. This is reflected in the safeguards against Type I error that are built into statistical hypothesis testing methods. In environmental monitoring, however, Type I errors (i.e. concluding that an action has an environmental impact when in fact it does not) are less serious and costly than Type II errors (i.e. concluding that an action has no impact when in fact it does) (Cohen, 1988; Underwood and Chapman, 2003). The extra costs of making a Type II error are incurred due to the costs of remediation (e.g. stock recovery) or possibly irreversible environmental damage (e.g. stock collapse) when the impact is eventually discovered (Fairweather, 1991; Peterman and M'Gonigle, 1992, Mapstone, 1995; Underwood, 1997a; Underwood and Chapman, 2003). Because of the seriousness of Type II errors in environmental monitoring, it has been argued that more care should be taken to avoid Type II errors.

In assessing the economic viability of the Lobster Fishery, the consequences of Type I and Type II errors are different again, because unlike environmental monitoring, where there are two possible outcomes of interest (impact or no impact), in economic analysis there are three outcomes of interest: increase, decrease or no change to economic viability, as measured against some reference level. The consequences of the different error types that could result from uncertainty are shown in Table B4.1. From this table it is apparent that both types of error can cause problems for economic viability, however a Type II error where economic viability declines but remains undetected is likely to cause long term problems for both the management agency and the viability of the industry. Therefore, management actions based on such analysis should err on the side of caution (i.e. take a precautionary approach) with regard to the potential for such errors.

Table B4.26 Possible implications of making interpretation/decision errors in qualitative risk assessment.

Interpretation/Decision Errors			**Implications of Interptetation/Decision Errors**	
Error type	**Interpretation/ Decision**	**Reality**	**For management agency**	**For economic viability**
False positive - Change detected when none has occurred (analogous to Type I)	Improvement in economic viability	No change in economic viability	No problem	Short-term problem if management agency initiates change in response to false positive signals
	Reduction in economic viability	No change in economic viability	Short term problem if higher management costs result from unnecessary monitoring	No problem
False negative - No change detected but change has occurred (analogous to Type II)	No change in economic viability	Improvement in economic viability	No problem	No problem
	No change in economic viability	Reduction in economic viability	Long-term problem if source of reduction results in costly monitoring and programs	Long-term problem if changes are irreversible

B4.5.3 Risk analysis of the current operation of the fishery

In this section the risk analysis framework described in Section B2.1 is applied to analysis of the risks to economic viability in the Lobster Fishery at the broad level. Risks to the economic viability of the Lobster Fishery from the existing operational regime in the fishery have been assessed based on the overall economic return from the fishery, rather than on the basis of financial returns for individual fishers.

B4.5.3.1 Risk identification

To identify areas of risk to economic viability, activities in the Lobster Fishery, and factors that affect these activities, were analysed in greater detail (Table B4.27). Activities that constitute potential sources of risk to economic viability are then linked to broad components of economic viability and quantitative levels of risk assigned (Table B4.28). Included in the table are risks to economic viability from factors external to the fishery, i.e. outside the direct operation and management of the commercial fishery, which would require mitigative actions that are beyond the scope of the FMS for the commercial Lobster Fishery. There may also be other activities in the fishery that affect economic viability both directly and indirectly that are not specifically addressed in the table.

Table B4.27 Description of activities of the Lobster Fishery that impact on economic viability

Activity/Factor	Definition of activity and potential impacts
Catch related:	
Availability of stock to fishers	The stock available for harvest by lobster fishers. This may be affected by i) changes in the underlying stock biomass and/or structure; and/or ii) management changes (such as TACC, size limits and area closures), which may be introduced in response to information about the status of the stock.
Method of harvesting	Components of a commercial fishing operation pertaining to the capture and sale of lobster. Potential impacts may include recruitment overfishing, growth overfishing, changes in population structure and trophic cascades, all of which may result in changes to the Total Allowable Catch.
Discarding catch	Component of lobster stock that is caught and thrown back as a result of commercial fishing operations in the Lobster fishery. Potential impacts may include high mortality rates of discards that contribute to recruitment overfishing, changes in population structure and trophic cascades, all of which may result in changes to the Total Allowable Catch and an increase in the costs associated with taking catch.
Loss of fishing gear	Component of catch lost due to fishing gear lost during fishing operations. This includes the effects of "ghost fishing" and entanglements. Potential impacts include high mortality rates that contribute to recruitment overfishing, changes in population structure and trophic cascades, all of which may result in changes to the Total Allowable Catch and an increase in the costs associated with taking catch.
Other:	
Quality of economic and social data	Information on the economic and social components of a fishing business that affect viability. Potential impacts arise from uncertainty in interpretation of available economic data.
Knowledge of Industry structure	Information on the distribution of fishers, size and profitability of business units, ability of business units to respond to changing economic circumstances, etc. Potential impacts include better information on which to base decisions about industry restructuring.
Management charges	Component of costs represented by government charges. Potential impacts arise from uncertainty in the interpretation of available economic data.
Quota trading system	The system whereby fishers can lease entitlements to harvest catch from other operators in the fishery. Potential impacts include high transactions costs.
External factors:	
Imported lobster	Component of lobster available for sale that is taken in waters other than in NSW. Potential impacts include lower prices for lobster caught in NSW waters due to competition from lower priced imports.
Other user groups	Effects on the environment and catching activities in the lobster fishery from other use activities, including recreational and Indigenous fishers (data is lacking with which to assess this catch) and interaction between lobster gear and gear in other commercial fisheries. Potential impacts include a reduction in lobster stock which may result in changes to the Total Allowable Catch, and an increase in the costs associated with taking catch.
Illegal catch	Component of non-reported catch that is made up of illegally caught lobster (as opposed to the non-reported recreational and Indigenous harvest). Potential impacts include a reduction in the Total Allowable Commercial Catch.
Co-op charges and services	Charges levied by Co-ops and services provided along the NSW coast vary markedly. Potential impacts include an increase in the cost of marketing lobster catch.
Input prices	Prices paid by fishers for inputs used in commercial lobster fishing such as bait, traps etc. Potential impacts include increases in input prices resulting in an increase in the costs associated with taking lobster catch.

B4.5.3.2 Risk characterisation

As was done in the ecological risk assessment (Section B2.1) a risk rating is assigned to each of the factors in the fishery that poses a threat to economic viability (Table B4.28). Factors are ranked as high, high-intermediate, intermediate, intermediate-low or low, depending on their risk to economic viability. Factors ranked as high risk are expected to have a significant negative impact on the viability of the Lobster Fishery; factors identified as intermediate risk are expected to negatively impact the viability of the Lobster Fishery, but further research would be needed to determine the extent of this impact; factors ranked as low risk pose only a minimal threat to the economic viability of the Lobster Fishery, but should be closely monitored in case this situation changes. As can be seen in Table B4.28, several activities pose a significant threat to economic viability.

Table B4.28 Level of risk to economic viability from activities in the Lobster Fishery

		Economic component	
	Activities/Factor	**Value of production**	**Cost of production**
Internal	Catch:		
	- Availabilty of stock to fishers	High	Low
	- Method of harvesting	Low	Low
	- Discarding catch	Low	Low
	- Loss of fishing gear	High	High
	Quality of social and economic data	High	Intermediate
	Knowledge of industry structure	Intermediate	Intermediate
	Management charges	Not Applicable	Low
	Quota trading system	Intermediate	Intermediate
External	Imported lobster	High	Not Applicable
	Other user groups	Intermediate	Intermediate
	Illegal catch	Intermediate	Intermediate
	Variability in co-op charges and services	Intermediate	Intermediate
	Input prices	Not Applicable	High

External risks

As mentioned in Section B4.5.3.1, risks that are external to the existing operation of the fishery cannot be addressed within the FMS. Several external risks pose a significant threat to economic viability (Table B4.28). For example, the effect on prices received for NSW lobster from lower priced imports (both interstate and overseas) poses a high level of risk to the economic viability of the Lobster Fishery, through the depressing effect these imports have on the price paid for NSW lobster.

The effect of other user groups such as other commercial fisheries, recreational fishers and Indigenous groups, may be significant. In the case of other commercial fisheries, access to fishing grounds and the interaction between lobster gear and gear in other fisheries, e.g. longline gear interacting with, and possibly destroying lobster gear; and loss of lobster grounds to other fishing methods, e.g. trawl, due to insufficient mapping and separation of grounds, can have a significant negative effect on catches taken, and incomes received, by lobster fishers.

Whilst noting that the lobster resource is community owned and shared among different sectors, recreational and Indigenous fishers may affect catches taken, and incomes received, by commercial lobster fishers in several ways, including through: greater resource access being afforded to these groups and the TACC being reduced as a result; and through insufficient data leading to either: an overestimation of catches taken by these groups, and hence the setting of a TACC that is too conservative; or through an underestimation of the catches taken by these groups, and hence an underestimation of the total catch taken in the fishery, leading to increased pressure on the resource and long-term problems for economic viability if resource problems are costly for management to rectify, or, even worse, irreversible. Fishers may also experience increased costs if availability of lobster declines and catching costs increase as a result, i.e. cost per unit of effort may be higher.

Illegal catch also constitutes a significant problem for economic viability due to a reduction in the volume of lobster available for harvest by the commercial sector, and incomes received. That is, the TACC is set having regard to the estimated level of illegal catch. Ongoing uncertainty about the level of illegal catch also presents a risk as incorrect estimates may reduce the catches and incomes received by lobster fishers. However, in all cases where data availability and quality is poor, the costs of collecting better data must be weighed up against the benefits of setting a more conservative TACC.

Variability in co-op charges and level of service along the NSW coast may result in increased costs for fishers if, as a result of higher charges and lower service provision at co-ops in a particular region, fishers are receiving less income from catches, or are travelling considerable distances to land product elsewhere, including at co-ops in other districts where charges are lower or services are better (see Section 4.2.2.1 for a further discussion of this).

Increases in prices paid for inputs, such as fuel and bait, significantly affect the costs of going lobster fishing. For example, oil price shocks may significantly increase the costs of fuel, or unfavourable exchange rate fluctuations may increase the cost of imported bait. To some extent fishers can plan for fluctuations in input prices, but when fluctuations are significant, and sustained for long periods of time, the negative impact on fishers viability is considerable.

Factors affecting catch

Factors affecting catch in the fishery do so mainly through availability of stock. Management restrictions (e.g. size limits, TACC and area closures) aimed at protecting the status of the stock, as well as fluctuations in underlying biomass and structure, affect stock availability, and, hence, incomes of fishers. Despite current management processes and research designed to gather information on the status of the stock to assist in setting the TAC at its biological optimum, unforseen events, such as the outbreak of disease, may result in a reduction in the TAC. This may, in turn, result in a reduction in the value of production in the fishery, notwithstanding increases in prices. Hence, the risk to economic viability from stock availability is high. In comparison, discarding of catch in the Lobster Fishery is expected to have only a minimal affect on catches in the fishery, as the impact of discarding on the stock of lobster is considered to be minimal (see Table B2.5, Section B2.2).

While the method of harvesting lobster is expected to have only minimal impact on economic viability, measures taken by lobster fishers that relate to improvements in the way in which lobsters are handled while on board, and subsequently marketed to end-users, may help to improve the value of catch. In addition, efficiencies in the method of harvesting lobster may help to reduce costs of taking lobster catch.

