OCEAN HAULING
EIA REPORT

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Prepared by:

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PREPARATION, REVIEW AND AUTHORISATION

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1 INTRODUCTION

1.1 BACKGROUND

NSW Fisheries is currently preparing fishery management strategies for the State's commercial marine fisheries. Concurrently, environmental assessments are being prepared under Division 5, Part 5 of the *Environmental Planning and Assessment Act 1979*. The assessments will estimate the level of pressure on the environment from the fishing activities and predict the likely impacts of implementing the draft fishery management strategies. The guidelines for the preparation of the environmental assessments issued by the Department of Urban Affairs and Planning (DUAP) requires that among other issues NSW Fisheries must address noise, light, air quality, and energy and greenhouse issues.

SMEC Environment was commissioned by NSW Fisheries to prepare assessments addressing noise, light, air quality, and energy and greenhouse issues for three commercial fisheries, Estuary General, Ocean Hauling and Estuary Prawn Trawl. This report presents the assessment for the Ocean Hauling Fishery.

1.2 METHODOLOGY

Ocean Hauling Fishing:

- involves five different fishing methods;
- is undertaken by about 375 fishing businesses;
- occurs on beaches and in waters along the entire NSW coastline; and
- involves over 17 species.

This complexity has made it impossible to assess each activity and region in the Ocean Hauling Fishery separately. The methodology adopted involved:

- consultation with NSW Fisheries, members of the fishing industry and local councils;
- broadly describing each method of fishing and identifying the activities that may generate noise, light or air emissions;
- identifying the types of land use that occurs surrounding beaches where Ocean Hauling Fishing is conducted;
- combining the above two factors to identify whether there was any potential for significant adverse effects; and
- identifying mitigation measures to minimise or reduce identified areas of impact.

Greenhouse and energy issues were considered by examination of the fishing fleet and methods of fishing.

To present the findings of the investigations this report contains four sections:

1. this brief introduction;
2. a description of the fishing activity and estuarine environment;
3. an impact assessment for noise, light and air quality issues; and

4. a consideration of greenhouse and energy issues.

1.3 CONSULTATION

To facilitate an understanding of the Ocean Hauling Fishery and relevant environmental issues consultation was undertaken with members of the Ocean Hauling Management Advisory Committee (OHMAC), Local Councils and the staff of NSW Fisheries.

i Consultation With OHMAC Members

A number of members from OHMAC were contacted regarding issues in the Ocean Hauling Fishery. These members of OHMAC serve as industry representatives for commercial fishing operators in the Ocean Hauling Fishery, and have first-hand experience of the fisheries' issues.

The Ocean Hauling Fishery is subject to a large number of restrictions, the majority of which are imposed by NSW Fisheries. The National Parks and Wildlife Service (NPWS) also imposes some restrictions in areas that are bounded by National Parks, and particularly beaches where access is through National Parks. Local councils play a limited role in controlling commercial fishing activities, with their input generally limited to access controls on beaches.

Responses from OHMAC members indicate that the noise, light, air quality, and energy and greenhouse issues relating to Ocean Hauling tend to be fairly limited. Most commercial fishermen undertaking Ocean Hauling activities tend to be responsible and implement necessary measures to mitigate any possible impacts.

The following list outlines the issues raised regarding noise, light and air quality/energy and greenhouse issues.

- Noise Issues
  Noise is probably the main issue arising from Ocean Hauling activities. However, these issues are fairly limited. For the most part, Ocean Hauling activities that generate any substantial noise, such as motors or winches, tend to occur a reasonable distance from the coast. Hauling that occurs on beaches is most commonly done by hand, and so generates very minimal noise. Generally, Ocean Hauling occurs during daytime hours when noise considerations are less pertinent. Although not addressed as an issue, some Ocean Hauling fishers do access the beaches with four wheel drive vehicles equipped with winches. These would generate substantial levels of noise.
- Light Issues
  Ocean Hauling is predominantly a daytime exercise and as such, there are very few light issues associated with Ocean Hauling. Any Ocean Hauling that occurs during the night tends to be in open waters well removed from any residential areas.
- Air Quality/Energy and Greenhouse Issues
  The air quality and energy issues were considered to be minimal. Where hand beach hauling is concerned, there are no air quality or energy issues, except vehicle emissions associated with gaining access to the beach. Emissions in relation to the use of four wheel drive based winches for hauling were not raised. Boat based hauling does generate some issues through the use of motors, but these are considered to be minor.

ii Consultation With Local Councils

Questionnaires were sent to seven local councils, Eurobodalla Shire Council, Maclean Shire Council, Great Lakes Council, Lake Macquarie City Council, Port Stephens Council, Greater Taree City Council and Richmond Valley Council. A copy of the questionnaire is included as Appendix A. These councils were selected because there is a diverse range of commercial fishing carried out within their areas, including Ocean Hauling.

Three responses were received, from Eurobodalla Shire Council, Greater Taree City Council and Port Stephens Council. The responses were, on the whole, very similar with all indicating that these Councils had very little to do with commercial fishing management, largely because the Councils do not have the staff expertise to effectively deal with fishery issues. As a result, management of commercial fishing is left to NSW Fisheries.

No public complaints had been received at the three Councils about noise, light, air quality or energy issues in relation to commercial fishing activities.

iii Consultation With Regional Offices of NSW Fisheries

Regional offices of NSW Fisheries were contacted to determine the number and type of complaint received concerning commercial fishing activity.

Very few complaints are received concerning commercial fishing operations and, for the most part, the complaints that are received relate to noise issues.

2 OCEAN HAULING FISHERY

2.1 FISHERY WATERS

2.1.1 Description

There are a number of defined waters in which Ocean Hauling may occur. These waters include:

- ocean waters within three nautical miles of the natural coastline;
- the waters of Jervis Bay;
- the waters of Botany Bay; and
- the waters of Coffs Harbour.

Ocean Hauling activities occur on beaches and in waters along the entire New South Wales coastline, though it should be noted that not all ocean beaches and ocean waters are open to Ocean Hauling Fishing. There are various beaches and waters that are closed to Ocean Hauling activities.

Where ocean waters meet estuary waters, there can be some conflict over where boundary exists. As Ocean Hauling must occur in ocean waters, this boundary can have some implications for the fishery.

2.1.2 Surrounding Land Uses

A diverse range of land uses can be found in areas where Ocean Hauling occurs. When Ocean Hauling activities occur further out to sea, their impact on surrounding land uses is minimal. However, Ocean Hauling from, or in close proximity to, land including ocean beaches can have a much greater impact on surrounding land uses.

Where beaches are used for Ocean Hauling activities, they are often fairly remote, and sometimes are only accessible by four-wheel drive. In these cases, surrounding land uses are dominated by National Parks or other nature reserves, and residential use is generally limited to isolated dwellings or possible a small village. The existence of National Parks or other nature areas often results in restrictions being placed on Ocean Hauling activities, predominantly through beach access controls.

There are many coastal townships where commercial fishing, including Ocean Hauling, provides a backbone of the economy. These include places such as Byron Bay, Ulladulla, Narooma, Nambucca Heads, South West Rocks and Yamba. In these areas, residential land uses are prominent and the growth of the tourism industry has created greater conflicts with commercial fishing operations.

Jervis Bay contains large areas of National Park, as well as a number of small villages that the Ocean Hauling activities operate from, Huskisson being one such village. Botany Bay in sharp contrast is dominated by industrial and port uses, but still has some surrounding residential land use and areas of nature reserve and National Park. Ocean Hauling operations near the Kurnell Peninsula and the Botany Bay National Park are boat based due to area's rocky headlands.

2.2 FISHERY DESCRIPTION

The Ocean Hauling Fishery involves the taking of finfish from ocean waters, using a number of methods. These methods include hauling nets to ocean beaches, boat based activities where nets are hauled to a boat, and ocean purse seine operations that generally use larger boats and occur further out to sea. These general fishing methods are illustrated in Figures 2.1 and 2.2, with a more detailed description provided in Table 2.1. Table 2.1 also outlines environmental implications of each of these fishing methods for the areas of noise, light, air quality, and energy and greenhouse issues.

The Ocean Hauling Fishery targets a range of species, using netting techniques to catch near-shore schooling species along the coast and bait species in deeper waters. The main species caught in the fishery include sea mullet, blue mackerel, yellowtail scad, Australian salmon, pilchards, sea garfish, and luderick.. Figure 2.3 identifies the proportion of the principle species making up the total Ocean Hauling landings by all Ocean Hauling methods averaged over fiscal years 1997-1998 to 1999-2000.

In the past, the fishery was dominated by beach based activities, but technological advances have seen a rapid increase in use of boats. The boats used are generally small 'run-about' or 'punt' style vessels ranging from three to six metres. However, there is also use of larger, faster 'jet boat' style vessels with motors up to 35 kilowatts. These type of boats are generally used more in purse seine operations, or Ocean Hauling that occurs further out to sea.

Ocean Hauling has been a restricted access fishery since 1995, with commercial fishermen being required to have licences to operate commercial Ocean Hauling activities. There are three class endorsements within the Ocean Hauling Fishery, being Class A (skipper), Class B (crew) and Class C (purse seine). At present, 374 business hold one or more endorsements in the fishery, with the fishery including 184 Class A endorsements, 203 Class B endorsements and 26 Class C endorsements. 92% of Ocean Hauling businesses also hold endorsements in other commercial fisheries with the Estuary General Fishery, in particular, being closely linked to Ocean Hauling.

In 1998/99, the Ocean Hauling Fishery contributed approximately 16% of the total catch from waters within New South Wales.

Table 2.1 Fishing methods and environmental implications

Method	Catch	Noise	Light	Air	Energy/ Greenhouse
Hauling Net – General Purpose The net is "shot" from a set point while the boat encircles the target species. The net is then hauled to the shore or the boat, either by hand or by motorised haulers.	Sea mullet, luderick, yellowtail scad, pilchards, sea garfish	Boat engine, winches and other hauling equipment, beach based 4WD vehicles (if used), crew members' instructions	Occasional lights from boats and from beach based operations (if net is hauled to shore) at night and in the early morning	Boat engine, 4WD vehicles (if used)	Boat engine, 4WD vehicles (if used)
Hauling Net – Pilchard, anchovy and bait net Used for smaller species of fish. Generally used directly from beach, but now being used more from boats.	Pilchards, anchovy, whitebait, blue mackerel	4WD vehicles, winches and other hauling equipment, boats (if used to set the net), crew members' instructions	Occasional lights from beached based operations and boats (if used) at night and in the early morning	4WD vehicles, boat engine (if used)	4WD vehicles, boat engine (if used)
Hauling Net – Garfish Specifically designed to catch garfish, positively buoyant to target surface schooling fish.	Sea garfish	Boat engine, winches and other hauling equipment, crew members' instructions	Occasional lights from boats at night and in the early morning	Boat engine	Boat engine
Garfish Bullringing Net A net designed specifically for garfish, using a slightly different method than the hauling net	Sea garfish	Boat engine, winches and other hauling equipment, crew members' instructions	Occasional lights from boats at night and in the early morning	Boat engine	Boat engine
Purse Seine Net A wall of netting that is set around a school of fish	Pilchards, yellowtail scad, blue mackerel	Boat engine, winches and other hauling equipment, crew members' instructions	Occasional lights from boats at night and in the early morning	Boat engine	Boat engine

Figure 2.1 Beach based Ocean Hauling Fishery method

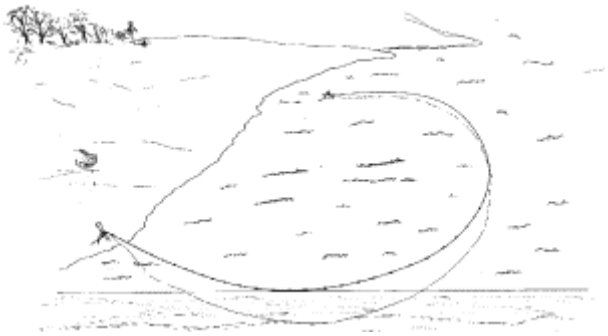


Figure 2.2 Boat based Ocean Hauling Fishery method

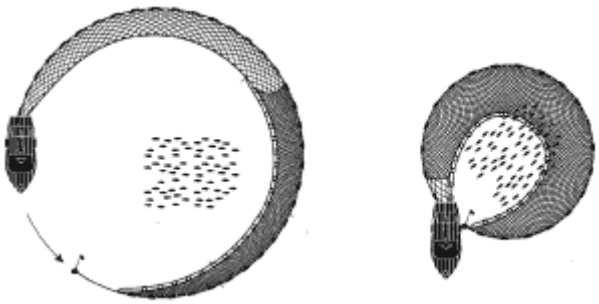
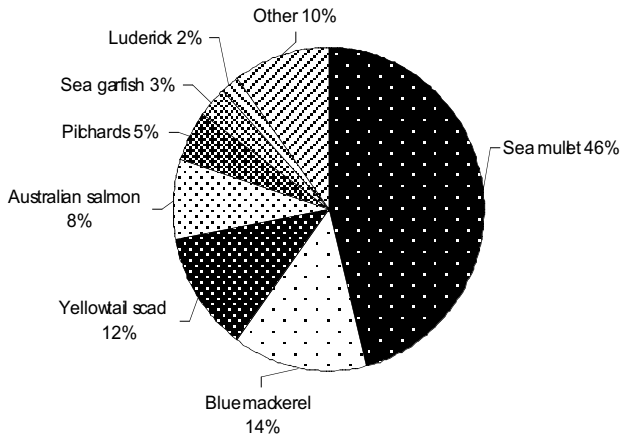


Figure 2.3 Ocean Haul Fishery: principle species catch 1997-1998 and 1999-2000



Source: Data supplied by NSW Fisheries

2.3 OCEAN HAULING CONTROLS

The Ocean Hauling Fishery is managed entirely via input controls. These are controls that limit the resources that can be used by commercial fishermen, thus indirectly controlling the catch size. There are no direct restrictions on catch size or quotas. Input controls include restrictions on the number of licences available, the size and engine capacity of boats, the length and mesh size of nets and the locations and times that can be worked. NSW Fisheries is responsible for the majority of controls imposed on the Ocean Hauling Fishery, although the NSW National Parks and Wildlife Service also imposes some controls, as do various local councils.

An overview of the controls is provided below.

2.3.1 Limited Entry

As mentioned above, the Ocean Hauling Fishery is a restricted access fishery. A licensing system and the endorsement system provide a mechanism for controlling the number of commercial operations undertaking Ocean Hauling.

2.3.2 Permits

There are a range of different permits that allow commercial fishermen to undertake certain activities that would normally be prohibited in the Ocean Hauling Fishery. These include permits for net variations, permits that allow certain species to be caught and permits for research.

2.3.3 Equipment Controls

Controls on equipment make up the greatest number of controls imposed with the Ocean Hauling Fishery. These controls include:

- boat replacement policy. This is designed to prevent increases in the size of vessels within the commercial fishing fleet. The policy essentially prevents fishermen from replacing their existing boats with larger boats;
- engine controls. These limit engines being used for Ocean Hauling to 45 horsepower (33 kilowatts);
- net registration. All nets being used in the Ocean Hauling Fishery must be registered. There is currently a freeze on registration of new nets, thus preventing any expansion in the number of nets being used within the fishery; and
- net size. All nets must comply with length and design guidelines, and must meet requirements for mesh size.

2.3.4 Closures

There are a range of closures imposed on the Ocean Hauling Fishery. The closures can be categorised as location closures, preventing Ocean Hauling activities from occurring in certain areas, or time closures, preventing Ocean Hauling activities from occurring during certain periods of the year or certain times of day. There are currently around 30 closures in the Ocean Hauling Fishery within New South Wales.

2.3.5 Size Limits

These apply to certain species taken within the Ocean Hauling Fishery, and prevent fish below a specified size from being retained.

2.3.6 Zoning

Zoning controls are designed to restrict commercial operators to within a single region (one of the seven fishery regions) in order to minimise conflicts arising from 'travelling crews'.

2.3.7 Code of Conduct

Commercial operators within the Ocean Hauling Fishery are bound by a Code of Conduct. The Code of Conduct deals with issues such as beach access points, vehicle speed limits on beaches, avoiding environmental damage and working with local councils.

3 IMPACT ASSESSMENT

3.1 NOISE

3.1.1 Impact Assessment

Potential sources of noise impact were identified in Table 2.1. These include:

- boat engines. This applies to those vessels that are engine powered (28% of Ocean Hauling Fishery vessels are powered by oars). The median motor size is 29.8 kilowatts (40 horsepower) and 90% of the motor powered fleet has motors sized 96.9 kilowatts (130 horsepower) or less;
- hauling winches and other hauling equipment (these may be four wheel drive vehicle based on the beach);
- other fishing activities such as water release and general noise; and
- crew members talking/instructions.

These activities can occur at any time of the day or night.

For noise to have an effect there must be a receptor who or which would be disturbed by the noise. For Ocean Hauling Fishing these receptors are either people who live adjacent to beaches or wildlife.

i Residents Adjacent to Beaches

Noise from Ocean Hauling Fishing may cause adverse effects to residents where houses are close enough to the beach front for the fishing activity to cause disturbance. Given the type of activity and likely low sound power level of the potential noise sources, except in the case where winches on four wheel drive vehicles are used for hauling on the beach, it is probable that there is only a potential for disturbance during night-time operations. The potential for disturbance would be determined by a number of factors, including:

- size of boat motor and whether it is an outboard or in-board motor;
- duration and type of fishing activity;
- number of other operators in the same area;
- where beach based hauling is done from winches on four wheel vehicles, the number of four wheel drives operating winches simultaneously (ie occasionally more than one vehicle may operate together on the same beach);
- position of the house, both its distance from the activity and intervening topography; and
- land-based activity in the vicinity of the house. A house in a coastal town or close to a main road could be expected to have a higher background noise level compared to an isolated farm house.

A brief description of land uses surrounding areas of Ocean Hauling fisheries was given in Section 2. Given that Ocean Hauling Fishing occurs on beaches and in waters along the entire

NSW coast, there will be areas where the activity causes disturbance to nearby houses, whether these are houses in villages or towns, or isolated farm or holiday houses.

ii Wildlife

Noise from Ocean Hauling Fishing activities would only affect wildlife when:

- fishing is undertaken in areas where wildlife that is sensitive to noise is present; and/or
- noise from fishing activities disturbs wildlife either due to the volume or type of noise generated.

Noise impacts could result from hauling activities, fisherman's voices, the sound of equipment contacting boats, motors, trucks on the beach and the splashing of water. Wildlife that could be affected may include birds and terrestrial mammals from beach based activities, and aquatic mammals and non-target fish from other aspects of the fishery. Any such wildlife that is disturbed may:

- remain in the area but become inactive (ie hide);
- temporarily move away from the area to return when the disturbance has ceased; or
- may permanently move away from the area (this is more likely if the disturbance is prolonged or occurs frequently).

During the daytime, fauna that is sensitive to noise is more likely to occur at secluded locations. These areas are likely to be fringed by native plant communities such as coastal scrub, sclerophyll forest and woodland or rainforest. Such locations are likely to be relatively free of human activity and are more likely to harbour noise sensitive species. Noise sensitive wildlife may also occur in developed areas if these are relatively quiet and support suitable habitat.

During the night-time, background noise levels are reduced. The area affected by noise and the severity of the noise impacts would be greater. A greater range of species is likely to be affected during the night-time. This would include diurnal species disturbed from their sleep and nocturnal species whose behaviour is altered as a result of noise from fishing activities.
In general, noise sensitive species may be encountered at night-time over a greater area than during the daytime. Accordingly, the area affected by noise from Ocean Hauling Fishing and the severity of the noise impacts would be greater at night. Also a greater range of species is likely to be affected during the night-time. This would include diurnal species disturbed from their sleep and nocturnal species whose behaviour is altered as a result of noise from fishing activities.

Impacts on sleeping diurnal species would only occur where fishing is sufficiently close to their habitat to disturb such species. Fishing would impact upon sleeping diurnal birds and terrestrial mammals where fishing is undertaken from the beach or near aquatic vegetation.

The significance of the disturbance to wildlife would vary depending on the species and on the timing of the disturbance. The greatest impacts could be expected during the nesting or breeding season. At these times, any disturbance could impact upon the reproduction of a species and may endanger the viability of local populations. This would be particularly be the case if the disturbance was a frequent, regular or on-going activity.

Species most likely to be impacted by commercial fishing during the nesting or breading season would include birds that nest in aquatic or riparian vegetation, or in vegetation near the water's edge. Non-target fish could similarly be impacted if fishing is undertaken near nurseries or breeding habitat such as areas of seagrass.

3.1.2 Mitigation Measures

A potential for adverse effects caused by noise from Ocean Hauling Fishing on people and wildlife has been identified. This potential is not a new, as Ocean Hauling Fishing has been a continuing industry for more than 100 years. There are a number of existing controls on the industry (which are outlined in full in Section 2.3) that have relevance to the mitigation of noise impacts from the fishery. These include:

- limited entry controls;
- equipment controls;
- total closures; and
- codes of conduct.

These controls were instigated for a number of reasons, including conservation and to prevent disturbance to people living close to areas where Ocean Hauling Fishing occurs.

It is also proposed to continue to monitor the levels of complaint received concerning noise levels from the Ocean Hauling Fishery. Two authorities currently receive complaints, local councils (who tend to refer these to NSW Fisheries) and regional offices of NSW Fisheries. The number and type of complaints should be used as an input into reviewing the existing controls.

3.2 LIGHT

3.2.1 Impact Identification

i Residents

The only potential for adverse effects from lights used in the Ocean Hauling Fishery would be from spotlights used in the fishing process. Navigation lights, deck lighting or lights used for visibility purposes from beach based activities would not have a potential for significant adverse effect. Spotlights would only cause an adverse effect where these were shone into houses adjacent to the beach. The activities of the Ocean Hauling Fishery (Table 2.1) generally do not require intensive use of spotlights nor high strength lights. It is not anticipated that this type of lighting would have a potential for significant adverse impacts.

ii Wildlife

Impacts from light upon wildlife are unlikely to be significant unless light beams repeatedly or continuously affect the same individuals. The severity of this impact would increase with the intensity of the light.

Wildlife most susceptible to impacts from light would be those occurring in the water, on aquatic vegetation or near the water edge. Species would include aquatic mammals, non-target fish, terrestrial mammals and birds. Nocturnal species would be most likely to be impacted. However, diurnal species disturbed from their sleep could also be impacted.

3.2.2 Mitigation Measures

Mitigation measures outlined for noise impacts are generally applicable for reducing the potential for adverse effects from lighting. In summary these were:

- existing controls to limit the location of fishing; and
- monitoring of levels of complaint.

3.3 AIR QUALITY

The two identified sources of air pollution from the Ocean Hauling Fishery are emissions from boat engines and from four wheel drive vehicles where they are used for beach based hauling. These emissions do not have a potential to significantly affect air quality, as they:

- do not represent a concentrated source of inputs as they occur along the NSW coast;
- vary according to both season and time of day; and
- are, in the case of the boats, generally from relatively small engines.

Mitigation measures to reduce air quality emissions are the same as those proposed to reduce energy and greenhouse inputs. These are discussed in the Section 4.

4 ENERGY AND GREENHOUSE ISSUES

4.1 DESCRIPTION OF FISHING FLEET

The majority of boats used in the Ocean Hauling Fishery are small 'run-about' or 'punt' style vessels generally of aluminium, wood or fibreglass construction powered either by oars (28%) or petrol and diesel marine engines/motors. In some cases two motors are used per boat, with one of smaller capacity used to enable navigation of the vessel at low speed during the process of shooting hauling nets. Some larger and faster vessels also participate in the industry. These are of two types: 'jet boat' style vessels with motor sizes up to 35 kilowatts; and larger vessels used in the Ocean Trap and Line Fishery by fishers who hold endorsements for the Ocean Hauling Fishery as well. In fact, the majority of the vessels involved in the Ocean Hauling Fishery are also used in other fisheries with only ten vessels currently licensed for Ocean Hauling alone in New South Wales. Smaller Ocean Hauling vessels are often used in the Estuary General Fishery.

Table 4.1 contains a summary of the characteristics of the Ocean Hauling Fishing fleet. The median figure represents the size above or below which 50% of the fleet lies. The 80% range indicates the size range within which 80% of the fleet lies, while the range indicates the smallest and largest size in the fleet. Most engines are powered by petrol (80%) with smaller numbers using diesel (20%).

Beach based hauling may be done via winches based on for wheel drive vehicles. A typical vehicle has a 3 litre engine capacity and an aluminium tray table top (NSW Fisheries).

No data were available for the typical use of boats or four wheel drive based winches in terms of hours used and distance travelled. This would vary according to the fishing business, the beaches and waters where Ocean Hauling is undertaken and the time of year. Similarly, there was no quantitative information on the catch/effort characteristics of the different methods of Ocean Hauling Fishing.

Table 4.1 Fishing fleet characteristics

Characteristic	Number Registered	Median	80% Range	Range
Motor Size (kilowatt)	550	29.8	11.2 – 96.9	2 – 820.3
Boat Length (m)	765*	5.05	4 – 6.79	3 – 22.7

*The total number of registered vessels involved in the Ocean Hauling Fishery is 765. There are 550 motor-powered vessels (20 of these have two motors) and 215 oar-powered vessels.
Source: Data supplied to SMEC by NSW Fisheries

Maintenance is the responsibility of the fishing vessel and four wheel drive owner. Manufacturers' maintenance instructions should be followed to ensure engine efficiency and emission control systems work properly. Lack of compliance by vessel and four wheel drive owners with instructions can result in lower levels of energy efficiency (ie fuel wasting) and higher greenhouse emission rates. There is no specific information on 'typical' marine engine maintenance practices but given the size and type of the industry there is likely to be a varied response to maintenance.

Petrol and diesel fuels have similar CO_2 emission factors as shown in Table 4.1. On that basis the fuels are not dissimilar in their potential greenhouse impact although this would depend on other factors such as comparative efficiency between diesel and petrol motors and motor size availability.

Table 4.2 CO_2 emission factors

Fuel	CO_2 Emission Factor (kg CO_2/GJ)
Petrol	65.3
Diesel	69.0

Source: *Factors and Methodologies, The Greenhouse Challenge* (Australian Greenhouse Office 2001)

4.2 ENERGY AND GREENHOUSE ASSESSMENT

Energy and greenhouse effects are considered together as the only potential for greenhouse gas inputs is from the energy consumed in the boat motors and four wheel drive motors where winches are used for hauling from the beach. Overall, the numerical size of the fleet and the size of the boats and motors used means that the overall consumption of energy resources and subsequent greenhouse gas emissions is not significant. The Ocean Hauling Fishery consists predominantly of many small businesses operating in a low technology environment. Potential measures to reduce energy and greenhouse emissions may not be practicable for many of these ventures due to initial cost.

There are range of possible methods for reducing energy use and also greenhouse gas emissions. These include the use of alternative power sources and measures to maximise energy efficiency and these are discussed below. One principal mitigation measure would be on-going education to members of the Ocean Hauling Fishing industry of these and other mitigation measures. This could be achieved in a number of ways, including the distribution of information through industry associations or the boat and fishing licence registration system.

Renewable energy for fishing vessel operation is already used by 28% of the fleet through the use of oars. Further renewable energy use could include solar and wind energy. However utilisation of these energy alternatives is not currently considered viable for Ocean Hauling commercial fishing vessels.

Potential measures to maximise energy efficiency and hence minimise the emission of greenhouse gases for commercial fishing vessels involved in Ocean Hauling Fishing have not been investigated in detail in Australia. These measures fall into two main areas, material and technology selection, and operational practice. Specific measures applicable to each of these aspects of commercial fisheries are outlined below.

i Material and Technology Selection

Material and technology selection options may significantly affect energy usage and greenhouse gas emissions. Opportunities for the reduction of greenhouse impacts and improvement of energy efficiency include:

- Improved performance marine engines.

The State of California Environmental Protection Authority (EPA) Air Resources Board (ARB) (http://www.arb.ca.gov) and the US EPA (http://www.epa.gov/oms/marine.htm) introduced parallel regulations commencing in 2001 requiring manufacturers to market improved performance marine engines. According to the ARB the regulations were introduced due to concerns that many conventional two-stroke marine engines burn fuel inefficiently and 'discharge up to 30 percent unburnt fuel into the environment'; the ARB recommend switching from a two-stroke to a more efficient four-stroke marine engine. ARB analysis shows that advanced technology marine engines burn up to 30 percent less fuel and oil.

- High strength lightweight polyethylene trawler nets.

  Fuel savings of 10 to 20 percent per vessel, 40 percent drag reduction and very short term paybacks in fuel cost savings can be achieved with the use of strong high performance polyethylene smaller diameter fibre in trawl nets.