As mentioned in the section above on external risks, loss of fishing gear in the Lobster Fishery due to interaction with gear from other fisheries, e.g. longline gear interacting with, and possibly destroying lobster gear, may have a significant negative effect on incomes in the Lobster Fishery by lowering the value of production through loss of catch, and increasing the costs of taking catch. Hence, the risk to economic viability from loss of fishing gear is high. Lost gear may also further reduce catch as a result of "ghost fishing", whereby lost gear continues to fish, thereby reducing available lobster.

Quality of social and economic data

There is a high level of risk to economic viability in the Lobster Fishery as a result of the quality of economic and social data. To date only two detailed surveys of costs and earnings of Lobster Fishers have been undertaken and one social survey. The first costs and earnings survey was undertaken by Hassall and Associates in 1999. Data were collected for 68 businesses holding lobster shares in the 1997/98 financial year. Of these, 64 were able to be used in calculations of net return. At the time this sample represented 34% of the fishery. Given the large negative average return to capital, i.e. –213%, estimated using data collected through this survey, the results of the survey were treated with caution. In particular, it was though that because the data collected through the survey

was being used to estimate resource rent in the fishery, fishers may have had the incentive to understate returns and overstate costs.

The second costs and earnings survey was undertaken by Roy Morgan Research in May 2001 for the 1999/00 financial year. The information was recorded for approximately 27 businesses holding lobster shares, which, at the time, represented around 22% of total fishing businesses holding endorsements in the Lobster Fishery. Of the 27 survey responses, only 24 were able to be used in calculations of net return. Again, the survey results suggested that, on average, fishers were making a negative return to capital. This was also attributed to possible strategic bias in the survey responses, i.e. an overestimation of the costs of going fishing, and, hence, an underestimation of the net return, and available economic rent. In addition, due to the small sample size, inferences made about the population of fishers from the survey results were treated with caution.

Of concern in both costs and earnings surveys is the method through which data was collected on the labour component of a fishing business, as well as the absence of information, such as an expected rate of return on risk and entrepreneurial skill, with which to calculate an appropriate discount rate. As was demonstrated in Section B4.4.1, their are significant differences in net returns to a fishing business holding lobster shares as a result of adjustments to cost data reported in the Roy Morgan survey. This has implications for calculations of the level of economic rent that can be appropriated from the resource and returned to the community through a community contribution.

Data on the social aspects of fishing were collected through a survey by Roy Morgan Research in 2001. Whilst this survey provided good information on some of the lifestyle factors associated with fishing, further work is needed in order to better understand the non-pecuniary benefits fishers receive from commercial fishing activities. The absence of such data in calculations of economic rent may mean that the true return and, hence, rent fishers receive from commercial fishing activities, is underestimated. This also has implications for estimation of the level of economic rent that can be appropriated from the resource and returned to the community through a community contribution.

The potential inaccuracies in the economic data collected through the Hassall and Associates and Roy Morgan surveys, and the lack of better economic and social data, poses a high risk to the economic viability of the Lobster Fishery. A more accurate data set, collected more regularly, would improve the information base available to the lobster industry and NSW Department of Primary Industries to make informed business and management decisions, and would support efforts to refine the level of community contribution. Especially important are: improvements in the method through which data on the labour component of a fishing business is collected, the collection of better information to use in calculating an appropriate discount rate, and better information on the non-pecuniary benefits fishers receive from commercial fishing activities.

It is suggested that key information gaps could be overcome by running a regular survey of operators (the alternative is to tolerate potential efficiency losses that may result from basing management decisions on inaccurate data). In addition, close monitoring of external and internal factors causing changes to economic viability should be undertaken.

Given the poor reliability of the data used to make assertions about economic viability, the risk of making an error analogous to a Type I or Type II error is greatly increased.

Knowledge of industry structure

There is an intermediate risk to economic viability in the Lobster Fishery as a result of a lack of knowledge about the structure of businesses in the lobster industry. Improving this knowledge

involves developing an understanding of the number of businesses, diversity of business mixes, and the ability of these businesses to respond to changing economic circumstances. Also important is developing an understanding of the non-pecuniary benefits some lobster fishers derive from commercial fishing, as well as the pecuniary benefits other fishers may derive from other commercial fishing activities and/or activities outside fishing which they may use to subsidise their lobster fishing activities.

A better understanding of the factors that define industry structure would help inform decisions about industry restructuring. For example, the information available from the Roy Morgan economic survey suggests that smaller lobster businesses are, in general, the least profitable. However, an appreciation of the income these businesses derive from other commercial fisheries as well as from activities outside fishing, combined with an appreciation of the non-pecuniary benefits derived from fishing, may help to better understand the economic rationale for the participation of such businesses in the fishery.

Notwithstanding the information gaps that currently exist, the information from the economic survey, and from LobMAC, suggests that there may be viability problems with businesses with small shareholdings in the Lobster Fishery. If this is the case, interim measures to encourage such businesses to improve their viability may be warranted. In addition, the involvement of a relatively high number of businesses with small shareholdings in the fishery may contribute to higher management, administrative and compliance costs and risks.

An understanding of the factors driving structural change in the industry would be useful. It is suggested that the reluctance of operators, who are operating below the level of long-term viability, to leave the industry could be due to several factors, including: operators are willing to accept a lower level of profit for participation in a fishery due to the lifestyle benefits they derive from fishing; restrictions on transferability and sale of fishing licences; lack of alternative skills or employment opportunities; the prospect of false starts in new employment; the age structure of the Lobster Fishery; and the psychic costs of changing occupation (and possibly place of living). It is also the case that several individuals running a fishing business with lobster shares have a second job, and their income from fishing is less important. For example, in 1999/2000 17% of lobster fishers earned incomes from non-fishing sources (Roy Morgan 2001a).

Further investigations are warranted to determine whether the economic viability of the Lobster Fishery, including other components of a fishing business, is below the level required for long-term viability. Getting more reliable data on costs and returns is a priority, particularly with respect to informing decisions about industry structure and the need and strategies for adjustment. Consideration should be given to the range of adjustment strategies, including encouraging better business planning, product marketing and the use of minimum shareholding provisions.

Management charges

Management charges pose a low level of risk to economic viability in the Lobster Fishery. As part of the ongoing operation of a fishing business, lobster fishers incur a range of costs, including direct costs, e.g. gear, bait, fuel, and indirect costs, e.g. interest charges and management charges. Future increases in input costs may reduce the financial viability of fishers unless the value of lobster catches increase sufficiently to offset this. Of these costs, management charges are the only variable input cost that NSW Department of Primary Industries has control over. As mentioned earlier, management charges are necessary to recover the costs of managing the use of a natural resource (e.g. stock assessment), such that harvest of that resource is undertaken in a sustainable manner. Cost

recovery is consistent with the principles of ecologically sustainable development and national competition policy requirements.

Reductions in the TACC may also reduce the financial viability of fishers unless the price of lobster increases sufficiently to offset this. Whilst lobster prices vary considerably over time, for example, in response to local product availability and interstate competition, it seems unlikely that any sustained reduction in the TACC would be offset by a sustained increase in prices.

Industry members of the Lobster Management Advisory Committee have expressed concern that management charges are not responsive to changes in the TACC. By comparison, fishers have the ability to reduce some other input costs in response to a lower available catch. However, it is generally not effective to make management costs responsive to changes in the TACC, given that a certain level of management services are necessary to maintain the sustainable use and sharing of the resource. It is also important to note that the information available from the economic survey is not sufficient to draw firm conclusions about lobster shareholders' costs and returns, and hence their ability to pay existing management charges.

Management charges in the Lobster Fishery were $59.70 per share in 2002/03. This represented around 11 percent of the total value of catch in 2002/03. However, in 2001/02, when management charges per share were lower, at $58.00 per share, catches were also lower, hence management charges represented a proportionately higher percentage of the total value of catch, at 13%. However, again it is important to note that management services, e.g. stock assessment, compliance and TACC setting, are essential to long term sustainability and economic viability in the fishery. Additionally, there is a minimum level at which these services can be provided. Management costs in the Lobster Fishery appear relatively high as a proportion of revenue mainly due to the relatively small size and value of the fishery. Accordingly, efforts should continue to ensure the cost effective delivery of key management services.

Given the poor reliability of the data used to make assertions about economic viability, the risk of making an error analogous to a Type I or Type II error is greatly increased. As indicated in Table B4.27 this has implications for the costs of management in the fishery.

Quota trading system

There is an intermediate level of risk to economic viability in the Lobster Fishery as a result of the quota trading system. Currently, transaction costs (where transaction costs are defined as all the costs incurred in making an economic exchange, including the opportunity cost of time) associated with the leasing of quota in the Lobster Fishery are relatively high. This may discourage lobster fishers from trading in small packages of quota, and may force costs of leasing quota above the value which fishers place on it. In addition to the high search costs associated with locating other fishers with quota for sale, a key reason for the high transaction costs is the time involved in rectifying catch returns of fishers against quota requirements. If fishers were able to easily locate others with quota available for sale, and trade this quota electronically, transaction costs could be minimised. However, an electronic quota system comes at a cost, and this cost must be balanced against the possible efficiency losses arising from a manual system. In addition, an electronic system requires fishers' catch records to be up to date, which may not always be the case.

The high transaction costs associated with trading quota also results in inefficiencies in the catching sector, as lobster fishers are not able to lease in quota in time to make it possible to land catches that may be over quota.

The high transaction costs associated with quota leasing, and the subsequent inefficiencies that are introduced in the catching sector as a result, are likely to be one of the reasons for the inability of the fishery to fill the TACC each season (Table B4.29). However, non-filling of quota may also reflect the fact that the TACC exceeds the catch that could be taken within the constraints of the existing production technology, stock abundance, environmental and market conditions (Bose *et al*., 2000).

Table B4.29 Reported commercial catch and TACC

Year	TACC (tonnes)	Reported commercial catch (tonnes)	% TACC caught
1995-96	106	99.8	94.1
1996-97	106	102.6	96.8
1997-98	117	108.2	92.5
1998-99	125	109.9	87.9
1999-00	140	117	83.6
2000-2001	150	102.4	68.3
2001-2002	150	102.3	68.2
2002-2003	135	121.3	89.9

The inability of the quota leasing system to result in the most efficient allocation of resources, i.e. from high to low cost fishers, and the effect of this on fishers' viability, warrants further investigation as does the cost effectiveness of introducing an electronic quota trading system, as is in place in several other quota managed fisheries.

B5 Social Issues

The NSW Department of Planning, Infrastructure and Natural Resources guidelines have been followed for the assessment of social issues. The guidelines require an analysis of the basis of views presented, as such, some extra information outside the guidelines has been explored in this section.

B5.1 Community values and views associated with the fishery

B5.1.1 Introduction

This section examines the social characteristics of fishers who operate in the Lobster Fishery. Along with the analysis of fishers, an overview of the communities and regions in which fishers live is also explored. Data were obtained from the Australian Bureau of Statistics (ABS), NSW Department of Primary Industries and from the Roy Morgan Social Survey (2001a). The latter source provided specific information in regards to the fishers themselves. Details of the survey are outlined in Appendix B2.