- Selection of equipment with low embodied energy content.
- Energy use minimisation control equipment, including timer controls, thermostats, and sensors and controls to optimise flow rates, temperatures, pressures and other energy relevant variables.
- Matching equipment size and machinery to fish catch and journey requirements to minimise energy utilisation.
- Use of energy efficient lighting systems and controls.
- The potential use of the Australian appliance energy rating system. California's ARB has also introduced a marine engine and watercraft labelling system to indicate to purchasers which vessels 'meet', 'exceed' or 'greatly exceed' their new regulatory requirements. The potential use of the Australian appliance energy rating system (http://www.energyrating.gov.au) to assist consumers in selecting energy efficient marine engines and vessels is one way in which this could be translated to the fishing fleet.

ii Operational Practice

A number of decisions made during operational practice can have significant impact on energy efficiency and greenhouse gas emissions. Relevant facets of operational practice include:

- development of systematic and cyclic maintenance programs;
- implementation of energy and greenhouse management processes, such as:

  - employee energy conservation training;
  - energy and greenhouse audits; and
  - ongoing consideration of new technologies as they become available and economically viable.

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Appendix A
Questionnaire to Councils

Commercial Fishing Questionnaire

This questionnaire is concerned with any Council involvement in the regulation of <u>commercial</u> fishing, specifically commercial fishing activity in estuaries and from ocean beaches.

Estuary fishing is fishing that occurs in tidal estuary waters, such as lagoons and rivers. It includes the removal of finfish, shellfish and prawns from estuary waters using a variety of methods, such as trapping and netting. Ocean Hauling Fishing is fishing using nets from open ocean beaches.

1. Are you aware of any commercial fishing in estuaries and/or from beaches within your area?

☐ Yes ☐ No

2. Does Council have any formal controls on commercial fishing in estuaries and/or from beaches within your area?

☐ Yes ☐ No (skip to Q.3)

↓

2a. What do these controls deal with? *(Tick all that apply)*

☐ Location of commercial fishing

☐ Operating hours of commercial fishing

☐ Other – please specify: _____

_____

_____

2b. Can you please provide an overview of the nature of any of these controls

_____

_____

_____

_____

_____

_____

_____

3. Are there any joint arrangements between Council and NSW Fisheries for the management of commercial fishing in estuaries and/or from beaches in your area?

☐ Yes ☐ No (Skip to Q.4)

↓

(Answer Q.3a overleaf)

3a. Please outline these arrangements:

_____
_____
_____
_____
_____

4. Does your Council have any records of complaints about commercial fishing in estuaries and/or from beaches?

☐ Yes ☐ No (Skip to Q.5)

↓

4a. Approximately how many complaints have been received?

☐ Less then 5

☐ 5-10

☐ 10-50

☐ More than 50

4b. What do these complaints specifically relate to? *(Tick all that apply)*

☐ Noise pollution

☐ Air pollution/air quality

☐ Water pollution

☐ Other – please specify: _____
_____
_____

4c. Can you provide some brief comments on the nature of these complaints:

_____
_____
_____
_____

5. Any other relevant comments you would like to add:

_____
_____
_____

Name:_____

Thank you for your time, it is most appreciated.

Dominion Consulting Pty. Ltd. A.C.N. 079 198 780.

Consulting in fisheries management, economics and training.

An Assessment of Economic and Social Issues in the NSW Ocean Hauling Fisheries Management Strategy

A report to NSW Fisheries

by Dominion Consulting Pty Ltd

January 2002

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The normal disclaimer applies.

(G) ECONOMIC ISSUES

Introduction

The DUAP Directors Guidelines require that the impacts of a Fisheries Management Strategy are assessed as part of an Environmental Impact Statement (EIS). Under the principles of Ecologically Sustainable Development, the DUAP Director's guidelines include assessment of the economic and social impacts of any proposed fishery management strategies according to sixteen economic and nineteen social considerations, respectively. This is to make the economic and social aspects of sustainable resource use and management more transparent in the decision-making process. It also enables potential policy impacts to be mitigated in the policy development process, rather than after the event.

The economic and social assessment sections of the DUAP Directors Guidelines require a review of existing fisheries information in section (1) and an evaluation of the likely implications of the plan (fishery management strategies) in section (2). Section 3 requires information shortfalls to be identified. The DUAP Directors guidelines for commercial fisheries are new and it is envisaged that they may be further developed after their application to a fisheries management strategy.

The management of fisheries in NSW has not previously integrated economic and social information into the planning process in a formal manner. The current initiative to incorporate available economic and social information is an important step towards more comprehensive planning. In undertaking the assessment, there is a lack of information on basic economic characteristics of fishing operations and the secondary seafood industries. There have been no previous state-wide economic surveys or economic appraisals of the sustainability of fishing operations. There has been some social information on fishers, but little on the social composition of fishing communities in NSW. The lack of previous information, available time and resources means the current study is a first attempt to gather and analyse economic and social information in order to appraise the fisheries management plan of a specific fishery. The DUAP process enables information needs to be identified.

Much of the available economic and social information comes from regulatory sources, such as NSW Fisheries licence records and fishers' catch returns. Catch records can be combined with price information available from the Sydney Fish Markets Pty Ltd to impute revenues to fishers and fisheries in order to estimate a value at point of first sale. This may give a minimum estimated value and probably underestimates the industry catch value at first sale.

Concurrent to the fisheries management strategy assessment process, is the recreational fishing area (RFA) process which has involved debate on value of commercial and recreational fishing sectors. The current study is not intended as a "valuation" of the fishing industry and existing economic and social information is presented as a background to the assessment of specific fishery management strategies envisaged in the future management of the Ocean Hauling fishery. The secondary information available on the seafood industry is limited, coming from licensing details of registered premises. There is no publicly available descriptive information or an economic profile of the processing, wholesaling and retail sections of the NSW seafood industry. This leaves an information void in which secondary value estimates of the seafood industry in NSW are not available.

To gain economic and social information for the assessment process, two surveys were commissioned by NSW Fisheries in May 2001, to gain up to date economic and social information across all fishery primary producers in NSW who directly interface with the fish resource. There was insufficient time to survey the secondary level of the seafood industry and this is recommended for future work. The economic and social

surveys were to gain information on the fishers and their fishing operations, to enable the impacts of implementing fishery management strategies to be appraised. Given this is part of a new fishery assessment process, subsequent research and information gathering is recommended for future appraisals as per section 3 of the guidelines.

The social assessment of the fisheries management strategies also uses existing administrative information from licence records and has been augmented by a telephone survey of fishers in NSW (RM, 2001a). This information was gathered to fill the most immediate information shortfalls for assessment purposes and to give a social profile of the state's fishers in relation to the impending need created by the FMS. This approach will need to be augmented with further fishing community surveys in the future. There is a lack of independent surveyed community opinion on fishing issues.

This economic and social fishery management strategy assessment is the second in a series in NSW and has been compiled in a short time period, in which source data has been collected and analysed. It should be regarded as a first step towards more accountable and transparent fisheries management strategy assessment in order to improve ecological sustainability.

Available information

Initial analysis of available data revealed a deficit of economic and social information, with the available data coming from the licensing and catch record information held by NSW Fisheries. Available data for the social assessment was accessed via the Bureau of Rural Science, Social Science unit from the Australian Bureau of Statistics (ABS). Aggregate ABS data is of limited use to a specific OH fishery study being across fishery administrations, thus including Commonwealth and interstate fishing activity. The NSW EIS process and ABS data access is an area for future development. Separate social and economic surveys were undertaken across all commercial fisheries in NSW in the May-June period of 2001 in order that this and six subsequent environmental impacts assessments could benefit from improved information.

Given the time available, the survey was able to address shortages in information on the fishing industry at the primary level of fishing enterprises and fishers. Time precluded surveying of the secondary level of the processing industry and the industrial activity associated with the seafood industry. The limitations on data are discussed as part 3 of the guidelines. As part of the assessment process, recommendations are made on how to improve the data available for future assessments.

There are four main sources of information and data for the economic and social assessment:

a) existing NSW Fisheries records from licensing and catch records;

b) results of the Social survey (Roy Morgan, 2001a);

c) results of the Economic survey (Roy Morgan, 2001b);

d) other publications with relevant material where available.

Other sources of information have been cited, including general literature and available government and industry statistics. Some background on each of the data sources used in the assessment is given below:

a) Existing NSW Fisheries licencing records have some fisher details such as date of birth and postcode. The licencing records can also show endorsements holdings and fisher file and business number. Catch and effort information from the NSW Fisheries database can be added to existing licencing information.

   The Sydney Fish Market average monthly prices for species, enables the catch data from catch and effort returns estimated an imputed Sydney value at time of first sale - the "Sydney index". This infers that the

estimated landed prices of all seafood landed is the monthly average price at first sale in Sydney and may under or over report the revenue associated with individual fishers. As a price at first sale, it does not include market deductions (circa 10%), and it does not account for export sales which may exceed Sydney prices. Data sourced from Department's records will be referred to as **"Source: NSWF" or "Sydney index"** in the study.

Comparisons of the Sydney Index and revenues as stated by the respondents in the economic indicate that the Sydney index understates OH fisher revenue for those sampled by approximately 50%, (with the exception of region 4 (-1%)), exceeding the 50% in region 2 (200%) and region 3 (108%). Potentially all "Sydney index" data in this report may under state revenue by 50% in total and by more than this in regions 2 and 3.

b) A specially devised social survey was executed by telephone in May 2001 (Roy Morgan, 2001a). A total of 870 fisher responses were recorded from a total of 1,751 fishers contacted state-wide. The survey results have been analysed for the Ocean Hauling fishery and will be referred to as **"Source: RM-SS"**;

c) An economic survey was designed and executed by mail in May/June 2001 by Roy Morgan Research (Roy Morgan, 2001b). A total of 250 fisher responses were recorded from a total of 1640 fishers and businesses contacted state-wide. The survey results have been analysed in the current study for the fishing businesses in the Ocean Hauling fishery and will be referred to **"Source: RM-ES"**;

Other information from existing literature will be referenced.

The DUAP guidelines for economic issues will be followed below. The guidelines are presented to guide the reader with a response stated below each guideline. The DUAP Director's guidelines require the following:

" Assess the likely economic impacts of implementing the management plan having regard to the following":

(1) REVIEW OF THE EXISTING SITUATION

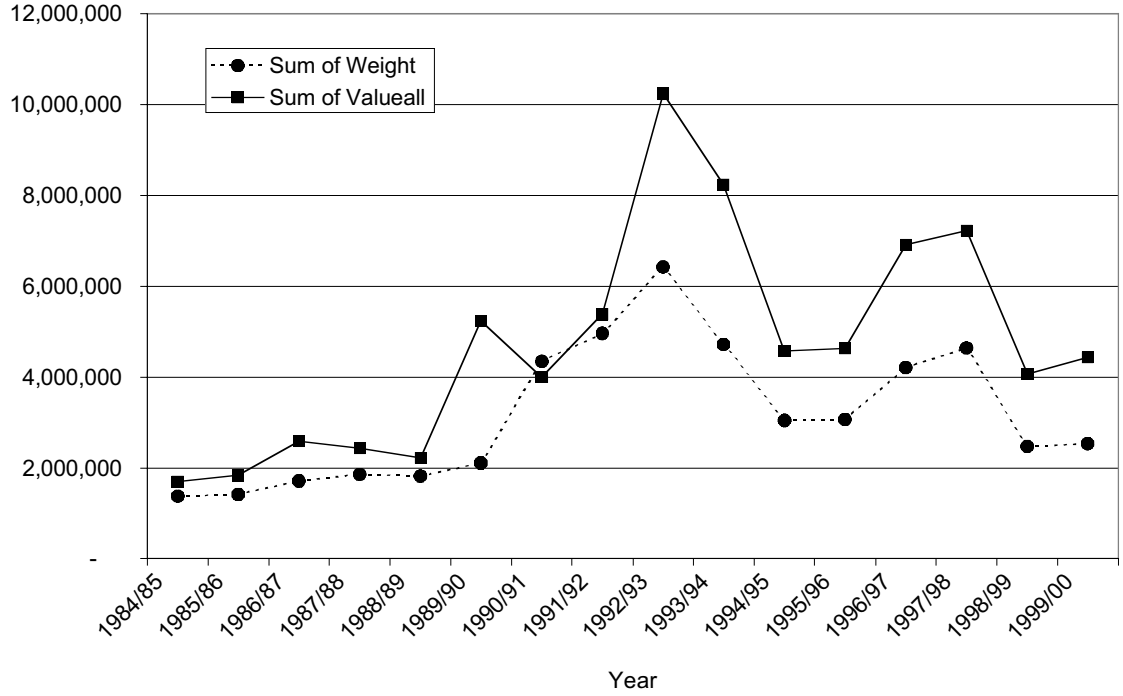
a) location, structure (including interrelationships), age and investment in the fishing fleet (if relevant); consider the regional or sub-regional implications

Location and number of fishers and vessels in fishery and sub regions.

The Ocean Hauling (OH) fishery has commercially licenced fishers operating in coastal NSW. The list of administrative zones are reported in the Ocean Hauling Fisheries Management Strategy (FMS, 2001; section B2, Map B1).

In May 2001, there were 374 OH businesses. Of these, approximately two thirds were in the north of the state (regions 1-4) and one third in the south (regions 5-7). The total catch and value of the OH fishery in the 1984-2000 period is reported in Figure G1[1].

Figure G1: Total catch (Kg) and total value ($, nominal) of catch associated with the Hauling fishery in the 1984-2000 period (Source: NSWF-Sydney Index; see footnote 1).



The total production in the 1997-2000 period, when Ocean Hauling (OH) was a distinct fishery, was between 2,300 and 4,300 tonnes of seafood and had an estimated value at first sale of $4.0-$7.3million dollars as reported in Table G1. Calibration of the Sydney index data from the economic survey results suggest the gross revenue may be 50% higher than the Sydney Index (i.e. $4.0m becomes $6.0m and $7.3m becomes $11.0m).

Inter relationships between OH and other endorsed fisheries

The OH fishery has an annual revenue of $4.1m to $7.2m and possibly as high as $10.8m and is approximately 8% by revenue of the total annual fishery production in NSW as reported in Table G1. Given the first sale revenue estimates are from the Sydney index, they should be treated as a minimum estimate exclusive of alternative marketing to Sydney, and fish marketed in export markets.

Table G1: The total revenue of fisheries production in different fisheries in NSW (excluding Abalone) in the years 1997-2000 (millions $ nominal, Source: NSWF- Sydney index).