B5.1.1.1 Demographic overview of fishers in the Lobster Fishery and regional statistics

Lobster fishing is conducted across a vast stretch of the NSW coast. Fishers surveyed with endorsements in the Lobster Fishery are located in 45 towns along the NSW coast. The analysis in this section uses the same regional breakdown of fishers as presented in section B4, that is, the Far North, Mid North, Sydney South and Far South. The separation of towns into these regions and districts is given in Figure B5.2. Consideration of the industry as a whole has also been given in the analysis. The proportion of respondents to the social survey (109 in total), which live in the four regions, is shown in Figure B5.1. The sum of respondents in each region (including 'Can't Say') is greater than the total number of respondents to the survey. It is thought the reason for this is that some fishers gave two homeports during the survey.

The information for lobster fishing communities per region is given in Table B5.1 and the four regions are shown on Figure B4.1. The Mid North region has the largest number of respondents with 39, compared with the other regions. The reason for such a concentration in respondents is that the Mid North region contains the port with the highest concentration of fishers, Nelson Bay. The home port of Port Stephens had a total of 11 of the 39 respondents for the Mid North region (28%). The survey results have been used to make inferences about the population, but as with the economic survey, the inferences made must be considered in the context of the representativeness of the sample (see Appendix B2 for details on the social survey).

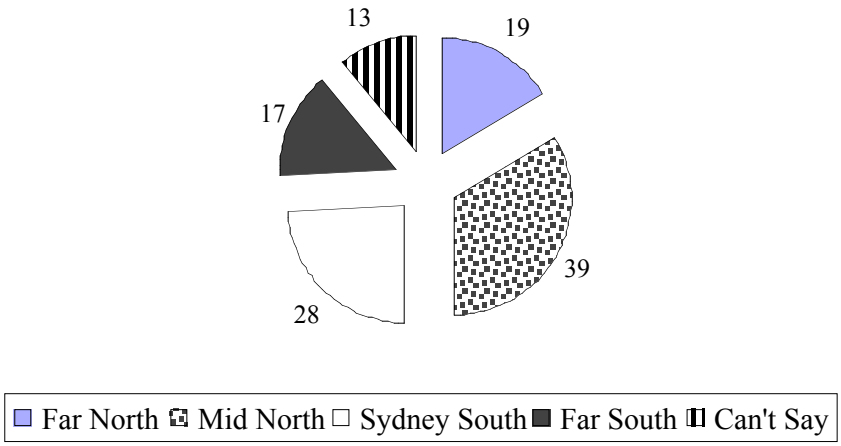

Figure B5.1 Respondents per region
(Source: Roy Morgan 2001a).

B5.1.1.2 Regional unemployment statistics

Unemployment by statistical regions for the communities in which the lobster fishers live and work is illustrated in Table B5.1. Whilst unemployment in NSW has been falling in recent times, the unemployment rate varies significantly across the state.

Table B5.1 Statistics for each region and statistical areas

Region	Statistical Region	Population	Unemployment Rate	Median Income (weekly)	Labour Force
Far North	Clarence SLAs, Greater Taree	82,078	16.22%	$364	30,363
	Richmond Valley	21,137	12.27%	$278	8,164
	Tweed	81,669	13.00%	$280	30,419
	Coffs Harbour	83,156	14.01%	$286	34,028
Fishers as a percentage of the Labour force: Far North region					0.01%
Mid North	Great Lakes	62,055	11.35%	$278	23,109
	Hastings	76,478	11.43%	$283	29,201
	Lake Macquarie	268,849	9.35%	$324	118,248
	Newcastle	81,161	12.49%	$310	36,430
	Port Stephens	80,493	9.74%	$317	33,817
Fishers as a percentage of the Labour force: Mid North region					0.02%
Sydney South	Sydney, Sth Sydney, Botany	238,315	6.07%	$528	124,645
	Gosford	155,892	7.36%	$367	69,325
	Hawkesbury	76,310	4.84%	$438	38,090
	Kiama, Shoalhaven	115,440	9.32%	$306	45,592
	Wollongong, Shellharbour	237,322	9.19%	$330	105,669
Fishers as a percentage of the Labour force: Sydney South region					0.01%
Far South	Eurobodalla, Bega	63,454	11.14%	$285	24,283
Fishers as a percentage of the Labour force: Far South region					0.05%

Source: ABS 2001a. Kiama Shoalhaven listed as Sydney South, however Kiama is in Sydney South and Shoalhaven occurs in the Far South.

The unemployment rate in regional areas is higher than in major cities within NSW (ABS, 2001b). The highest rates of unemployment were recorded for areas in the Far North. Median incomes are also significantly lower in areas outside of the Sydney region (Table B5.1). Further, lobster fishers as a proportion of the labour force is very small. This is expected as the industry had only 175 share holders in 2001/2002.

Median incomes for fishers in the Lobster Fishery are reported in Figure B5.2. The median gross (before tax) income for lobster fishers lies between $50,000 and $59,999 per year. Of the respondents, 24% earned incomes between $20,000 and $39,999 per year. The incomes reported do not specify the proportion of income earned from the Lobster Fishery alone. Despite this, the median incomes of lobster fishers exceed those for the various statistical regions presented in Table B5.1

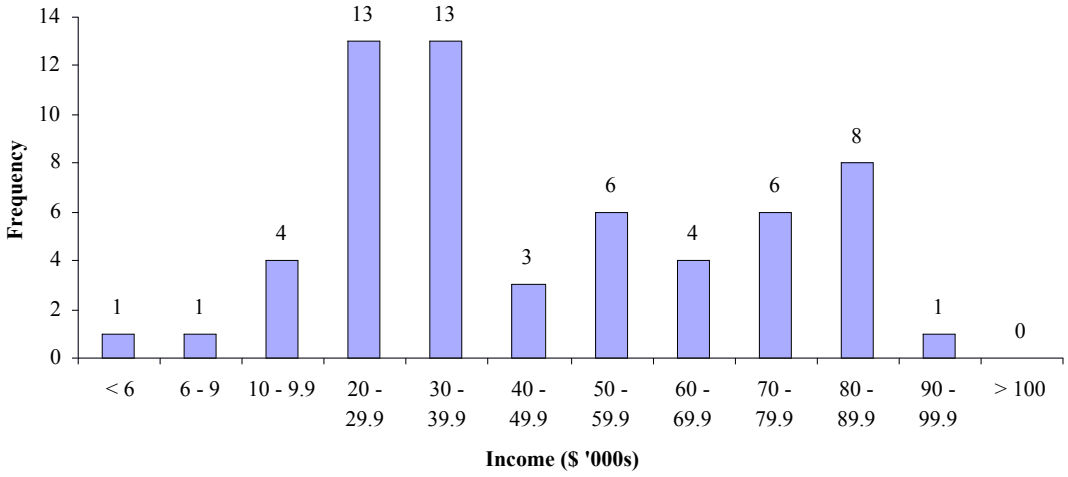

Figure B5.2 Incomes of lobster fishers

(Source: Roy Morgan 2001a).

The proportion of fishers that earn in excess of $100,000 is greatest in the Far North and Far South, 29% and 25% respectively, compared with 8% and 16% in the Mid North and Sydney South regions (Figure B5.3). The Sydney South and Far South regions had the greatest proportion of fishers with incomes below $40,000 per year, with 63% and 50% respectively.

Since the survey it is likely that the distribution of incomes in the four regions has changed as a result of the fluctuations in the income that fishers have received from lobster fishing. For example, the Far North region of the Lobster Fishery has recently reported three seasons with lower catches, whilst in the Sydney South and Far South regions, catches in the past three seasons have been relatively higher.

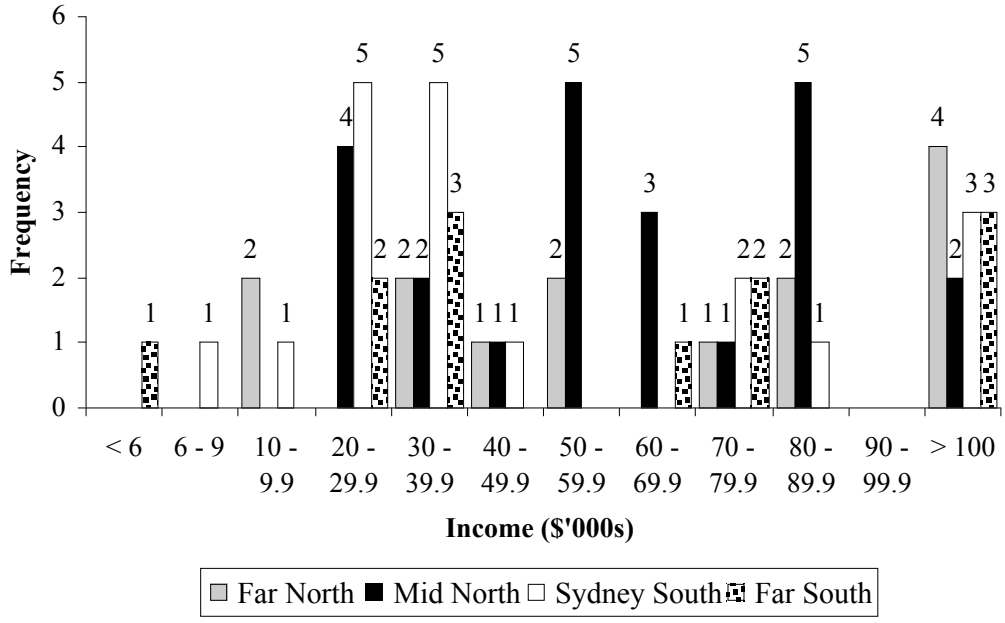

Figure B5.3 Incomes across regions

(Source: Roy Morgan 2001a).

Unemployment data from the ABS 2001 Census of Population and Housing provides information on the labour force at a statistical region level. Table B5.2 shows the regional unemployment rates for statistical regions covering the towns in which the lobster fishers live. The median incomes and unemployment rates vary widely across the different regions. It can be seen that city areas have a lower unemployment rate, and a higher median income, than those of more remote communities. Also, in regions where unemployment is high there is a lower labour force participation rate, possibly indicating a larger amount of hidden unemployment (those who are no longer looking for work as they feel prospects are too bad).

Data on unemployment were aggregated into the four regions of the Lobster Fishery. It can be seen from Table B5.3 that the Far North region has the highest level of unemployment, whilst the Sydney South has the lowest. Further, the Far North and Far South regions have the lowest median incomes and highest unemployment rates. These figures suggest that employment in these regions is harder to obtain. In addition, the lower median incomes could be representative of a higher proportion of individuals being on social security benefits.

Table B5.2 Labour force statistics for statistical regions.