Year	EG	EPT	OH	*OH adj.*	OPT	OFT	OTL	RL	Total
1997/98	19.4	2.6	7.2	*10.8*	20.9	5.2	11.2	4.2	70.7
1998/99	17.6	3.2	4.1	*6.1*	23.4	4.1	9.6	3.8	65.8
1999/00	17.3	3.8	4.4	*6.6*	22.4	3.9	9.8	4.5	66.1
Ave.	**18.1**	**3.2**	**5.2**	***[7.8]***	**22.2**	**4.4**	**10.2**	**4.2**	**67.5**
%	**27%**	**5%**	**8%**		**33%**	**7%**	**15%**	**6%**	**100%**

* 1999/2000 data as of May 2001 (Key: EG Estuary General; EPT Estuary Prawn Trawl; OH Ocean Haul; OHadj. Ocean Hauling adjusted from Sydney index by economic survey estimates; OPT Ocean Prawn Trawl; OFT Ocean Fish Trawl; OTL Ocean Trap and Line and RL Rock Lobster)

[1] Prior to 1997 Ocean Hauling was not a distinct fisher and data prior to 1997 should be treated with caution.

Due to the mixed endorsement holdings of OH fishers across several fisheries, the revenue associated with catches across several fisheries made by fishers and fishing businesses holding OH endorsements is greater than $4.4m per annum and was $18.5m in 1999-2000 (see Table G3). The NSW fishery revenue for different regions and districts along the NSW coast is reported in Table G2. The OH fishers operate regionally within this State-wide picture of fishery interaction.

Table G2: State wide fishery revenue in different fishery zones and districts of NSW in 1999-2000 ($'000, Source: NSWF- Sydney Index).

ZONE	DISTRICT	EG	EPT	OH	OPT	OFT	OTL	RL	TOTAL	EG % of Total
1	TWEED	655	-	342	1,703	-	775	-	3,475	5.2%
1	RICHMOND	1,856	14	-	3,067	21	1,172	53	6,183	9.3%
2	CLARENCE	2,740	2,607	157	9,081	-	341	217	15,142	22.8%
3	COFFS HARBOUR	245	-	212	2,538	3	1,585	431	5,013	7.6%
3	HASTINGS	912	20	504	1,634	26	468	234	3,798	5.7%
4	MANNING	1,193	8	258	420	38	445	288	2,651	4.0%
4	WALLIS LAKE	2,272	48	266	614	40	495	600	4,336	6.5%
4	PORT STEPHENS	860	-	200	1,430	925	312	829	4,556	6.9%
4	HUNTER	1,555	287	57	1,187	1,003	282	133	4,505	6.8%
4	CENTRAL COAST	1,061	182	106	1	50	645	154	2,200	3.3%
5	HAWKESBURY	251	312	-	4	-	1	-	568	0.9%
5	SYDNEY NORTH	290	185	69	257	686	181	58	1,726	2.6%
5	SYDNEY SOUTH	467	170	22	151	13	417	430	1,670	2.5%
6	ILLAWARRA	876	-	1,206	62	1	861	565	3,572	5.4%
6	SHOALHAVEN	1,042	10	73	134	292	606	132	2,289	3.5%
7	BATEMANS BAY	442	1	258	88	715	271	395	2,171	3.3%
7	MONTAGUE	451	4	60	30	8	742	17	1,312	2.0%
7	FAR SOUTH COAST	128	-	645	37	60	228	20	1,118	1.7%
	Total	**17,299**	**3,848**	**4,434**	**22,439**	**3,880**	**9,826**	**4,558**	**66,283**	**100%**

The state wide fishery relationships reported in Table G2 reveal that the Clarence district has 23% of state wide fishing revenue, reflecting the OPT, EPT and EG fisheries in that region. The districts north of Sydney North have approximately 81% of the revenue from state wide fish production.

The regional fishery revenue associated with OH endorsed fishing businesses is reported in Table G3 for 1999/00 across all fisheries giving the total catch in each district as a percentage of the total of $18.5m ($20.6m, if the OH adjusted estimates were used). In Table G3 the OH revenues indicate the OH catch as a percentage of total catch in a district for the year 1999-2000.

Table G3: Fisher revenue for OH fishers in the OH and other fisheries in different districts of NSW in 1999-2000 ($ '000, Source: NSWF- Sydney Index).

ZONE	DISTRICT	END	ACTIVE	EG	EPT	OH	OHadj	OPT	OFT	OTL	RL	TOTAL	OH as %
1	TWEED	30	21	375	-	342	**499**	-	-	190	-	906	38%
1	RICHMOND	5	3	489	-	-	**-**	-	-	33	-	521	0%
2	CLARENCE	51	39	893	581	157	**469**	1,382	-	110	160	3,283	5%
3	COFFS HARBOUR	25	15	115	-	212	**441**	-	-	83	67	445	48%
3	HASTINGS	25	20	273	-	504	**1,048**	-	-	91	5	872	58%
4	MANNING	31	22	402	-	258	**258**	288	38	187	164	1,338	19%
4	WALLIS LAKE	41	36	1,346	-	266	**266**	-	-	108	279	1,999	13%
4	PORT STEPHENS	48	31	585	-	200	**200**	309	111	32	769	2,006	10%
4	HUNTER	10	7	168	-	57	**57**	-	-	14	98	336	17%
4	CENTRAL COAST	21	17	411	5	106	**106**	-	-	257	106	885	12%
5	SYDNEY NORTH	15	8	208	30	69	**91**	1	-	15	51	374	18%
5	SYDNEY SOUTH	5	3	22	-	22	**29**	-	-	217	49	310	7%
6	ILLAWARRA	42	29	758	-	1,206	**1,315**	-	-	17	215	2,195	55%
6	SHOALHAVEN	39	15	680	-	73	**79**	-	-	374	121	1,248	6%
7	BATEMANS BAY	24	13	249	-	258	**485**	-	-	38	61	601	43%
7	MONTAGUE	12	6	101	-	60	**113**	-	8	93	0	263	23%
7	FAR SOUTH COAST	30	14	92	-	645	**1,213**	1	-	142	15	895	72%
	TOTAL	**454**	**299**	**7,169**	**617**	**4,434**	***6,651***	**1,981**	**157**	**2,000**	**2,158**	**18,477**	**24%**

Key – END, Endorsements; Active, submitted one or more catch returns in 1999-2000; OH adj. are adjusted OH revenues inferred from responses to the economic survey by region – these are estimates only.

Those districts with more than 35% of revenue from Ocean Hauling are Tweed, Coffs Harbour, Hastings, Illawarra, Botany Bay and Far South Coast. Table G3 reports that in May 2001 there were apparently 454 fisher endorsements in the OH fishery (374 fishing businesses). Given a fisher can only record catch under one unique file number, this translates into 404 endorsed fishers in the OH fishery. In the 1999-2000 year, 299 endorsement holders were active and had fished in the OH fishery. The final column of Table G3 illustrates the regional dependence on the OH fishery. The OH fishery is based in the northern zones of the state where beach fishers target mullet seasonally and in the areas south of Sydney, where purse seining, salmon and bait species fishing takes place. The diversity in OH fishery operations can be seen in the range of catch revenues from fishing methods reported in Table G4.

Table G4: Revenue (in $ nominal) associated with different fishing methods in the Ocean Hauling fishery 1999-2000 (Source: NSWF-Sydney Index).

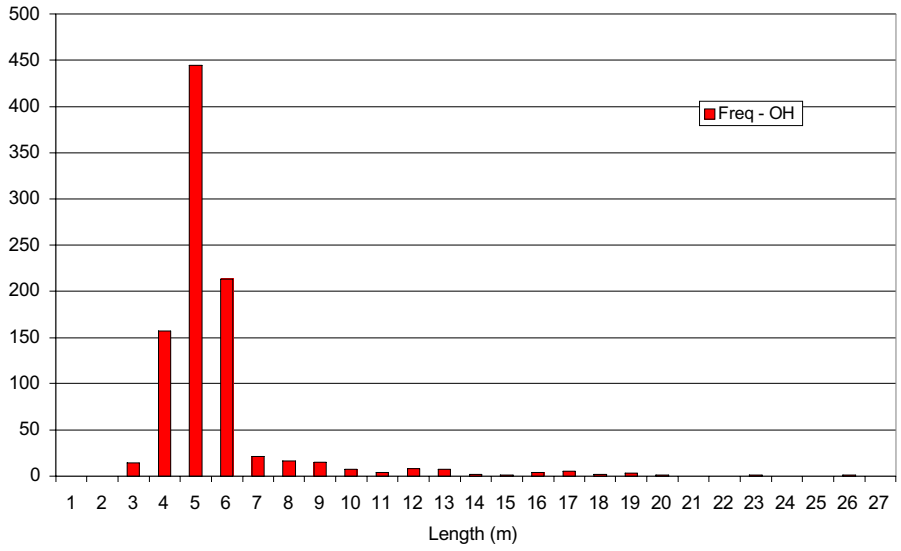
Method name	1997-98	1998-99	1999-2000	Average
Hauling net - general purpose	4,881,875	2,167,920	2,275,916	3,108,570
Purse seine	1,481,904	1,191,105	1,668,950	1,447,320
Pilchard, anchovy, bait net	586,741	566,659	451,566	534,989
Other	218,676	81,049	2,022	100,582
Bullringing	52,829	49,780	35,087	45,899
Grand Total	7,222,025	4,056,513	4,433,541	5,237,360

Vessel data from licence records

Vessels in the OH fishery are diverse as businesses and fishers can have several licenced vessels. These vary from open vessels, powered or unpowered, circa 5.8m (NMB, 2000), to large vessels with wheelhouse, decked vessels up to approximately 15m in length for "haul to" vessels in ocean waters endorsements. Also boat trailers, commercial fishing equipment as allowed and vehicles, such as open backed utilities and 4 wheel drive motor vehicles, are common (NMB, 2000).

The NSWF licence data confirms that OH fishers may have several small vessels being held by one fishing business. For the haul to beach operations, vessels are not as large a capital item as for the haul to vessel fishery. Figure G2 reports available details on the vessels held by OH endorsed fishers. OH fishing businesses have 926 boats from a state wide total of 2,950 and average a mean length of 5.6m and sd of 2.33m.

Figure G2: The distribution of vessel lengths in the OH fishery (NSWF- Licence records).



Method endorsements within the OH fishery are either:

- Haul to beach – general purpose (mullet, blackfish and bream, garfish, pilchard and anchovy and bait).
- Haul to boat – garfish bullringing and garfish hauling, pilchard, anchovy and bait hauling.

Capital investment in the OH fishery

Capital investment in the OH fishery ranges from $20,000 to $150,000 for an extensive fishing business (Newcastle Marine Brokers, 2000). The appraisal of a capital value is complicated by restrictions on transferability and the additional items included within business deals, such as boats, nets, sheds and equipment. There have been no published appraisals of licence values.

The average capital investment is approximately $40,000 (haul to beach) and $80,000 (haul to vessel), though these would differ with the diversity of businesses activities and assets (Newcastle Marine Brokers, 2000). The range of value of specific business operations would be large. More accurate information is needed on fishery licence values and investments. This need will increase, as share values need be monitored as an indicator of viability, when the new FMS is implemented.

b) location and condition of existing infrastructure – such as transport (water and road), berthing facilities, maintenance and repairs, cold stores if relevant, distribution and/or processing facilities; consider the regional or sub-regional implications

Information on port infrastructure comes from records held by Department of Land and Water Conservation (DLWC) and licensing records for fish receivers held by NSW Fisheries.

OH Ports in NSW with berthing facilities

The operators in the OH use a variety of sites and facilities for boat storage and operation. In the beach fishery few operations are in conjunction with established wharf and fishing cooperatives, whereas the purse seine fishing vessels use ports and vessel access points. A list of all public port assets for NSW was obtained from the Department of Land and Water Conservation. This was then compared with areas of operation of the OH fishers, Fishing Co-operatives and towns in coastal NSW. The locations of port infrastructure are reported in Table G5.

The major port facilities available to fishers in the OH and interview comments are attached to the right hand side of Table G5.

Distribution – licenced processing facilities/ cooperatives

In the period prior to deregulation of fish marketing, NSW had a system of fish marketing cooperatives, certificates of exemption and consents given to fishers to sell outside the regulated system. Deregulation of fish marketing has brought a new system in which Cooperatives have a less central place than before.

NSW Fisheries has a system of Registered Fish Receivers (RFR) and Restricted RFRs to enable monitoring of the seafood industry. The system has two categories of receiver:

(1) RFR, for large seafood receivers of which there are 92 state-wide, and

(2) the RRFR, generally smaller holders of consent forms to sell catch locally and which number 84 state-wide.

Table G5: The OH fishery and public port assets in NSW. Comments on OH use (Source: DLWC).