Statistical Region	Unemployment Rate	Median Weekly Income	Labour Force Participation Rate
Sydney, Sth Sydney, Botany	6.07%	$528	52.30%
Gosford	7.36%	$367	44.47%
Hawkesbury	4.84%	$438	49.91%
Lake Macquarie	9.35%	$324	43.98%
Newcastle	12.49%	$310	44.89%
Port Stephens	9.74%	$317	42.01%
Great Lakes	11.35%	$278	37.24%
Wollongong, Shellharbour	9.19%	$330	44.53%
Kiama, Shoalhaven	9.32%	$306	39.49%
Hastings	11.43%	$283	38.18%
Coffs Harbour	14.01%	$286	40.92%
Clarence SLAs, Greater Taree	16.22%	$264	34.31%
Richmond Valley	12.27%	$278	38.62%
Tweed	13.00%	$280	37.25%
Eurobodalla, Bega	11.14%	$286	61.73%

(Source: ABS 2001b)

Table B5.3 Labour force statistics for the regions of the Lobster Fishery

Region	Unemployment Rate	Median Weekly Income	Labour Force Particpation Rate
Far North	13.84%	$277	38.42%
Mid North	10.32%	$311	42.32%
Sydney South	7.43%	$401	46.56%
Far South	11.14%	$286	61.73%

(Source: ABS 2001b)

The majority of fishers in the Lobster Fishery were male (98%). Table B5.4 presents the unemployment rates for different age groups of males in NSW. It can be seen that the employment rate of males is highest for the age group 15-19 years of age.

Table B5.4 Male unemployment in NSW

Age	15-19	20-24	25-34	35-44	45-54	55-59	60-64	65 and over
%	13.7%	9.3%	5.3%	4.6%	4.1%	4.5%	3.4%	2.8%

(Source: ABS 2001a, p.19)

Labour force, age and family structure

The demographic statistics for the fishery as a whole and in each region are presented in Table B5.5. A noticeable characteristic of the industry is that it is a male dominated industry. Of the total number of respondents, only 2 were female. Further, the proportion of fishers married or in a relationship is consistent across the regions.

The level of home ownership (those who own a home and do not have a mortgage) amongst fishers is relatively high compared with the state and national average. In NSW, 40.6% of people in 1999 owned their own home, and a further 29% owned their home but had a mortgage (ABS 2003b, p.167). The Australian average in 1999 was 38.8% ownership and 31.3% paying off their own home (ABS 2003b, p.167). The results for lobster fishers show that on an industry basis 52% of fishers own their own home with a further 29% paying their home off. The highest rates of ownership were seen

for fishers in the Mid North and Far South regions in which 90% and 82% owned or were paying off their own home respectively.

Table B5.5 Demographic statistics for lobster fishers

Profile	Far North	Mid North	Sydney South	Far South	Industry
Age Structure					
Mean age of fishers	49.5	49.97	50.35	49.06	49.76
Age Range	30-71	79	30-81	25-70	25-81
Percent males	100%	97%	100%	100%	98%
Martial Status					
Married or Relationship	79%	82%	75%	88%	79%
Single	16%	15%	18%	12%	14%
Other (Divorced, separated, widowed)	5%	3%	7%	0%	7%
Dependants					
Mean number of children under 16	1.1	0.77	0.18	0.25	0.75
Other Dependants					
None	47%	49%	54%	71%	58%
Spouse	21%	26%	29%	29%	25%
Children over 16	0%	10%	0%	0%	4%
Other [1]	32%	16%	18%	0%	14%
Housing Tenure					
Own	53%	54%	57%	47%	52%
Paying off	11%	36%	21%	35%	29%
Renting	37%	8%	14%	18%	16%
Other	0%	3%	7%	0%	3%
Education-highest level achieved					
Did Not Finish Primary School	0%	0%	4%	0%	1%
Finished Primary School	0%	0%	0%	6%	1%
Year 7	11%	3%	0%	6%	5%
Year 8	5%	8%	11%	6%	9%
Year 9	11%	26%	21%	18%	20%
Year 10	42%	33%	36%	29%	33%
Year 11	5%	5%	0%	0%	3%
Year 12	26%	13%	7%	12%	13%
Trade Or Tafe Certificate(s)	0%	5%	11%	6%	7%
Industry Or Business Course(s)	0%	0%	0%	6%	1%
University Degree/ Tertiary Education	0%	3%	7%	6%	5%
Other	0%	5%	4%	0%	2%

Notes: 1. includes Grandparents, sister/brother, other children/partners.

(Source: Roy Morgan 2001a).

The results from the social survey for education show that most fishers in each region achieved at least a school level qualification. On an industry basis, 33% of fishers finished school after the completion of year 10, with few going on to further qualifications. The Far North region had the highest proportion of fishers' finishing school after the completion of year 10, with a total of 42%.

A total of 17.8% and 18.9% of people in 2002 in Australia and NSW respectively had attained a Bachelor degree or higher (ABS 2003b, p.86). This compares with 5% for lobster fishers. Further qualifications in other areas were also low, with only 15% of fishers on an industry basis receiving post school qualifications. These figures suggest fishers' skills have been developed through on the job experience and are specialised, thus creating an impediment to labour flow to outside industries.

The proportion of fishers with dependant children under the age of 16 is presented in Table B5.6. The average number of dependant children for the population of lobster fishers as a whole was

0.75, however, of those that did have children, the average number of children per family was 1.82, with the majority of families having only 1 child. Further to dependant children under the age of 16, 25% of fishers had a dependant spouse. These figures did not vary significantly across the four regions.

Table B5.6 Dependant children under 16

Number of Children	Frequency	Total Children	Percent (of families with children)
0	64	-	
1	20	20	44%
2	17	34	38%
3	6	18	13%
4+	2	10	4%
Total	109	82	100%

(Source: Roy Morgan 2001a).

B5.1.1.3 Skills base and industry working practices

Information about the working practices of fishers in the Lobster Fishery was obtained in the Roy Morgan Social Survey (2001a). The reason for collection of such data is to see if working hours in different seasons compare with 'traditional' society working hours, i.e. the conventional 40-hour week. Data on hours worked during low, normal and high seasons were collected and are presented in Figure B5.4.

The Australian Bureau of Statistics defines full time employment if a person works 35 hours or more in a week. Average weekly hours worked on a national scale are estimated to be 40.8 hours for full time employees in 2003, with 24.3% of the full time work force working 50 hours or more in a given week (ABS 2003b, p.112). Similar results for NSW were obtained with 41.0 hours worked on average per week and 24.3% of full time employees working longer than 50 hours per week (ABS 2003b, p.112).

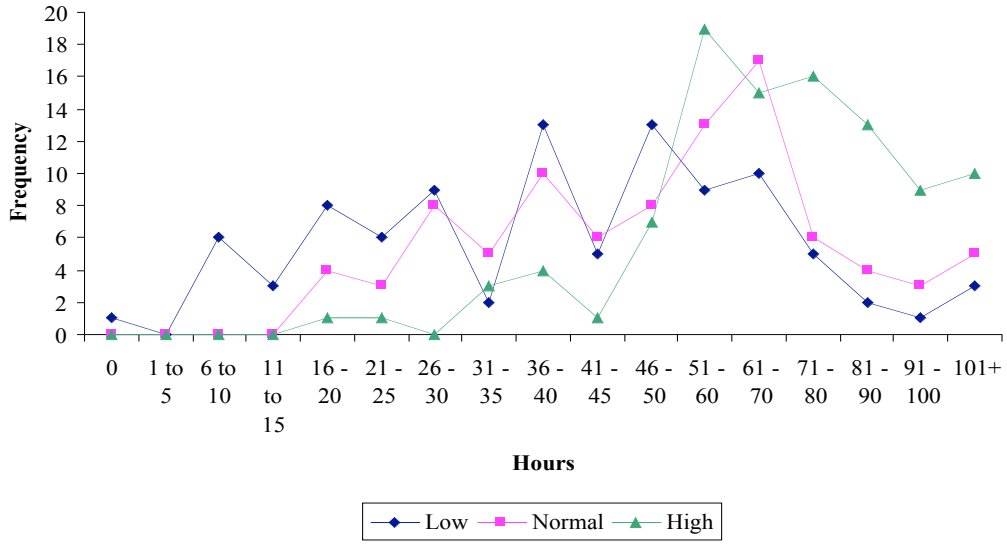

Figure B5.4 Hours worked per week in high, normal and low seasons by lobster fishers
(Source: Roy Morgan 2001a).

Average hours worked during low, normal and high seasons are expected to vary significantly. The average hours worked for lobster fishers during the high season were 70.2 hours, with 54.87 and 42.01 hours worked per week for normal and low seasons respectively. As can be seen from Figure B5.4, weekly hours in the Lobster Fishery exceed the average weekly hours of the nation, with 83, 52 and 31% working longer than 50 hrs in high, normal and low seasons respectively.

B5.1.1.4 Community/regional aspects of fishery

As part of the social survey, fishers were asked about the distance they have to travel to get to the place of their main fishing activity. On an industry basis, 11% of fishers travel significant distances (more that 50km by boat one-way). Of the remaining, 81% travelled less than 50km and 4% could not say.

Table B5.7 Distance travelled to main fishing site by lobster fishers

	Total		**Far North**		**Mid North**		**Sydney South**		**Far South**	
Distance	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
< 25km and/ or 1hr by boat	71	64%	15	79%	21	55%	18	69%	8	53%
25-50km and/or 1-2hrs by boat	24	22%	4	21%	8	21%	4	15%	6	40%
50-100km and/or 2-3hrs by boat	7	6%	0	0%	3	8%	2	8%	1	7%
> 100km and/or > 3hrs by boat	5	5%	0	0%	3	8%	1	4%	0	0%
Can't Say	4	4%	0	0%	3	8%	1	4%	0	0%

(Source: Roy Morgan 2001a).

Table B5.7 shows the breakdown of distance travelled by fishers in the Lobster Fishery by regions and at the industry level. It can be seen that distance travelled to the fishing grounds is fairly consistent across each region. However, a higher proportion of fishers in the Far South region travel longer distances, with 40% travelling between 25 to 50km or 1 to 2 hrs a day. It also can be noted that in both the Far North and Sydney South regions a greater proportion of fishers travel less that 25km or 1hr a day, 79% and 69% respectively.

Lobster fishers length of residency in a particular area was obtained from the social survey. As a group, the median length of residency for a fisher to live within the same postcode was 26 to 30 years. Further, about 75% of fishers had lived in the same postcode for over 20 years, with only 9% having moved to a new postcode within the last 5 years. Lobster fishers therefore form a component of the long-term residents in a community, possibly with greater attachment to the town or area in which they live. The residency rates are shown in Figure B5.5.

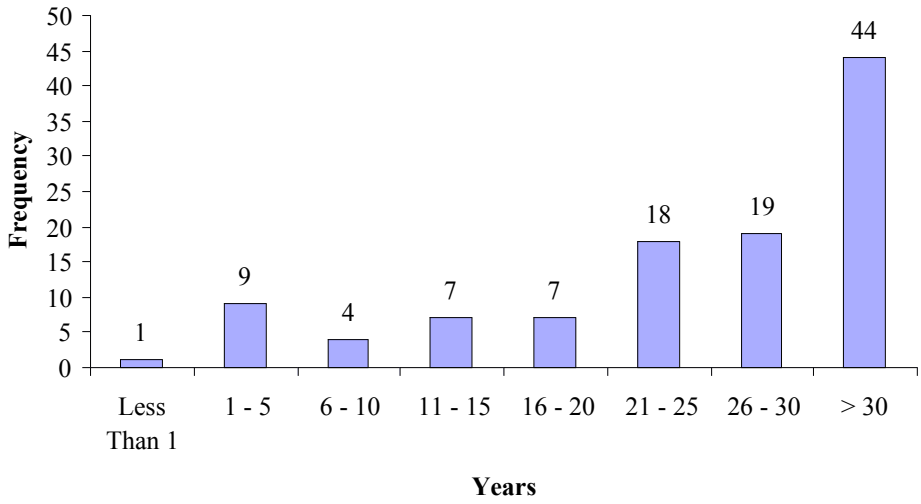

Figure B5.5 Lengths of residencies of lobster fishers in postcode areas

(Source: Roy Morgan 2001a).