		Asset Type ID					
Town	**Port Assets**	**HBR**	**JET**	**WHV**	**ACC**	**OH y/n**	**Comment - OH**
Tweed Heads	Tweed Heads	1	2		1	Y	Trailer boats & vehicles
Brunswick Heads	Brunswick Heads	1	3	2	1	Y	Trailer boats & vehicles
Ballina	Ballina	1	1	2	1	Y	Trailer boats & vehicles
Evans Head	Evans Head	1	1	1	1	Y	Trailer boats & vehicles
Iluka	Iluka	1	2	2	1	Y	Trailer boats & vehicles
Yamba	Yamba	1	2	1	1	Y	Trailer boats & vehicles
Maclean	Maclean					Y	Trailer boats & vehicles
Wolli	Wooli	1		1	1	Y	Trailer boats & vehicles
Coffs Harbour	Coffs Harbour	1		5	1	Y	Trailer boats & vehicles
	South West Rocks	1	2	1	1	Y	Trailer boats & vehicles
Port Macquarie	Port Macquarie	1		2	1	Y	Trailer boats & vehicles
Laurieton	Camden Haven	1	1	2	1	Y	Trailer boats & vehicles
Crowdy Head	Crowdy Head	1	2	1	1	Y	Trailer boats & vehicles
Taree						Y	Trailer boats & vehicles
Tuncurry	Tuncurry	1	1	3		Y	Trailer boats & vehicles
Nelson Bay	Nelson Bay	1	1	5	1	Y	Trailer boats & vehicles some areas may
Tea Gardens	Tea Gardens	1		1		N	No ocean access (Fishers live there and tow their boats to the sea)
Wickham	Raymond Terrace	1	1		1	N	
Newcastle	Swansea	1	1			Y	Some access to ocean beaches is gained from
Tacoma						Y	Trailer boats & vehicles
Brooklyn	Brooklyn	1	1			Y	No vehicle access, some access to ocean
Pyrmont						Y	No vehicle access, some access to ocean beaches by tow boat and net boat
Mascot	Cooks River					Y	No vehicle access, some access to ocean beaches by tow boat and net boat
Wollongong	Wollongong	2	1	1	1	Y	No vehicle access, some access to ocean beaches by tow boat and net boat
	Bellambi	1	1			Y	No vehicle access, some access to ocean beaches by tow boat and net boat
Berkley	Berkeley	1	1	2	1	Y	Trailer boats & vehicles some access from Wollongong based operators
	Port Kembla	1	1			N	No one works out of there, and not currently fished
	Shellharbour	1		1	1	Y	Trailer boats & vehicles some access from Wollongong based operators
	Kiama	1	1	1	1	Y	Trailer boats & vehicles some access from Wollongong based operators
	Greenwell Point	1	2		1	Y	Trailer boats & vehicles
Nowra	Greenwell Point	1	1			Y	Trailer boats & vehicles
Huskisson						Y	Trailer boats & vehicles
Ulladulla	Ulladulla	1	1	2	1	N	Not applicable
	Batemans Bay	1	2	2	1	Y	Trailer boats & vehicles
	Narooma	1	1	3	2	Y	Trailer boats & vehicles
Bermagui South	Bermagui	1	3		1	Y	Trailer boats & vehicles
Eden	Eden	1	2	3	1	Y	Some access from port with tow boats, others
	Throsby Creek	1	2	2	1	N	

(nb: HBR- harbour; JET – jetty; WHF – wharf; Acc – Access ramp)

Table G6 was compiled from these regulatory forms and can give some indication as to the number of licensed processing facilities associated with OH and their location. Table G6 a&b reports an estimation of the RFR and RRFR holders handling species associated with the OH fishery – (there is limited data and it should be treated with caution).

Table G6a&b: The RFRs associated with the OH fishery in NSW (Source: NSWF Fish receiver records).

Areas		**No. RFR's**	**With Cold Store**	**No. Cold Vehicles**	**OH**	**OH - Cold Store**	**No. Cold Veh. - OH**
North	**Tweed-Manning**	38	34	39	10	10	10
Central	**Wallis-Sydney**	29	21	30	9	8	8
South	**Illawarra - Far South Coast**	25	22	33	7	7	7
Total		**92**	**77**	**102**	**26**	**25**	**25**

Table G6b: The RRFRs associated with the OH fishery in NSW (Source: NSWF Fish receiver records).

	No. RRFR's	OH	OH - Cold Store	No. Ice Boxes - OH
North	22	7	7	7
Central	26	5	5	5
South	35	11	11	11
Total	**83**	**23**	**23**	**23**

The estimates come from the data submitted to NSW Fisheries in registering fish receivers and the forms have limited information on the NSW seafood processing sector and are shown in aggregate to preserve confidentiality (see data requirements section 3).

Table G6 indicates the location of RFRs and RRFRs associated with the OH fishery. It is estimated that 26 of the 92 RFRs establishments in the state (28.2%) may work with OH species, but the proportion and volume of business is unknown. There are 10 of 26 RFRs (38.5%) associated with OH species in the northern area (Tweed to Manning), and less in the central and south of the state. Approximately 73% of processing firms (by number) are north of Sydney as per fisher numbers and the value of fishery revenue. Cold storage and retail sales follow this pattern also.

The RRFR data indicates that of 83 RRFRs state-wide, 23 (27%) may have involvement with OH species. All 23 have access to a cold store below 5 degrees C and have ice box arrangements in place to maintain quality (Table G6b). Due to historical reasons there are more RRFRs, formerly consent holders, in the southern area of the state with cold storage capacity.

Road transport and cold stores.

Road transport in the Ocean Hauling fishery is required to take the catch from the landing point to market via processors or cooperatives. From state-wide records there are 25 fish transport vehicles capable of holding fish below 5 degrees C, associated with establishments which handle OH species amongst other seafood. Only an unknown proportion of this capacity would be directly attributable to the OH fishery. Approximately 25 of 26 OH RFRs have a cold store colder than 5 degrees.

c) employment by regions and sub-regions for fishers including direct employment eg boat owners, skippers and crew and indirect employment (cold stores, traders, suppliers); identify the distribution of income including seasonality factors; identify proportion of fishers with employment in other sectors as well as fishing (where possible estimate % of income non-fisheries related for boat owners, skippers and crew) or could be considered to be semi-retired;

The NSW Fishing industry has direct employment in fishing operations and indirect employment through the cold stores, processors and traders. Current information is available for direct fisher employment only, with the social survey giving new employment estimates. Table G3 has presented the regional location of OH fishers along the NSW coastal zones.

Direct employment

Fishers are employed in their businesses and each business may have several fishers. Fishers can be either owner operators, nominated fishers, employees or crew, depending on the fishery. However the analysis is complicated by the ability of fishers to form several businesses, or be part of partnerships and companies. All this also takes place within the broader state wide activity patterns of fishers fishing in different fisheries where one person can be endorsed in up to six fisheries. The following facts from the database are provided at State-wide and for the OH fishery.

The fishing industry state-wide has the following figures obtained from NSWF data base sets in May 2001:

- In NSW there are 1,603 fishing businesses associated with 1,921 fisher file numbers;
- There are 1,590 Owner operators, 295 nominated fishers, 119 Skippers and 95 registered crew associated with the marine fisheries in NSW;
- A further breakdown of "entities" state wide reports 84 companies, 149 joint partnerships and 1,674 male and 14 female fishers;
- There were 1,407 active file numbers fishing in 1999-2000.

The following facts for Ocean Hauling were obtained from available data sets:

- In OH there are 374 businesses associated with 404 fisher file numbers;
- In May 2001 there were approximately 28 nominated fishers associated with the OH fishery;
- A further breakdown of "entities" reports 9 companies, 26 partnerships and 414 male and 5 female endorsed fishers.

The 404 includes approximately 50 active fishers, who apparently fished, but did not submit a return in 1999-2000, due to team working and reporting arrangements (pers. comm., D. Ferrell, NSWF).

The social survey investigated employment in the OH fishery. There were 222 respondents holding OH endorsements. Each was asked: How many people have you employed in the last 12 months? (Full time, F-T or Part time, P-T). The results are presented in Table G7.

Table G7: Estimation of number of employees in the OH fishery sample (Source: RM- SS)

No of employees	Frequency	Total employees	Full-Time	Part –Time
0	151	0	0	0
1	25	25	11	14
2	14	28	24	4
3	7	21	14	7
4	8	24	12	12
5	1	5	0	5
6	2	12	6	6
7	1	7	7	0
8	2	16	8	8
10	2	20	12	8
>10	8	158	77	81
Total	**221**	**316**	**171**	**145**

Of the 221 respondents, 151 had no employees and 70 had a total of 316 employees, of whom 171 were full-time and 145 part-time. Assuming the sample is representative, given there were 222 responses from 404 fishers, it is proposed to adjust the survey estimate2.

The fishers are also to be included in employment estimates and represent 404 fishers/ endorsement holders both full time and part time. Only 299 fishers (both part time and full time) chose to fish in the OH in 1999-2000.

[2] Adjustment is proposed in the ratio of 404/ 222 = 1.81 In Table G7 over 50% of employees, were in 8 responses with > 10 employees and relate to processing activities, double counting of haul team members, or processing in a range of fisheries, not just the OH fishery. It should be noted that the multiplying of this sample by 1.81 is almost certainly an over estimate of "OH employees".

There are between 6153 and 9754 persons employed full time and part time in fishing businesses which hold an OH endorsement. There is no indication as to the extent of part-time employment in this seasonal fishery. The estimates of employment need to be seen in the context of all fishing activity state-wide, rather than for each administered fishery and requires further investigation to exclude double counting.

All fishers were asked regarding the percentage of their income from fishing as compared to non fishing. Income from directorships and general investments was also identified as reported in Table G9.

Table G9: The percentage of income from fishing and non-fishing source in which OH fishers participated in the last 12 months (Source: RM- SS).

Freq. n=218	% OH Fishing	% Fisheries Representative Work	%General Investments	% Other industries
11	<10	24	46	17
0	20.0	-	-	-
3	30.0	-	23	47
1	40.0	10	-	50
6	50.0	-	13	37
1	60.0	-	-	40
2	70.0	-	-	30
7	80.0	5	3	14
11	90.0	8	2	4
176	100.0	-	-	-

Table G9 reports 176 of 218 fishers who responded to this question have 100% income from fishing (81%) and another 18 (10%) with over 80% income from fishing. Part time fishing involvement is limited, with 14 from 218 persons (6%) having less than 30% of income from fishing and up to 50% of income from another industries. Fishers working in other industries are described in the social issues section.

The social survey employment estimates also includes the employment of fisher's partners. In the survey sample, 70 of 183 fishers had their marital partners "in the business" of which 30 (43%) were full time and 40 (57%) were part time. Previous tables such as Table G3 and Table G6 indicate that that approximately 64% of fishers in the OH fishery are employed north of Sydney in the fishing and processing sectors.

Dependence measures

The revenue from the OH fishery as a share of total fishing catch revenue is reported in Table G2. The area dependence is reported in Table G3 for the different zones and districts in the OH. In Table G3 regions, in which OH revenue is greater than 35% of district revenue are: Tweed; Coffs Harbour; Hastings; Illawarra; Batemans Bay; and Far South Coast. The dependence of fishers on different methods in the OH is reported in Table G4. Tables G10a&b report the level of dependence of multiple endorsement holders on the OH fishery. OH dependence generally reduces with increasing numbers of fishery endorsements, reflecting the seasonal nature of the fishery.

Table G10a: The distribution of total returns for OH endorsed fishers and other fishery endorsements (1999-2000) (Source: NSWF-Sydney Index).

No. Active Fisheries	No. Fishers	%	OH Catch	%	Total Catch	%	% OH
Endorsed - no catch*	105	26%		-		0%	0%
Endorsed - Other catch	151	37%	-	-	6,867,712	37%	0%
1	21	14%	1,417,191	32%	1,417,191	12%	100%
2	63	43%	1,745,717	40%	4,877,097	42%	36%
3	46	31%	924,134	21%	3,462,032	30%	27%
4	15	10%	240,162	5%	1,515,162	13%	16%
5	3	2%	67,855	2%	337,585	3%	20%
Total	404	100%	4,395,059	100%	11,609,067	100%	38%

[3] (299 active OH fishers + between 316 [sample data] and 571 [expanded data] employees) i.e. 615 or 870.
[4] (404 endorsed OH fishers + between 316 [sample data] and 571 [expanded data] employees) i.e. 720 or 975.

Key: * includes 55 latent fishers and 50 fishers reporting on other catch returns (see section d below).

Table G10b: The distribution of total returns for OH endorsed fishers and other fishery endorsements (1999-2000) (Source: NSWF-Sydney Index).

Catch Comb.	No. Fishers	% of Total	OH Catch ($ '000)	% of Total	Total Catch ($ '000)	% of Total	% OH
OH Only	21	5%	1,417	32%	1,417	8%	100%
OH, EG	49	12%	1,093	25%	3,588	19%	30%
OH, OTL	11	3%	595	14%	1,032	6%	58%
OH, EG, OTL	26	6%	553	13%	1,676	9%	33%
OH, EG, OTL, RL	11	3%	216	5%	911	5%	24%
OH, OTL, RL	10	2%	207	5%	869	5%	24%
Others OH, OTL, Prawn	10	2%	183	4%	717	4%	26%
Others OH, OTL RL	16	4%	131	3%	1,399	8%	9%
Endorsed - no catch*	105	26%		-		0%	0%
End - Other catch	151	37%	-	-	6,868	37%	0%
Total	404	100%	4,395	100%	18,477	100%	24%

Key: * includes 55 latent fishers and 50 fishers reporting on other catch returns (see section d below).

Major catch inter-dependencies are with the Estuary General, Ocean Trap and Line and Rock Lobster fisheries. Comparison of percentages enable inferences to be made on the relative gross revenue in each fishery according to the Sydney price index.

Distribution of income among fishers – categories of annual income

The distribution of income is available through several measures. Firstly, revenues associated with each OH endorsed catch combination are reported in Table G11. The OH only fishers have below average, and much higher variability of, revenue in comparison to other fishing combinations, as seen in the average revenue results. The distribution of annual revenue varies by fishing category, as reported by the coefficient of variation. The variation in annual fisher's return is great. Gross returns by OH endorsed fishing businesses are plotted for the single and multiple fishing businesses in Figure G3.

Table G11: The distribution of average annual revenue for 148 active OH fishers fishing within the OH fishery in 1999-2000 (Source: NSWF-Sydney Index).

No. Active Fisheries	No. Fishers	Total $	Average Revenue ($) per annum	sd	Coef. of Var
1	21	1,417,191	67,485	102,759	1.52
2	63	4,877,097	77,414	57,532	0.74
3	46	3,462,032	75,262	57,918	0.77
4	15	1,515,162	101,011	78,309	0.78
5	3	337,585	112,528	68,997	0.61
	148	11,609,067	78,440	67,859	0.87

Key: Coefficient of variation = sd/mean

Figure G3: Frequency distribution of annual fishing revenue for 148 active OH fishers in 1999-2000, fishing OH Only, 2, 3 or 4 fisheries (Source: NSWF-Sydney Index).