Figure B5.6 shows the length of residencies in a postcode in each of the four regions. Figure B5.6 shows that the trend of long-term residency for the lobster fishers as a whole also applies to each region. The only exception to this occurs in the Far South region where there is a more even spread of individuals across each of the residency brackets, for example 30% of fishers have lived in the current postcode for 20 years or less and 70% for greater than 20 years. Fishers in the Far North region had the longest residency rates with 63% of fishers living in the same postcode for in excess of 26 years.

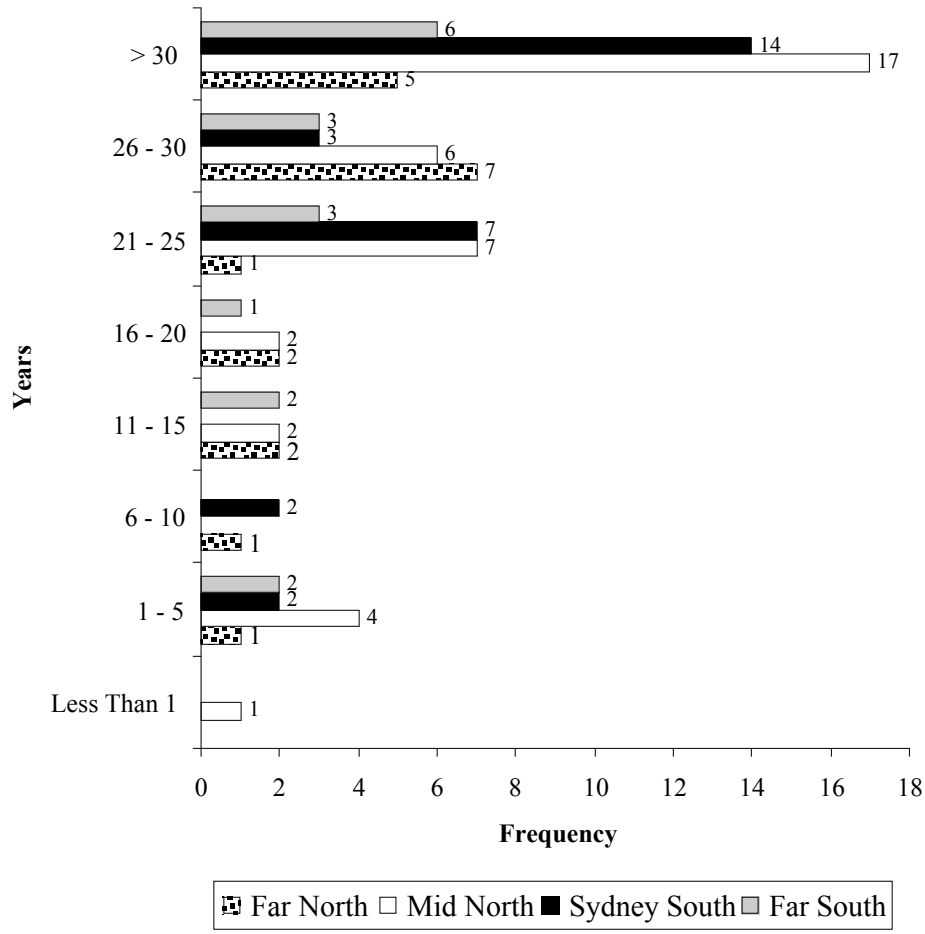

Figure B5.6 Lengths of residencies of lobster fishers in postcode areas per region

(Source: Roy Morgan 2001a).

B5.1.2 Social capital

Social capital is used to describe the networks, norms and trust that enable individuals to interact in a mutually beneficial manner (NSW Government 1997, p.8). These networks and norms are hard to measure as there are many ways in which individuals can contribute to the social capital of a community.

There is no one accepted measure of social capital however contributions by groups and individuals to the social infrastructure of a community are often used to measure of social capital. Contributions to the social infrastructure of a community can be made through memberships to clubs and local organisation. Other measures (proxies) of social capital include the years of residency within the community, the individual involvement in the industry and family history within the industry.

Results from the social survey show that fishers in the Lobster Fishery are seen to be long-term residents of a community. The long-term residencies within the community provide fishers opportunities to build networks and links within a community. These networks and links add to the social capital of the community, for example, some local fishers supply product to local restaurants. This then has a flow on effect to tourism as people come to the area as towns become known as a place where fresh, local produce can be obtained.

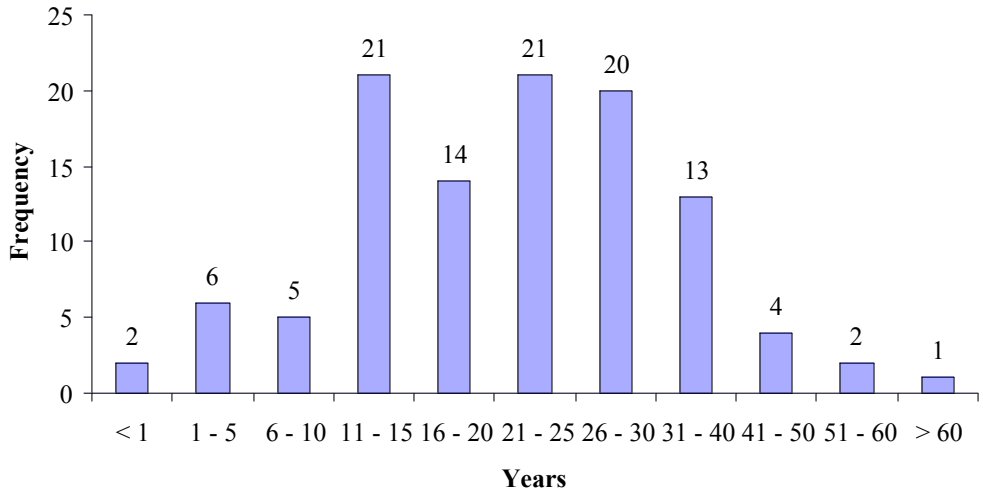

Figure B5.7 Number of years in the commercial fishing industry.

(Source: Roy Morgan 2001a).

The years of involvement of a fisher in the industry can provide a measure of the fishers' experience, and contribution to the industry. The median years that lobster fishers have been in the fishery lies between 21 and 25. Figure B5.7 shows the number of years that fishers have been involved in the industry. A total of 68% of lobster fishers have been involved in the industry for 15 years or more, whilst 88% have been involved for a period longer than 10 years.

Figure B5.8 shows the breakdown of fishers' involvement in the commercial fishing industry per region. The Sydney South region has the highest proportion of fishers who have been in the industry for less than 10 years, 21%, compared with 12% for the industry as a whole. The Far North and Mid North regions have a greater proportion of fishers who have been in the industry for longer than 10 years, with 95% and 92% respectively.

The information on years within the industry suggests that significant social capital exists within the members of the fishery. Further to years within the fishing industry, respondents were asked about their family history in the industry. Generations within the industry are another indicator to the level of social capital contributed by fishers in the Lobster Fishery.

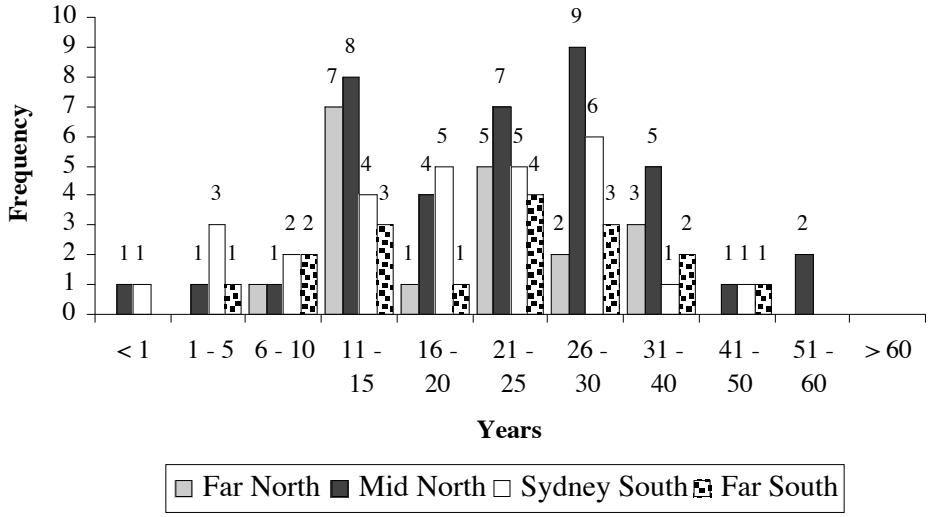

Figure B5.8 Number of years in the commercial fishing industry per region

(Source: Roy Morgan 2001a).

The number of generations within the fishing industry for the total respondents is shown in Figure B5.9. It can be seen that the majority of fishers are the first generation to be involved in the fishing industry. However, a significant proportion of fishers have had previous generations involved in the industry with 42% being the 2nd or 3rd generation to be in the industry.

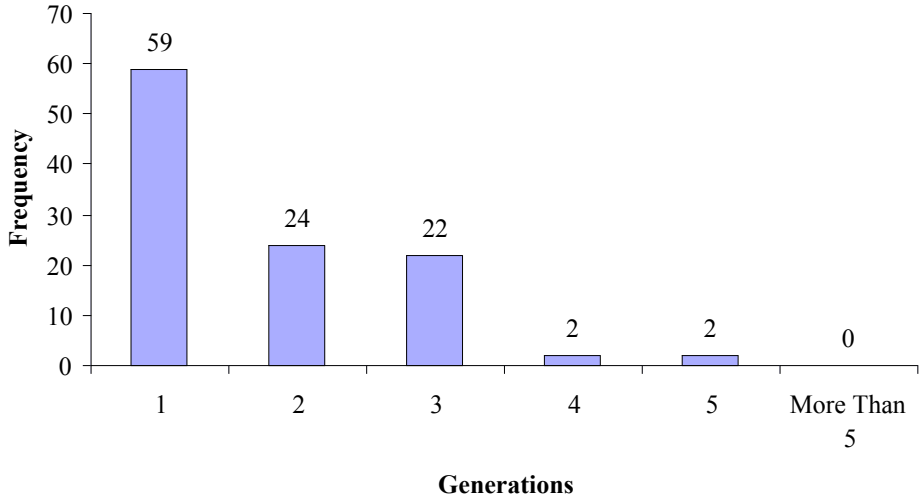

Figure B5.9 Generations within the industry

(Source: Roy Morgan 2001a).

A further breakdown in generations within the fishing industry by region is shown in Table B5.8. A much greater proportion of fishers in the Far North region are not the first generation in the industry. It can be seen that Sydney South has the greatest proportion of fishers who are the first generation to be in the fishing industry.

Table B5.8 Generations within the industry by region

	Far North		Mid North		Sydney South		Far South	
Generations	Freq.	%	Freq.	%	Freq.	%	Freq.	%
1	7	37%	18	46%	19	68%	10	59%
2	10	53%	4	10%	5	18%	6	35%
3	1	5%	15	38%	4	14%	0	0%
4	1	5%	1	3%	0	0%	0	0%
5	0	0%	1	3%	0	0%	1	6%
More Than 5	0	0%	0	0%	0	0%	0	0%

(Source: Roy Morgan 2001a).

B5.1.2.1 Age profile of licensed lobster fishers

The median age for male participants in the NSW workforce was 38 in 2003, with the median age for women being 37 (ABS 2003b, p.112). The average age of fishers in the Lobster Fishery is 50. This age is well in excess of the result for the NSW workforce. The distribution of ages is shown in Figure B5.10 for each of the four regions and the total fishery.

The distribution in ages of lobster fishers across the four regions is very similar. All regions have close to 50% of fishers who are older than the average age of 50, with close to 35% of fishers being in the 55 to 60 age bracket. However, the Far South region had a greater proportion of fishers under the age of 40, with the Mid North having the highest proportion over 60, 20% of respondents.

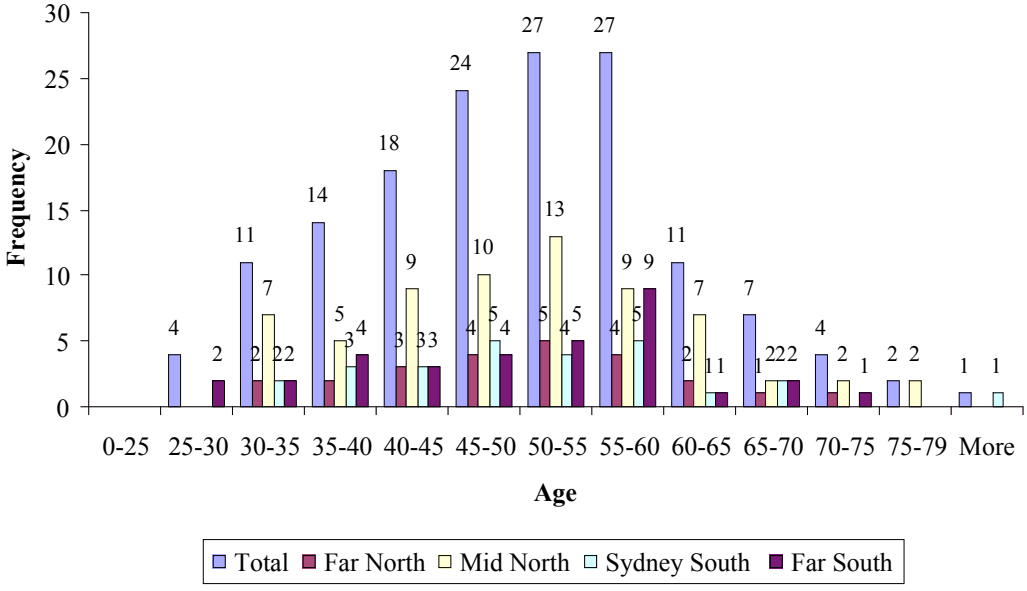

Figure B5.10 Age distribution of fishers

(Source: NSW Fisheries 2003)

B5.1.3 Skills base and transferability of skills

The Roy Morgan social survey investigated fishers' skills and willingness to transfer from the fishing industry. Fishers were asked questions in regards to their current employment in other industries, whether they would be willing to transfer to other industries, and whether or not they felt they were able to gain employment, given considerations for retraining. There were a total of 18 respondents (of the 109 lobster fishers surveyed) who currently earned income outside fishing. These

18 were then asked whether they would consider earning all their income outside fishing, their responses were:

- 39% (7) would consider earning all income outside fishing;
- 50% (9) would not consider earning all income outside fishing; and
- 11% (2) were undecided.

All respondents with endorsements in the Lobster Fishery (109 in total) were asked about their capacity to consider alternative employment in industries outside of fishing. Fishers were asked whether they could get full time, partial employment or if they thought they could not get employment, as fishing was considered 'all I know'. The results are:

- 14% (15) could get full time employment if so wished;
- 13% (14) could get partial employment if so wished;
- 72% (79) probably could not as fishing is 'all I know'; and
- 1% (1) could not say.

The 72% of fishers who answered that they could not obtain employment outside the fishing industry were further asked if they would consider retraining as a means of obtaining employment. Of the 79, 20% (16) said that they would consider retaining whilst the remaining 78% (62) said that they would not.

Fishers who stated that they would not consider retraining in alternate industries were further asked the reason for not considering this option. The results are presented in Table B5.9. The major reasons behind fishers not being willing to retrain are linked to age, the lifestyle fishing offers and invested experience. These factors indicate that labour in the Lobster Fishery appears to be relatively immobile.

Table B5.9 Reasons for not considering retraining outside of fishing.

Reason	Frequency	Percent
Fishing Is The Only Industry I Know	21	21%
I'm Too Old	38	39%
I Enjoy Fishing	20	20%
I've Invested In Fishing Equipment	6	6%
It's A Family Business	3	3%
Bad Health/ Injuries	4	4%
Risk Of Unemployment/ There Are No Jobs	1	1%
Illiterate/ Little Or No Education	0	0%
Language Barrier/ Limited English	0	0%
Other	5	5%
Can't Say	0	0%

Source: Roy Morgan (2001a). The total number of respondents who answer they would not be willing to retrain was 62, as can be seen from the table values do not sum to 62. It is believed the reason for this is due to some respondents selecting more than one category.

Fishers who said they would be willing to retrain in alternate industries were then asked which industry they would prefer to work in. Of the available choices, tourism/hospitality rated the highest, with 19% (3) indicating a preference to work in that sector. Of the remaining, 6% (1) indicated a preference for each landscaping/gardening, farming and charter fishing with the majority indicating that their preference was outside the list (44% choose other).

A regional breakdown of the willingness of lobster fishers who believed they could not obtain employment outside the fishing industry to retrain is summarised in Table B5.10. A higher proportion of fishers in the Far North region earn some of their income outside of fishing, with 32% of fishers earning income outside of fishing. A high proportion of fishers in all regions feel they are unable to attract full time work outside of fishing. Fishers in the Sydney South region were the least likely to find work outside of fishing, as fishing was all they knew.

Table B5.10 Retraining and Alternate income sources per region.

	Far North		Mid North		Sydney South		Far South	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Work outside fishing								
Yes	6	32%	6	15%	5	18%	2	12%
No/Cannot say	13	68%	33	85%	23	82%	15	88%
Of those that answered yes:								
Would consider all non-fishing	1	17%	3	50%	1	20%	2	100%
Would not	3	50%	3	50%	4	80%	0	0%
Undecided	2	33%	0	0%	0	0%	0	0%
All fishers								
Could get FT	1	5%	5	13%	5	18%	4	24%
Could get PT	3	16%	4	10%	7	25%	0	0%
Fishing is all I know	15	79%	30	77%	16	57%	12	71%
Cannot say	0	0%	0	0%	0	0%	1	6%
Fishing is all I know, consider retraining?								
Yes	6	40%	5	17%	2	13%	4	33%
No/Cannot say	9	60%	25	83%	14	88%	8	67%

(Source: Roy Morgan 2001a).

Table B5.10 shows that fishers in the Far North and Far South regions were more likely to consider retraining in an alternate industry (of those who answered fishing is all I know). A total of 40 and 33% in the Far North and Far South regions respectively would consider retraining, whilst only 13% of those in the Sydney South region would consider retraining. The responses as to which industry would be preferred to retrain in showed no significant differences across the regions. The data suggests that whilst the skills of fishers in regions outside Sydney South are more confined to the current fishing activities, individuals within these outer regions were more willing to retrain.

B5.1.3.1 Discussion

The information obtained from the social survey shows that fishers in the Lobster Fishery are heavily dependant on the industry of which they are a part. Close to 78% of respondents would not consider retraining in other industries indicating that they are unwilling to move into other industries. However, fear of poor employment opportunities in these other sectors was not the reason behind the lack of consideration of retraining. Further, fishers place a high importance on the satisfaction obtained from working in the profession (Table B5.10) and are unwilling to change.

Despite limited research into the mobility of labour within the fishing industry, parallels can be drawn from other industries in which participants place a value on the lifestyle associated with the industry. Bell and Nalson (1974) studied issues relating to dairy deregulation for the NSW dairy industry. Farmers were found to have a strong association with the land and the way of life that this industry affords (through various associations be they family, friends, neighbours, etc), which lead to a low labour mobility. This association with the land can be seen as analogous to the response in the category of 'I enjoy fishing'.

Bell and Nalson (1974) identified several other issues relating to social mobility of dairy farmers. These issues included farmers being unwilling to bear the risk of finding employment in other industries and thus some remaining farmers were subject to depressed economic and social conditions, the lack of alternate employment opportunities, and the link that generations of farmers have with the local area rarely moving and thus not being subject to alternate employment opportunities. It was suggested that most of the generational change in work practice was in changing the type of farm enterprise and not changing out of the industry.

Kilpatrick and Felmingham (1996) provide several reasons for the lack of mobility in the Australian workforce. The most significant factors that influenced labour mobility varied across states, but factors such as age, tenure in the current position, marital status, the type of employment (full or part time) and unemployment outside the industry all have negative effects on labour mobility.

It was seen that fishers in the Lobster Fishery had high rates of home ownership. A possible explanation for this is the length of time fishers have lived in the same postcode. A long residency level would be expected to transpose in some way to a higher rate of home ownership. It can be seen in the Far North region, that length of time lived in the same postcode is greater than in other regions and that a higher proportion are not the first generation in the industry.

B5.1.4 Community views and perceptions of fishing

Lobster fishers make up part of the rural, regional and metropolitan communities along the coast of NSW. Much of the public is aware of commercial fishing activities but as the work practices of many fishers do not coincide with traditional working hours, the fishing activities are generally not visible to most. Views on fishing vary among the community and across different fishing sectors, as such definitive public views on fishing are difficult to obtain.

In a public survey conducted for the Ocean Haul Fishery, individuals were asked about their views on commercial fishing. The general concern with fishing activities was due to the interaction with the environment, with many respondents feeling that the marine environment should be looked after, 44% of responses state “looking after the environment” as the most important aspects of fishery management (Roy Morgan 1999). Along with this, 95% felt “that our fish stocks are well looked after” (Roy Morgan 1999).

B5.1.4.1 Interaction with other uses of the fishing grounds

The NSW coast is used for a variety of different activities. As such, some of these activities interact with each other in a positive, negative or non-intrusive manner. Despite the range of differing activities, no definite study has been conducted to examine the interactions of these differing uses.

Much of the leisure activities conducted along the coast of NSW follow patterns of population and holidays. Most marine recreational activities are conducted close to shore, for example activities such as boating, recreational fishing, surfing, diving and water skiing. Lobster fishing is conducted both close to shore and further out. As such, there are potential interactions between leisure activities such as swimming, diving, surfing and boating as individuals can become caught up in or cause other damage to lobster pots. Indeed, an incidence of a surfer becoming entangled in lobster trap rope in Cronulla in the late 1990’s initiated alternative trap marking options.