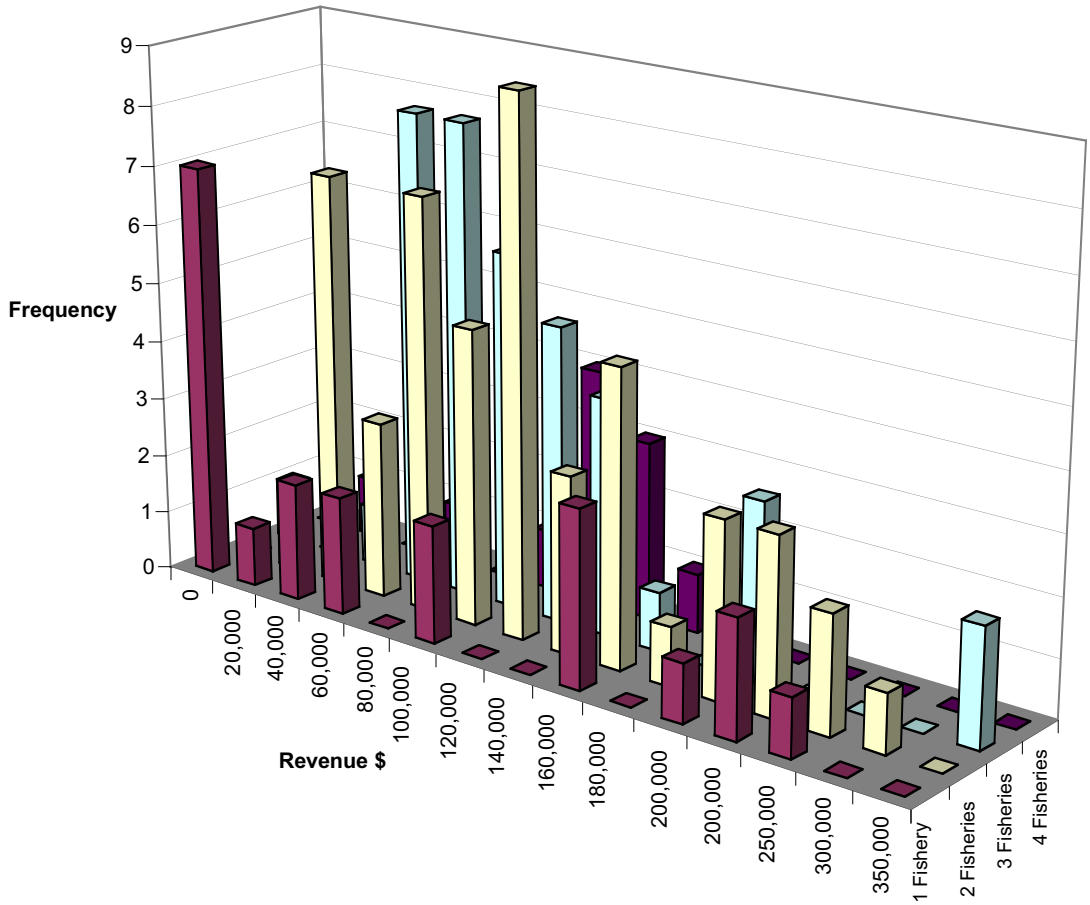
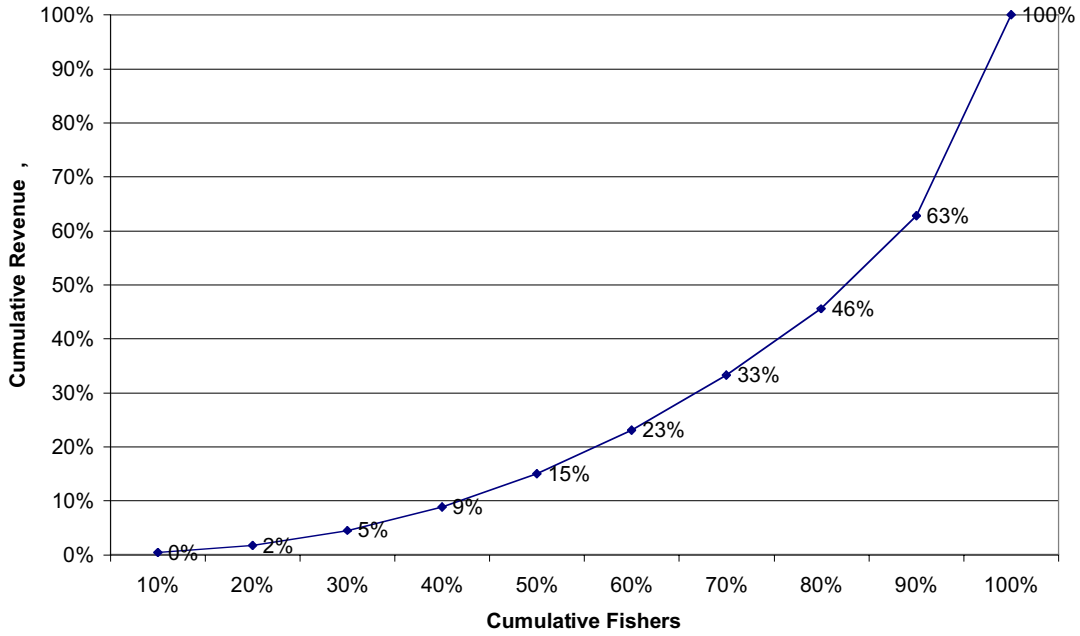


Figure G3 confirms the diversity in revenue among fishers, where a total of 7 OH only fishers have fishing revenue below $20,000 per annum, probably being part time fishers. Both Table G11 and Figure G3 indicate the variation in estimated fishing revenue.

Figure G4 displays this information to relate cumulative revenue and numbers of fishers in the OH fishery. In businesses with an OH endorsement it should be noted that:

- 50% of fishers take 85% of the fishery revenue;
- the top 10% take 37% of fishery revenue;
- the top 20% take 54% of fishery revenue;
- the top 30% take 67% of fishery revenue;
- the bottom 50% take 15% of revenue indicating part time fishers.

Figure G4: The cumulative revenue and cumulative number of endorsed fishers in the OH fishery 1998-99 (Source: NSWF-Sydney Index).



The regional dependence on OH fishing by district was reported in Table G3. Table G3 reports that endorsed OH fishers in districts such as Tweed, Clarence, Coffs Harbour in the north and Illawarra, Batemans Bay, Montague and Far South Coast are relatively most dependent on the OH fishery.

Other fisher income data is available from the social survey. Table G12 reports the frequency of gross income from all sources for 222 OH fishers who responded.

Table G12: The frequency of gross incomes (all industries) of OH fishers from the social survey (Source: RM-SS).

Gross individual income (all industries)							
Dollars per annum							
< 6,000	1	0%	60,000-69,999	8	4%		
6,000-9,999	3	1%	70,000-79,999	11	5%		
10,000-19,999	8	4%	80,000-89,999	7	3%		
20,000-29,999	22	10%	90,000-99,999	3	1%		
30,000-39,999	22	10%	100,000+	29	13%		
40,000-49,999	20	9%	Can't say	46	21%		
50,000-59,999	26	12%	refused	16	7%	n=	222

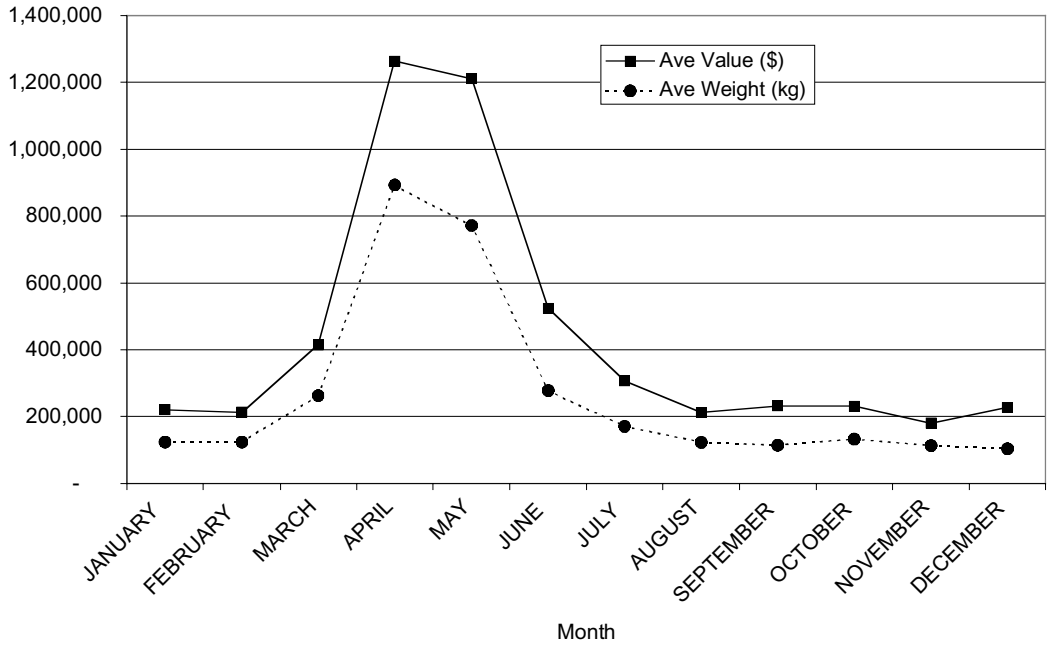
The distribution of income question revealed a mean household income of circa $40,000, but there 28% of fishers interviewed who did not to reply. A significant number of incomes of $100,000 or over were recorded (13%), but as it represents personal income from all industries, it may reflect financial diversification and business interests outside the OH fishery.

Seasonal employment

There was no previous data on seasonal employment prior to this study. The seasonal occurrence of the fish catch is reported below as it gives some background to seasonality in the fishery and the need for labour. Employment opportunities for fishers in other industries have been investigated through the social survey.

The monthly variation in OH catches is reported in Figure G5 and indicates increased catch in the March to July period, peaking in April. In comparison to the revenue available in January, there is a times 6 increase in fishery revenue by April with implications for seasonal employment in the OH beach fishery.

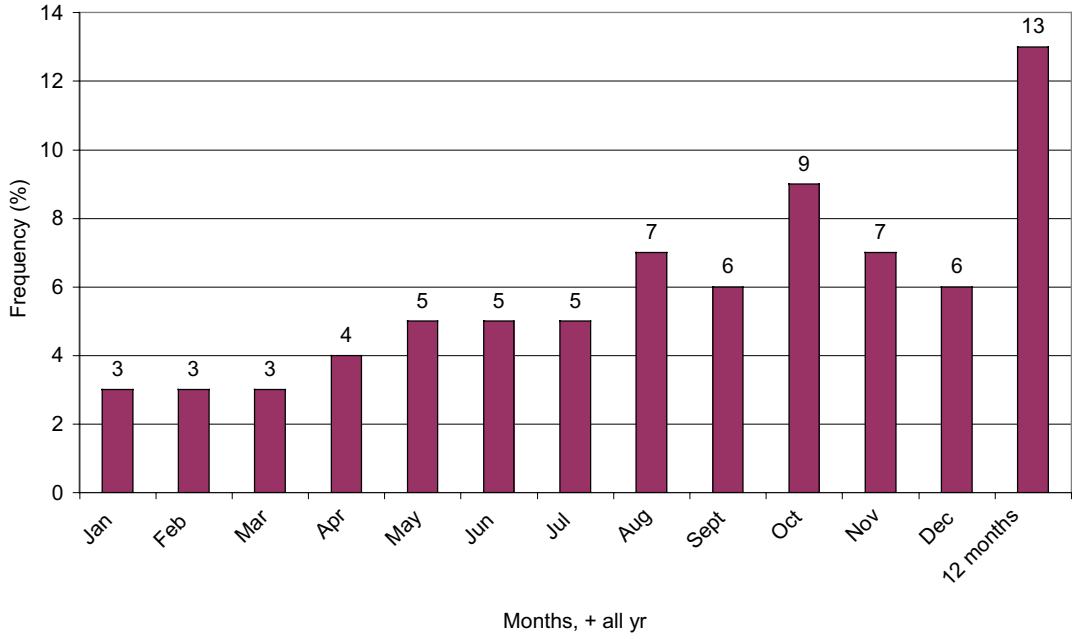
Figure G5: Monthly variation in OH fishery catch and revenue for years 1997-1998 to 1999-2000 averaged (Source: NSWF-Sydney Index).



The seasonality of part time work in other industries was investigated in the social survey by asking "in what months did you undertake paid employment outside the fishing industry"? Figure G6 reports monthly frequencies and annual frequencies for those who worked all year.

The comparison of the survey responses (Figure G6) and the NSW F catch and effort database catch data (Figure G5), indicates that fishers are working in other industries in the OH low season of July to December and all year round as well (see social section for further analysis of non-fishery employment).

Figure G6: Monthly frequency of employment outside fishing, (including all year round) in the OH fishery (Source: RM-SS).



d) examine current effort levels including latent effort and the link between effort and economic performance and the viability of the commercial operations

Fishing effort and latent effort in the OH fishery

Effort in a fishery can be appraised at different levels of aggregation. In the Ocean Hauling fishery many businesses produce effort in both the OH fishery and in other fisheries for which they hold endorsements. Endorsements can be inactive, or if active, used lightly or to a fuller extent, with the fishing activity being measured in days fished.

There were 374 businesses holding endorsements to fish in OH in 2001. For the 404 licence holders with OH endorsements, 299 had active fishing records in a range of commercial fisheries in 1999-2000 and 105 were not fishing, apparently being latent5.

Of the 299 active fisher records, 151 could have fished in OH, but chose to catch fish in other fisheries for which they were endorsed. This left 148 with a catch record in OH in 1999-2000. Of these 21 fished OH only and 127 fished OH in conjunction with other fisheries.

In discussions below, the term latent effort is used. It is defined as an endorsed fisher who has not submitted a catch return in a given period, as they have not fished. Active effort can be thought of as having three layers in relation to effort in the OH.

Firstly, some businesses may not be fishing any of their endorsements in OH or other fisheries. There are at least 55 endorsed fishers with no associated fishing activity in 1999-2000. These are considered latent and are unfished for a variety of reasons (for example, multiple endorsement holdings, ill health, old age, or in another industry or jurisdiction. The social section of this report provides further details). These business operators could activate their endorsements by fishing or transfers to other operators, hence raising active effort in the fishery. Holding the licence as a fishing right for its option value is also a permissible option and owners incur management costs and licence fees.

Secondly, OH endorsement holders that fished in other fisheries can be considered latent in looking at OH, but not to the degree of the previous case. They have chosen to fish other fisheries for a variety of reasons and to hold the OH endorsement for its option value. They may choose to fish it again next season. This behaviour may reflect both economic and social reasons and also perceived resource catch rates among alternative fisheries.

Thirdly, there are fishers in the OH fishery who could increase their effort by increasing the days fished to a higher level. The management issues with latent effort are discussed in Appendix G1a.

Fishing effort in the OH fishery

Fishing effort records are available through the NSWF logbook system. Those records before 1997 are less precise than recent logbook records. Effort levels can be measured in endorsement numbers, or in days fished. Effort measures may also be duplicative as fishing by three methods in one day represents three fishing days, though this is being addressed under the FMS. (It is currently possible for a fisher to have more than 365 days of effort in a calendar year). Current OH endorsement numbers by region, an aggregate effort measure, are reported in Table G13.

[5] The current data system enabled approximately 50 fishers to report on another's catch returns. 349 fishers (299 with catch records plus 50, included in other fisher's returns) were potentially active in the period and the number of latent fishers would be 55 (as opposed to 105).

Table G13: Current number of commercial fishers endorsed in each sector of the Ocean Hauling fishery (Source: NSWF- licensing records).

	Endorsement type	Number of businesses with endorsements							
	Region	1	2	3	4	5	6	7	Total
Class A (Skipper)	Hauling net (General purpose)	10	16	28	60	14	24	16	168
	Garfish net (hauling)	1	2	7	26	12	27	7	82
	Garfish net (bullringing)	0	1	0	7	2	7	4	21
	Pilchard, anchovy & bait net	9	4	10	8	11	4	0	46
	Total	10	16	28	63	14	33	13	184*
Class B (crew)		17	22	28	70	14	28	22	203*
Class C (purse seine)		N/A	N/A	N/A	N/A	N/A	N/A	N/A	26*

*Includes those who have class A and class C and those with a class B (part of a floating skipper arrangement) and a class C endorsement)

e) markets for fish harvested under the plan, eg. as domestic/export market for human food, pet/aquaculture food or other uses

Available marketing information comes from Sydney Fish markets and some processor data from the north of the state. The Sydney prices give base line minimum values for most fish in the OH fishery. There are a number of concerns in using the Sydney fish market data to determine species values. For mullet prices, Sydney does not incorporate the prices obtained in the north of the state for female mullet (in roe) and for exported product (pers. comm., OH MAC). This is a significant data shortfall (see section 3). In contrast, the price for male mullet in Sydney, may exceed that in the north of the state and prices of some of the purse seined species in Sydney, may exceed those received in for larger volumes of some species produced in the south of the state.

Much of the mullet produced in the OH fishery is exported from NSW to Queensland. The economic survey revealed OH fishers (those who obtain more than 20% of business revenue from the OH fishery) exported 12.6% of their product by value, to outside Australia (see Table G14a). This equated to approximately $11,000 per fisher interviewed totaling $650,000 among 59 fishers (Roy Morgan, 2001b).

Table G14a: Export from the OH fishery outside Australia, extracted from the economic survey of operators (Source: RM-ES).

	>20% OH	<20% OH	Total
Av % export	12.5	12.6	12.6
sd	17.8	23.0	20.8
Total $ export	$286,854	$370,780	$657,634
Export/fisher	$11,474	$10,905	$11,146
n =	25	34	59

Marketing costs as a percentage of gross revenue, were approximately 10.5% across all OH businesses (Roy Morgan, 2001b). Fishers with >20% in the OH, 11.6% and other fishers, 9.7%.

OH only fishers tend to supply the co-operatives (26%) and shops (11%) as reported in Table G15 (Roy Morgan, 2001b). Table G15 is from the economic survey of 114 OH fishers asked to state their main

marketing options by type of fish receiver and does not reflect product volume or value. Use of agents varies between dedicated OH fishers and others, with dedicated fishers using more agents in Queensland and more bait receivers. Sydney fish markets is used more by OH fishers that obtain less than 20% of business revenue in the OH fishery.

Table G14b: Frequency of marketing alternatives for OH fishers (Source: RM-ES). (Note: by number of fishers in survey, not volume of product).

	>20% OH	%	<20% OH	%	Total	%
Coops	14	27%	16	25%	30	26%
Sydney fish market	6	12%	17	27%	23	20%
Shops	6	12%	7	11%	13	11%
Restaurants	3	6%	2	3%	5	4%
Bait	5	10%	1	2%	6	5%
Agents NSW	9	18%	14	22%	23	20%
Agents Qld	6	12%	3	5%	9	8%
Agents Vic	2	4%	3	5%	5	4%
Total	51	100%	63	100%	114	100%

Some recent information on trends in national seafood marketing is presented in FRDC (2001), but has little Ocean Hauling fishery content. Ruello and Associates (2000) review general retail and consumption of seafood in Sydney and emerging trends since a similar study of retail outlets in 1991.

Price history

The price of species in the OH fishery depends on the method of capture, the handling of the species and the market examined. The Sydney index information is an underestimate of prices received in the north of the state. The Sydney price across all species of the OH product in nominal terms has increased from $1.25/kg towards $1.75/kg in the 1984-2000 period as reported in Figure G7 (Source: NSWF- Sydney Index) (derived from Figure G1). This nominal price rise was less than inflation for the period.

Figure G7a: Average price ($/kg, nominal) of OH fish across all species in the 1984-2000 period (Source: NSWF-Sydney Index).

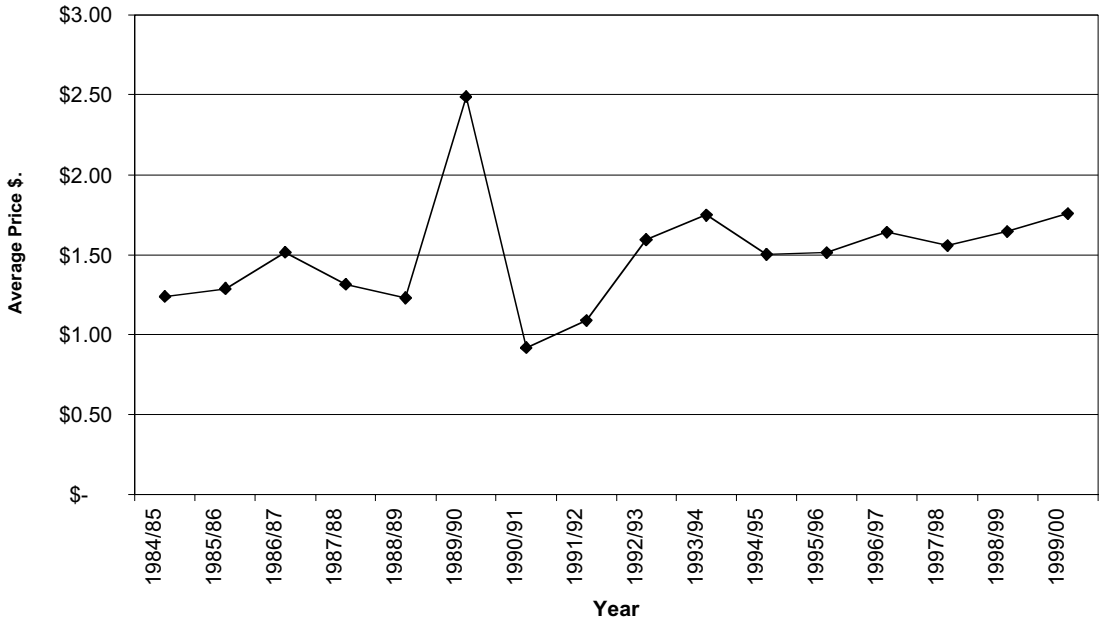
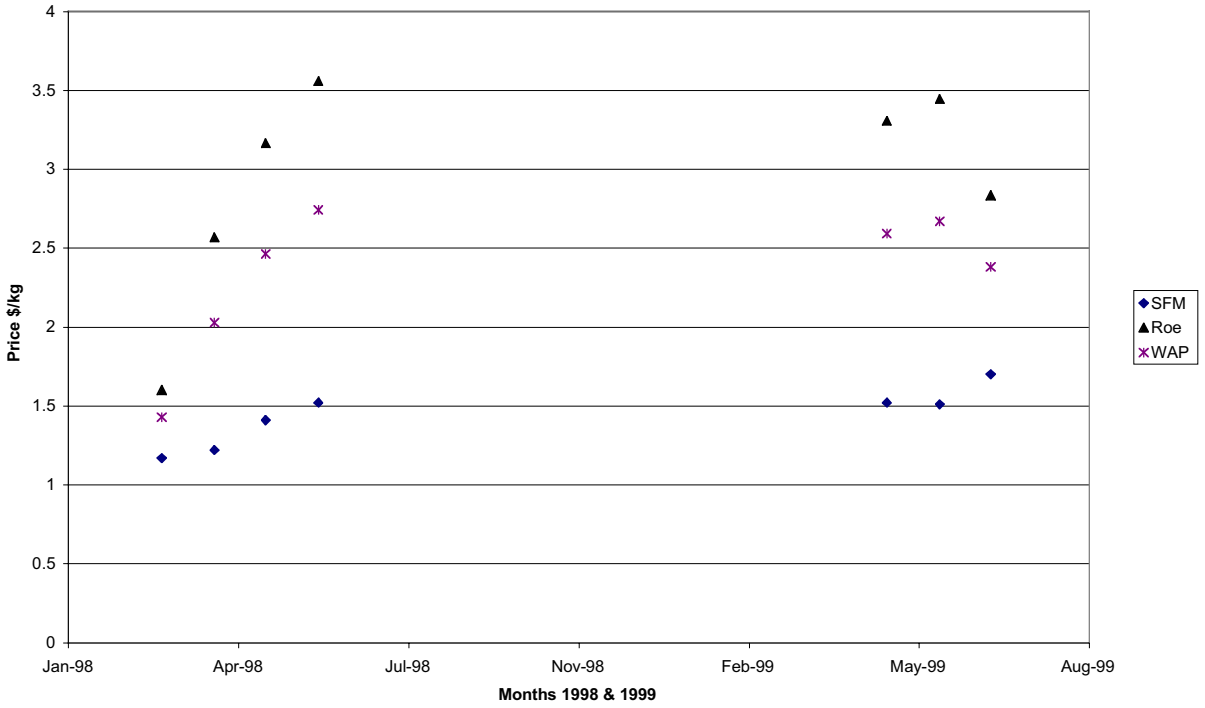


Figure G7b: Average price ($/kg) of Mullet in OH 1998 and 1999 seasons for females (roe), Sydney FM and a weighted average price, WAP (Source: Processors in Northern NSW).



The data reported in Figure G7b come from processor records in the north of NSW and indicate that prices for female mullet in 1998 and 1999 seasons, are higher than for the Sydney Fish Market. A weighted average price based on males receiving Sydney price and females the higher processor price, would reinforce the view that the average price reported in Figure G7a is an underestimate. Similarly the economic survey verification of the Sydney index, found the fish price was an average of 50% less than the price inferred from the economic survey results. This requires further research and monitoring of fish prices.

f) the economic return from the fishery including its contribution to individual, regional, state and national income; estimate the value of the share/licence held by individual fishers within the fishery

There is no previous information on economic performance of fishers in the OH fishery. The only previous economic survey work covering some OH fishers was by IPART (1998). The IPART study did a brief review of a cross section of fishing businesses in NSW, in order to establish their capacity to pay management charges.

Fishing operator survey

A fishing industry economic survey was developed and distributed to industry by Roy Morgan research (Roy Morgan, 2001b) in order to appraise fishing industry profitability and economic viability.

Fishing businesses and owner operators act as firms fishing among the portfolio of fishery choices available to them. An economic survey can measure the performance of the firm across all its fishing activities and give a profile of firms in the fishing industry. When we come to assess the economic performance of firms in a given fishery, we need to examine the scope of production of the firms – ie. which combinations of fisheries does it access? We can use pro rata methods to attribute an economic performance of firms in each

fishery. This could potentially give a rate of return for the firms in a particular fishery, but the estimate would be somewhat arbitrary, depending on the allocation of capital costs between fisheries.

Most OH endorsement holders are also holders of the Estuary General endorsement, or Trap and Line endorsement holders. The OH fishery is seasonal, particularly the beach component or "travelling season" for mullet. In examining the economic performance of the OH fishery, there are many businesses also fishing in the Estuary General (EG) fishery. The attraction of the OH fishery relative to fishing the EG was estimated through the economic survey.

Fishers were asked to apportion effort in each endorsed fishery expressing it as a percentage of total annual effort. Similarly revenue was expressed as a percentage of total revenue in each fishery. The ratio of percentages (ie.R (OH) = % revenue in OH / % effort in OH) is an index of the revenue of effort from that fishery. Then we can compare R(OH)/R(EG) as a new relative ratio.

The relative ratios for 34 fishers fishing EG and 2 or 3 other fisheries, was 1.17, meaning that relative to EG the revenue from a day's effort in OH was 17% higher. For 6 fishers who fished in 4 other fisheries, their OH effort yielded an index of 1.55, 55% higher revenue per unit of effort than in the EG component of the fishery.

In summary, this confirms that many fishers switch between the OH and EG fisheries. The OH fishery provides an economic opportunity for some fishers to spend up to 25% of their annual total effort in all fisheries in the OH and to receive 17%, or greater, revenue per day from effort, than in the alternative EG fishing opportunities.

Economic return

A fishing industry economic survey was developed and distributed to industry (Roy Morgan, 2001b). The survey methods and results are reported in Appendix G2.

The economic survey indicates that 25% of OH business respondents are earning an economic surplus under the levels of opportunity costs and economic depreciation assumed for long term viability. These operators are contributing to the local, state and national economy in terms of economic profit contributing to Gross Domestic Product (GDP). Approximately 75% of operators are under the long term viability measure, not contributing profit to to GDP, but will contribute to economic activity through their purchases of inputs and factors of production (eg. labour and capital) and thus to Gross Domestic Product through the profits and labour payments of firms from whom they purchase inputs. Workers employed by unprofitable fishing firms also contribute to economic activity through their consumer purchases.

The mean net economic return across businesses with OH fishing endorsements was -2% to capital and the median net return was -12%, indicating 50% of operators falling below this when examined on a single operational year. Businesses which obtained more than 20% of revenue from OH, had a net return of 3%, indicating an economic surplus over the opportunity cost of capital. Other businesses with less than 20% of revenue from OH, had a net economic return of –3%. The results indicate significant long run economic viability issues for the bottom half of operators, particularly for those fishers less involved with OH fishing.

Economic net returns within the social and socio-economic context of rural NSW requires further study, incorporating the contribution to household income from work in other sectors and family income, including welfare and social security payments. This should be part of future research work.

Gross costs and benefits and fishery management

The fishery has not been subject to a gross cost-benefit analysis. Environmental accounting under the principles of Ecologically Sustainable Development (ESD), requires that all inputs are priced at their true cost. In the fisheries case, this would include the operational costs, costs of management and ancillary services and the costs incurred in any depletion of the fish stock (ABARE, 2000; p16).

A cost-benefit schedule of the OH fishery

The economics of fisheries management enables an appraisal to be made of the economic contribution of the fishery to the economy and to analyse the impact of the changes advocated in the FMS. ESD principles dictate that resources should be valued at their market values and that subsidies should be taken into account in the form of an environmental accounting statement. The NSWF costs of management, research and compliance, (less any of these cost recovered from industry), should be added to the costs of fishing operations to give a full economic cost. The rise or fall in the value of the fish stocks should also be included in an environmental account as illustrated in Box G1 below:

Box G1: An economic environmental account of the Ocean Hauling fishery.