Conflicts can exist between lobster fishing activities and other commercial fishing activities that take place in the same waters. Activities such as trawl fishing can damage lobster pots and

equipment as the equipment can get caught up in trawl nets. Ocean haul activities also have the potential to damage or destroy lobster pots as ocean vessels can navigate over pots.

Commercial and recreational fishers compete for use of the lobster resource, particularly close to shore. There are currently no restrictions on the number of lobster pots that commercial fishers can use, and as such a possible conflict can arise through placement of an excessive number of pots close to shore in areas which recreational fishers may wish to use. Further, whilst there previously has been an increase in the lobster TACC, the recreational limit on catch has fallen; this creates a conflict between the two resource uses. Due to the large amount of illegal catch in the fishery, some commercial fishers see certain recreational activities as a threat to legal fishing through poaching.

A synergy exists between lobster fishing activities and some research activities. Lobster fishers often take research groups out on their boats (pers. comm. LobMAC, September 2003). This provides researchers with the opportunity to conduct their research at a lower cost than otherwise would be the case if they had to pay fees to charter operators. Another synergy that exists is between the lobster fishing activity and tourism. Through co-ops, fresh seafood can be sold directly to the public close to the point of landing. However, tourists are also concerned with the loss of environmental amenity that could result from some fishing activities.

B5.1.4.2 Visual and amenity issues

Lobster fishers, as with fishers in alternate fisheries can both add and detract from visual amenity. The storing of pots is one of the most significant aspects of the activity that influences visual amenity. Some individuals and tourist expect to see, and gain satisfaction from, fishing fleets and related activities. However, there are objections to fish odours and the disposal and storage of fishing equipment and waste in inappropriate ways. An external effect of some fishing activities and waste management procedures is that they attract some sea birds in higher concentrations. This can be viewed in both a positive and negative manner. Many of these issues are managed at a local council level through zoning laws and waste disposal facilities and others are addressed through responsible practice by fishers.

B5.2 Health risks to fishers

Lobster and other fishing activities can cause injuries to fishers. As such, current work practices pose a risk to the health of lobster fishers. A total of 18% of respondents with lobster endorsements in the social survey had taken time off fishing during the last 12 months due to injuries sustained in their fishing operation during 2000/01. The effect of these injuries on the time taken off fishing can be seen in Figure B5.5. Whilst the majority of fishers did not take time off, it can be seen that 67% of the fishers who had taken time off work due to injury were off for a period in excess of 1 week. This indicates that the type of industrial injury sustained was often fairly serious, and needed extended periods of rehabilitation.

The proportion of fishers who have taken time off to injury appears reasonable high. On an industry level, the proportion of individuals who had taken time off due to fishing related injuries was even higher, with 25% of all respondents to the social survey having taken time off. Further to this, 85% of fishers that took time off were off for longer than a week. This statistic shows that the types of injuries sustained in the Lobster and other Fisheries are usually serious resulting in the need for prolonged periods of recovery

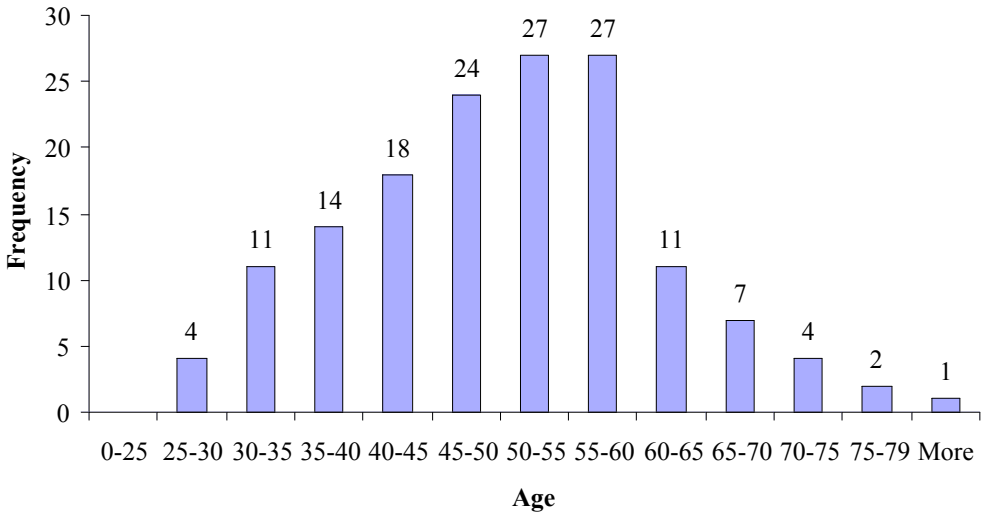

Figure B5.11 Age distribution of lobster fishers.

(Source: NSW Fisheries 2003)

Lobster fishing activities are shown to have the potential to cause serious injury. Lobster fishing activities are physical and thus have the potential to place a strain on fishers' health. As the age of fishers increases, this strain may become a greater burden. The average age of fishers in the Lobster Fishery is 50, with the median age for male participants in the NSW workforce being 38 in 2003, with the median age for women being 37 (ABS 2003b, p.112). This age is well in excess of the result for the NSW workforce. The distribution of ages is shown in Figure B5.11 for the total fishery.

There are a variety of Occupational Health and Safety (OH&S) risks associated with lobster fishing activities related to the use of boats, machinery, traps etc. Fishing businesses are required to operate in a manner consistent with OH&S legislation. However, the level of fishers' awareness of relevant OH&S procedures is not known.

B5.3 Health risks to consumers

The major health risk posed to consumers arises from the cooking of lobster. Lobster is generally cooked in either seawater, or estuary water. If fishers have cooking facilities on board, the lobster will usually be cooked in seawater, however, if these facilities are not available, then cooking is done in Fisherman's Co-operatives if sold through these receivers. The risk created from cooking lobster is due to any containment in the water used for cooking. Estuary water is more likely to have containments due to the large amount of interaction with other resource users (disposal of run-off stormwater, recreational and commercial boats, etc.).

The SafeFood initiative aims at reducing risk posed through cooking in estuary water. The NSW Food Authority (formerly SafeFood NSW) aims to develop food safety systems and to ensure their adoption by industry (Safe Food 2003). As such, fish caught and prepared in the Lobster Fishery must meet the standards set out by the NSW Food Authority. All seafood businesses are required to be licensed with the NSW Food Authority.

B5.4 Social risks

In order to identify areas of possible risk from the current operation of lobster fishers, the characteristics of fishers and their working practices have been analysed. The risks have been classified into three groups, those of high, intermediate and low risk.

The risk analysis undertaken in this section of the EIS is not as detailed as that undertaken for the environmental and economic risk sections (Sections B2.2 and B4.5). Further work would be needed to develop a more formal process of risk analysis for assessing social risks relating to commercial fisheries, however this is beyond the scope of this EIS.

The social survey of Lobster Fishery provided information on the skill base and working practices of those within the fishery. Further, information on the regions in which lobster fishers live showed that communities outside the Sydney Metropolitan region generally had much higher rates of unemployment indicating that the opportunity to find work outside the industry is low.

Several risks from the current operational regime were identified. These risks include the age structure of lobster fishers, unemployment in lobster fishing communities, labour mobility of fishers and injury rates amongst fishers. The level of risk will depend on the situations currently facing fishers, and as such may rely on information from other fishing activities conducted by fishers, which is outside the scope of this document. Each of these risks are discussed in more detail below, with a summary of risks and their classification presented in Table B5.11. Many of the social risks identified are outside the scope of management of the fishery or are to do with demographics of the lobster fisher population. For example, unemployment rates in communities where fishers live are generally high. In the Far North region, unemployment rates were the highest, indicating that job opportunities outside of fishing were low. This makes it difficult for fishers to find employment opportunities outside fishing, should alternative employment be necessary.

Table B5.11 Social risks of the current operational regime

Age structure of fishers	Low
Labour mobility of fishers	Low
Economic viability	Intermediate
Accident and injury	Intermediate

B5.4.1 Age structure of fishers

The median age range for fishers in the Lobster Fishery is between 50 and 55 years of age. As such, half the fishers in the fishery are either in this age range or older. The high proportion of fishers in older age brackets means that there are more fishers who are likely to retire in coming years. As such, there is a risk that some of the knowledge base will be lost, and along with it, some of the social capital. However, this may be offset to some extent through new skills brought to the industry by a new generation of fishers, possibly resulting in an evolution of social capital, rather than a net loss. Hence, the risk to social capital from an aging population of fishers is considered to be low.

With a high proportion of individuals leaving the fishery, there is a risk that established links with local communities that rely in produce from fishing activities of these individuals may not be replaced by links with new entrants into the fishery. However, offsetting this may be the development of new links between fishers and the local community.

B5.4.2 Labour mobility of fishers

The social survey identified that lobster fishers where generally unwilling to change careers. It was found that most lobster fishers preferred the lifestyle that fishing afforded. Further, the education levels of fishers and years spent fishing in the industry would make it difficult to transfer into another industry.

For the industry, the median years for a fisher to be involved in commercial fishing was 21 to 25 years. A total of 88% of respondents had been involved in the commercial fishing industry for a period longer than 10 years. When fishers were asked about their willingness to retrain, 72% felt that they would not be able to find employment outside of commercial fishing. Of those who felt they could not find employment outside of commercial fishing, 78% said that they would not be willing to retrain.

As such, a significant social risk would arise if fishers were unable to continue in their commercial fishing activities. For example, in the worst case, the fishery is closed for some unforseen reason. However, most fishers who are part of the Lobster Fishery are multi-endorsed. That is, fishers may be able to divert effort into other fisheries as a result of any changes. Considering this, the social risk due to labour mobility is believed to be low.

B5.4.3 Economic viability

Poor economic viability in the Lobster fishery was demonstrated through results of an economic survey undertaken in 2001 (Roy Morgan, 2001a). Data collected in the survey revealed that as many as 60 percent of lobster fishers were below the measure of long-term viability (i.e. the level of profitability required to keep capital and labour engaged in the industry). If the survey results are a true representation of the economic status of the industry (which is unlikely given problems identified with the survey data (see Section B4.4.1)), and economic circumstances in the industry have not changed appreciably from levels in 1999/2000, such low levels of viability would have an effect on the social capital of lobster fishers.

Low economic viability would be expected to have an affect on household income of lobster fishers and the ability of those household units to afford a reasonable standard of living. This is especially the case where fishing provides the main source of household income. As only 17 % of lobster fishers earned an income outside fishing in 1999/2000, poor economic viability would be expected to have a significant affect on household income, and the social capital of those households (Roy Morgan, 2001b).

Given the considerable uncertainty surrounding the reliability of the survey estimates on which the assertion of poor economic viability is made this risk is considered to be intermediate, but in the presence of more reliable data this grading may change.

B5.4.4 Accident and injury

The risk associated with accident and injury is compounded in some respects by age. Lobster fishing is a labour intensive fishing activity, and injuries can be significant. A total of 25% of fishers had taken time off due to injury during the past 12 months from the time of the survey, with 85% of those requiring more than a week to recover.

Injury caused in workplaces can have significant impacts on families and the livelihood of operators. As injuries require time off, it means that the fisher will have lower income during that

period. Also, if time is not taken, or shorter time is taken than is required to recover fully from the injury, fishers would operate with a diminished capacity which would not only effect lobster fishing activities, but all the activities that they currently under take. As such, the social risk caused by current operations on injuries is believed to be intermediate.

B5.5 Indigenous peoples

The following summaries are based on the detailed report prepared by Umwelt (Australia) Pty Ltd and presented in full in Volume 3 Appendix B3.

B5.5.1 Cultural Heritage Sites and Places

The overall risk that activities authorised by the Lobster FMS will detrimentally impact on Aboriginal cultural heritage objects (sites) or gazetted Aboriginal Places along the NSW coastline is considered to be small. Commercial rock lobster fishing in the nearshore area is generally undertaken with traps which are set from a small boat. This method of fishing is unlikely to affect archaeological sites because such sites are generally located on the shoreline rather than offshore. The fishing operation, however, does have the potential to impact cultural heritage sites when the sub tidal zone is being accessed. Boat ramps and car parks are generally located in areas where Aboriginal sites and important places are commonly located. Many of these facilities were constructed before there was an awareness of archaeological issues and so may be built on or near cultural heritage sites. However, commercial fishers access the coastline via access routes that have been endorsed by local Councils and NPWS. It is assumed that in agreeing to continuing access to such routes, NPWS has considered the risk that ongoing vehicle access may have on any archaeological sites.

Many local Aboriginal communities also value places because of traditional community associations, whether or not there is a specific spiritual association. In this category are places where communities have fished or celebrated special events in historical times and where elders have taught younger members of the community about traditional fishing practices. In addition to these community ties, some individuals and families have demonstrated traditional owner status, particularly on the north and south coasts where some families have maintained their contact throughout the period of European settlement.

B5.5.2 Commercial Fishers' and Indigenous Fishers' use of the Sub-tidal Environment

Some commercial rock lobster fishers and Indigenous fishers fish in the same rocky near shore environments, although commercial fishers also access the deep waters of the continental shelf. On the nearshore reefs and rock platforms, commercial divers (and trap setting), recreational divers and Indigenous divers target the same species. This means that, in some locations, resources may be limited by the activities of the other resource users. The concentration of commercial endorsements in three key locations highlights these areas as locations where there is potential for real or perceived conflicts about access to the valuable lobster resource.

The majority of lobster catch is taken by traps, with only a very small proportion taken by diving. The majority of commercial catch on the north coast (north of Newcastle) is taken from the shelf environment (i.e., in depths of 10-30 metres). On the south coast, nearshore catches are high (as is trap lift effort), but there are also significant catches in waters of more than 20 metres depth. Lobster fishing is clearly identified as a traditional Indigenous activity on the south coast. Although many

north coast communities state that they also fished for lobster (particularly in the Forster to Port Stephens areas), the focus appears to have been less. Consequently, the available data suggests that there is a higher likelihood that Indigenous fishers and commercial rock lobster fishers will interact on the south coast.

Some Aboriginal people suggested that commercial rock lobster fishers are gaining large economic benefits from 'our waters' and so the Aboriginal community should also be benefiting from the exploitation of marine waters (e.g. employment opportunities, royalties).

There is a strong body of anecdotal evidence from Aboriginal community representatives that Indigenous access to nearshore environments is less under the current regulatory framework than it was within the last 40 years or so. This does not apply to lobster habitats alone, but is broadly symptomatic of Indigenous concerns about loss of access to 'country' and to places and circumstances where traditional knowledge and responsibilities can be passed from one generation to another.

B5.5.3 Access to Employment and Economic Independence

There is a strong view in the Indigenous community that the level of employment of Indigenous people in commercial fisheries has declined. Notwithstanding this, Indigenous members of many coastal communities still regard themselves as fishing people, and a number of intra community responsibilities and obligations are linked to fishing activities – as a way to supplement diet for the whole community, as a way to share knowledge and resources across generations, as a way to earn a living and as a way to maintain traditional culture.

Aboriginal people describe their past fishing practices as 'circle fishing', mostly based in nearshore waters (estuarine and shallow marine), with simple fishing equipment (small boats, nets, traps and handlines) and targeting a small sample of what ever species were seasonally abundant. Although nominally commercial, in many cases the fishing was closer to a subsistence lifestyle. Access to licences for this type of fishing is no longer available.

As a consequence, Aboriginal men who attended meetings about the lobster FMS stated that they felt communities were losing traditional skills, and did not currently have the capital or the commercial experience to enter the modern, higher technology and efficiency focused commercial sector.

Although excluded from some traditional small scale commercial fishing activities, Indigenous people have continued to attempt to maintain what they consider to be culturally responsible fishing, outside the limits of the recreational sector. In practice, some of these activities might contravene the NSW fisheries regulations, leading to accusations of illegal fishing, close scrutiny of fishing practices and penalties. Some Indigenous people now claim that they are confused and intimidated by the enforcement of fishery regulations and have withdrawn from what they consider to be traditional rights. Others maintain that they will persist in fishing to meet their community obligations, others have adjusted their activities in the short to medium term to recognise the significant detrimental impacts of fines and jail sentences on the community.

While many of these matters cannot be addressed through the Lobster FMS alone, the Indigenous Fisheries Strategy creates the framework for broader initiatives to address Indigenous fishing issues.

B5.6 Historic heritage

The following summaries are based on the detailed report prepared by Umwelt (Australia) Pty Ltd and presented in full in Volume 3 Appendix B3.

B5.6.1 Introduction

The key issue arising from these requirements is an assessment of the relative risks presented to historic heritage sites and values (but principally shipwreck sites) by the current management strategies for the Lobster Fishery and by the proposed management of the fishery.

The activities associated with diving for and trapping rock lobster have a low potential to have an impact on cultural heritage values. In broad terms, the potential risks to historic heritage derive from direct impacts by vessels or traps on shipwrecks.

As noted in the DIPNR guidelines, risk comprises a combination of probability and consequence. Risk assessment concepts and methods are defined in Australian Standard (AS) 4360:1999. Risk assessment processes can vary from qualitative preliminary considerations which use broad consequences and likelihoods to give an understanding of comparative risk, to highly quantified assessments that provide detailed ranking of the risks associated with all aspects of a proposal or operation. For the purposes of this assessment, detailed quantification and ranking of risks is not considered necessary and risk has been considered in qualitative terms.

This assessment reports the results of a review of the historic heritage that is located off the southern NSW coastline. The review of historic heritage has defined those elements of the resource that are, or appear to be, located in such a position that either rock lobster fishing commercial operation might have some impact on an element or vice versa.

For the purposes of this report, historic heritage has been confined to the transport context having regard to the location of the study area. It is considered unlikely that other types of historic heritage (buildings, wharves etc) will have any interaction with the Lobster Fishery (undertaken in the inter tidal zone). The transport context is specifically represented in the record of shipwrecks.

This assessment therefore addresses shipwrecks that have been recorded in offshore NSW and Australian waters. It is heavily based on data contained in the 'Maritime Heritage Online – NSW' database (the database), which is maintained by the NSW Heritage Office. Only a sample of the information from the database has been analysed, for the waters off the coastlines of the Northern Rivers, Mid North Coast, Illawarra and South East regions. These areas have a strong maritime history and high concentration of offshore shipwrecks and are recognised rock lobster fishing grounds. The analysis that is presented demonstrates that shipwrecks are common right along the NSW coast in waters used by rock lobster fishers.

B5.6.2 Overlap and interaction with historic sites

It is difficult to pinpoint the locations of shipwrecks, or the amount of wreckage that may still remain, with any certainty. For many wrecks, only limited, broadly descriptive information is available, and the extent to which parts of the wreck may be exposed to snagging on ropes, traps, etc is difficult to determine. The condition of a shipwreck will depend on the nature of the vessel (size and type of construction), depth of water, the circumstances that caused the wreck, subsequent disturbance, and marine processes such as waves, currents and sediment transport. For many shipwrecks, little of this information is known directly. Further, almost all the shipwrecks along the NSW coast are

protected by either the Commonwealth heritage legislation (*Historic Shipwrecks Act*) or by the *NSW Heritage Act*.

The physical and spatial presence of heritage resources along the ocean floor is likely to have only a marginal effect on commercial fishing operations. The navigation of boats may have an impact on heritage items and vice versa; the traps utilised by rock lobster fishers may impact heritage items and vice versa; and divers targeting rock lobster have the potential to disturb underwater relics. Such relics are by their nature fragile while their in situ preservation is most frequently either precarious or on/or within a horizon of fine silt or sand. Disturbance of a relic in either of these environments can not only modify, damage or destroy a relic but alternatively or concurrently modify the environment in which it is located by moving, exposing or burying the relic.

B5.6.3 Risk considerations

Guidance on concepts for a qualitative risk assessment is provided in AS 4360. Tables B5.12 and B5.13 summarise qualitative descriptions of likelihood and consequence. These concepts have been used in considering potential risks to historic heritage associated with the operation of the Lobster Fishery. It is stressed that the assessment presented here is preliminary and qualitative in scope.

Table B5.12 Qualitative Description of Likelihood

Almost certain	May occur at least several times a year
Likely	May arise about once a year
Possible	May arise at least once in a ten year period
Unlikely	Likely to occur at some time during the next ten to twenty five years
Rare	Very unlikely to occur within the next twenty five years

Table B5.13 Indicative Consequence Scales

Catastrophic	Long term harm – significant, extensive and irreparable damage to highly valued structures or locations of cultural significance
Major	Major damage to highly valued locations or structures of cultural significance
Moderate	Damage to valued structures or places of cultural significance (not likely to be permanent or irreparable)
Minor	Minor damage to places or structures of cultural value
Insignificant	Negligible damage to structures or locations of cultural value

Even with a qualitative risk assessment, it is possible to grade the risk that results, in terms of the urgency of action to reduce risk to the environment, cultural places or safety. Descriptors and indicative responses are noted in Table B5.14.

Table B5.14 Qualitative Risk Descriptors

Extreme risk	Immediate action required to reduce risk
High	Urgent action required to reduce risk
Medium	Manage risk by monitoring or improving procedural guidelines etc
Low	Manage by routine procedures, unlikely to need specific additional resources

Table B5.15 presents consideration of two aspects of rock lobster fishing that have the potential to interact with historic heritage places (shipwrecks), and provides a preliminary evaluation of risks to historic heritage values. In an assessment conducted strictly in accordance with the National

Standard, this assessment process would be conducted by a panel of people involved in the activities in question. The use of a panel ensures that all aspects of activities and risks are taken into consideration. For this process, which is intended only to provide an indication of the scope of risks to historic heritage items/sites, the assessment has referred to the data base information rather than an expert panel.

Table B5.15 Qualitative Risk Assessment Considerations

Aspect	Likelihood	Consequence	Risk
Boat navigation – collision with shipwrecks	Unlikely to rare	Moderate	Low
Entanglement and impact of ropes and traps in shipwrecks	Possible	Moderate	Low to medium

The risk presented to historic shipwrecks by the activities of the Lobster Fishery is generally low, extending to medium for snagging in some cases. In this context, the types of response that would be appropriate in the Fishery Management Strategy relate to procedures for monitoring (for instance locations, frequency and consequence) and reporting incidents.