Gross revenue from catch* per annum	$6.65m
Less economic cost of operations**	$6.88m
Operational Economic surplus	$ -0.23m
less cost subsidies***	$ 0.71m
Total economic contribution	$ -0.94m
Plus rise or fall in fish stocks****	$ 0m
Total of environmental account	$ -0.94m

* This is the value of catch from all OH businesses in the OH fishery only, adjusted by the economic survey results in Table G3 (ie. $4.4m + 50% = $6.65m) to take account of higher prices across the state.

** This is the estimated economic cost of fishing inferred from the OH economic survey results for all OH fishing businesses (i.e. Appendix Table GA4 reports the average business as having $123,642 of economic costs for $127,856 of revenue ie. economic costs are 1.03 times revenue). The total economic costs, include opportunity costs, costs of licences and some costs of management.

*** To the operational surplus (TR-TC) costs of management not attributed to fishers under current cost policy are added (ie. management, research, compliance, etc). IPART estimates of this are $0.98 m, less fishers payments already in economic costs, $0.27m = $0.71 m. This does not include Commonwealth fuel or other primary producer subsidies.

**** The change in value of the stocks are unknown and are assumed to be zero, but may not be.

The cost-benefit schedule illustrates how the operational performance of the fishery, management charges and stock health can be related. The intention of the FMS is to promote long term economic viability, though the fishery needs to be in a position to be able to fully fund the attributable costs of management by 2008-09.

Licences

If licences are tradeable, then licence values can provide some information about the health of the industry. However, licence prices can reflect short-run effects which are not necessarily associated with a healthy fishery, reflecting over-capacity or over-fishing (ABARE, 2000). Nonetheless, interpreted correctly, licence prices can be a useful indicator of the performance of the industry in generating net value or rent.

In a fishery which has been under management and restructuring, there is an expectation of an increase in endorsement values through time. Available observations of endorsement/ business value data from Newcastle Marine Brokers suggests there has been no significant increase in OH business values in the last eight years. This may reflect profitability, management rules which limit endorsement transfer and reflect the attitude of the market and confidence in management.

However, since 1987 when the licence freeze came into being, licences went from the old $2 administrative charge to the $20,000-$150,000 business values of the mid 1990s and current period. The average capital investment is approximately $40,000 (haul to beach) and $80,000 (haul to vessel), though these would differ with the diversity of businesses activities and assets (Newcastle Marine Brokers, 2000). Detailed inference as to price structure of licence trades, is not possible due to a lack of available licence purchase information.

Other evidence of perceived economic surplus may include the entry of new fishers, which has happened in recent years (see fishers and licence duration in social section). This may be as much a social phenomenon, due to children and relatives of fishers entering the fishery, rather than an indicator of fishing prosperity.

g) Existing economic multiplier effects – costs and benefits

Review information on multipliers in the fishing industry of NSW.

Economic multipliers come from input-output modelling of economies and relate to the flow-on impacts of expenditure within a closed local economy and the revolving benefits of this. Similarly employment multipliers estimate the impacts on employment of expenditures in the locality. There are several historical fishing community studies appraising the multipliers and flow-on impacts in the NSW fishing industry. These studies can be used as a guide to likely economic impacts of policies and with some careful interpretation are likely to be preferred to interpolations from non-fishing industry material. In particular note should be taken of changes in the structure and operations of the industry since the studies were undertaken (Dr R. Powell, pers. comm.).

The available literature enables discussion of multipliers in four fishing communities in NSW, Eden and Ulladulla (Powell et al., 1989), the Northern NSW region (Tamblyn and Powell, 1988) and the Clarence region (McVerry, 1996). Table G15 presents multiplier estimates from the economic studies of fisheries in coastal regions of NSW.

The economic significance of an industry, such as commercial fishing, can be measured in terms of direct and indirect effects. The direct effects are a measure of the value of output of the industry itself, the number of people employed and the income they receive. The indirect effects can be divided into production induced and consumption induced effects. Production induced effects are the industry's purchase of goods and services from other industries. Consumption induced effects arise from the spending of household income received as payment for labour. The multipliers indicate the size of those impacts relative to the level of sales to final demand. The Type II ratios reflect the relationship between the total impact (direct and indirect) to the direct effect. In Table G15 a Type II value of 1.91 infers that for every dollar of direct output, there is a total impact of $1.91 due to both direct ($1) and indirect ($0.91) effects. The consumption and production induced components of the $0.91, are $0.72 and $0.19 respectively (Top line, Table G15).

A significant issue is whether the multipliers and/or estimated flow-on impacts include the downstream effects of transport, marketing and packing? The calculation of multipliers from fishing, will only include the linkages effects that occur back through the supply of inputs to fishermen and not any effects downstream toward the consumer.

Table G15: Output, income and employment multiplier estimates from fishing community studies in NSW (Tamblyn and Powell, 1988; McVerry,1996; and Powell et al., 1989).

OUTPUT (a)	Initial	First	Industry	Production induced	Consumption induced	Total	Type II ratio
Northern NSW (1)							
Fishing	1	0.1521	0.0412	0.1933	0.7166	1.91	1.91
Clarence (2)							
Fishing	1	0.063	0.028	0.091	0.787	1.877	1.877
Ulladulla (3)							
Trawl	1	0.1705	0.0663	0.2368	0.3269	1.5637	1.5637
Non trawl	1	0.1645	0.0588	0.2233	0.3409	1.5642	1.5642
Eden (3)							
Trawl	1	0.1702	0.0478	0.218	0.2206	1.4387	1.4387
Non trawl	1	0.1813	0.039	0.2203	0.1977	1.4179	1.417
Process+	1	0.3363	0.0893	0.4256	0.1051	1.5307	1.5307
INCOME (b)	**Initial**	**First**	**Industry**	**Production induced**	**Consumption induced**	**Total**	**Type II ratio**
Northern NSW (1)							
Fishing	0.4999	0.0409	0.0147	0.0556	0.2691	0.8329	1.662
Clarence (2)							
Fishing	0.59	0.017	0.009	0.026	0.308	0.924	1.566
Ulladulla (3)							
Trawl	0.2999	0.0472	0.0218	0.069	0.1266	0.4955	1.6524
Non trawl	0.3156	0.0497	0.0195	0.0692	0.1321	0.5168	1.6378
Eden (3)							
Trawl	0.2999	0.037	0.0128	0.0498	0.0802	0.4299	1.4337
Non trawl	0.2489	0.0535	0.0109	0.0644	0.0719	0.3852	1.5475
Process+	0.0621	0.0824	0.022	0.1044	0.0382	0.2047	3.2982
EMPLOYMENT (b)	**Initial**	**First**	**Industry**	**Production induced**	**Consumption induced**	**Total**	**Type II ratio**
Northern NSW (1)							
Fishing	0.0376	0.0031	0.0009	0.0416	0.0181	0.0596	1.5868
Clarence (2)							
Fishing	0.029	0.001	0	0.03	0.014	0.044	1.499
Ulladulla (3)							
Trawl	0.0184	0.0026	0.001	0.0036	0.0062	0.0282	1.5363
Non trawl	0.0268	0.0023	0.0009	0.03	0.0065	0.0365	1.3592
Eden (3)							
Trawl	0.0184	0.0018	0.0005	0.0207	0.0033	0.0239	1.3009
Non trawl	0.0147	0.002	0.0004	0.0024	0.0029	0.02	1.3669
Process+	0.0034	0.0045	0.001	0.0055	0.0016	0.0106	3.06
(a) per dollar of output				Sources:	(1) Tamblyn & Powell, 1988		
(b) employment per thousand dollars of output					(2) McVerry, 1996.		
					(3) Powell et al. 1989		

Output flow-on effects

From the initial output of one dollar there are total flow-on output effects ranging between 41.7 cents (non trawl Eden) and 91.0 cents (Northern NSW). Those levels of flow-on effect are relatively modest. They refer to the level of the flow-on effects within the small local area. In most cases, this reflects the limited

capacity of the local economy to supply inputs to the fishing activities as well as the relatively low level of purchased inputs used. Comments from each study are reported in Appendix G3 and discussed below.

Discussion

From a state-wide perspective the comparison of Eden and Ulladulla in 1978-88 with the Northern NSW 1984-85 and the Clarence in 1992-93 shows a contrast in the nature of the fisheries, time periods, regions and what is included in the analysis ie. fishing only, or processing, handling, transport and less usually wholesale and retail.

The Eden and Ulladulla trawl fishing flow-ons reflect the structure of the trawl industry and the influence of the orange roughy catch at that time. The non-trawl data from the same period is reported and is not significantly different from the trawl data in Eden and Ulladulla when output and income multipliers are compared.

In the Northern NSW study based on 1984-85 data and covering the Tweed Heads to Tuncurry area, the activity in a range of fisheries, especially the prawn industry sector, is captured. The Clarence region study in 1992-93 focuses on the fishing activity and processing in the Clarence at that time.

Given our interest is in the flow-on effects associated with the Ocean Hauling fishery in the current year 2001 period, the use of historical information is limited.

It is unlikely that either the Clarence or the Eden and Ulladulla results will be a representative source of "typical" multiplier values for impact appraisal in the OH fishery. The Northern NSW regional study covers the region in which the OH fishery is a major contributor, though the study may reflect the prawn industry influence. The two potential differences to take note of are the type of fishery included and what of the downstream activities are included – processing etc. (Dr R. Powell, pers. comm.).

Conclusion

The Northern NSW study indicates fishing as 82% of the total flow-on effect, which reflects many single person businesses in estuary fishing and a limited amount of processing. Both the southern and northern study indicate the ratio of all effects, to direct fishing effects, is between 1.5 and 2.0, with one result of 2.4 (Tamblyn and Powell, 1988; Powell et al., 1988). Local multiplier effects are likely to be relatively small at around 1.5 for most fishing activities. Even in that case, the larger part of the flow-ons will be consumption-induced effects. That reflects a relatively low level of use of purchased operating inputs apart from labour, while many of the specialist inputs used are not likely to be produced locally. The multiplier will be higher where there is a significant amount of on-shore activities associated with handling, marketing and transporting the catch. The more value adding undertaken within the local area, the higher the multiplier. That could result in multipliers near to 2.0 (Dr. R. Powell, pers. comm.).

The Regional expenditure of fishers

Fisher expenditures can be divided into expenditure on employment, inputs for the fishing process and capital items for fishing. The previous section examined results of detailed regional expenditure studies, which give multipliers showing employment and production induced expenditure effects. Capital and input expenditures are investigated below. Little information exists on regional expenditure interactions. For the Clarence region, McVerry (1996) estimated that 27% of fishing business expenditures move outside the region, leaving approximately 70% of the first sale value of catch in the local fishing community.

The regional nature of expenditures can also be seen by examining the larger scale purchases of the OH endorsed businesses. In the social survey 222 fishers were asked about the amount and location of their

major purchase over $1,000. Ninety-eight fishers had no major expenditures, but other expenditure locations are reported in Table G16a.

Table G16a: Towns outside local area in which OH fishers made a major expenditure over $1,000 in last 12 months (Source: RM-SS).

OH	TOTAL	%	<$50k	$50-99.9k	$100k+	Can't Say	No exp. >$1k
	222		**95**	**3**	**7**	**3**	**98**
Sydney	24	11%	23	1	0	0	0
Newcastle	15	7%	14	0	1	0	0
Other	12	5%	9	0	2	1	0
Brisbane	11	5%	9	1	0	1	0
Coffs Harbour	6	3%	6	0	0	0	0
Nowra	4	2%	4	0	0	0	0
Batemans Bay	3	1%	3	0	0	0	0
Yamba	3	1%	3	0	0	0	0
WA/ SA/ Tas	3	1%	1	0	2	0	0
Other (Queensland)	3	1%	3	0	0	0	0
Ballina	2	1%	2	0	0	0	0
Bermagui	2	1%	0	0	2	0	0
Eden	2	1%	1	0	1	0	0
Taree	2	1%	2	0	0	0	0
Ulladulla	2	1%	2	0	0	0	0
Kempsey	2	1%	1	1	0	0	0
Port Stephens/ Tea Gardens	2	1%	2	0	0	0	0
Other NSW (South Of Sydney)	2	1%	2	0	0	0	0
Can't Say	2	1%	1	0	0	1	0
Grafton	1	0%	1	0	0	0	0
Iluka	1	0%	1	0	0	0	0
Lismore	1	0%	1	0	0	0	0
Maclean	1	0%	1	0	0	0	0
Melbourne	1	0%	0	0	1	0	0
Narooma	1	0%	1	0	0	0	0
Southport	1	0%	1	0	0	0	0
Tweedheads	1	0%	1	0	0	0	0
Wollongong	1	0%	1	0	0	0	0
Wyong	1	0%	1	0	0	0	0
Forster/ Tuncurry	1	0%	1	0	0	0	0

Table G16b: Purchase of items outside local area in which OH fishers made an expenditure over $1,000 in last 12 months (Source: RM-SS).

Items	Expenditure ($)	%	Items	Expenditure ($)	%
Nets	2,397,550	56.3%	Propellors	55,200	1.3%
Inboard Engines	558,900	13.1%	Wire	54,500	1.3%
Other	324,050	7.6%	Boat/new Boat	30,000	0.7%
Bait/ Ice	174,000	4.1%	Can't say	17,900	0.4%
Outboard engines	161,600	3.8%	Radar	15,200	0.4%
No. of other items	123,850	2.9%	GPS	13,500	0.3%
Car/Ute	112,300	2.6%	Punts/ Dories	12,600	0.3%
Fuel/Oil	72,925	1.7%	Trailers	5,250	0.1%
Fishing gear	63,000	1.5%	Freezers	4,500	0.1%
Ropes/Lines	59,300	1.4%	Plotters	3,500	0.1%
			Grand Total	4,259,625	100.0%

Table G16b reports approximately $4.26m of items expended outside the OH fisher's local area by the 222 fishers interviewed. Nets and inboard engines are the major expenditure constituting 70% of OH expenditure outside of the local area. McVerry (1996) observed that 27% of fishing business expenditures in

the Clarence were outside the region. Approximately 70% of the first sale value of catch may reside in the fishing communities of NSW if the Clarence area is representative.

Table 16c reports the pattern of expenditure on major purchases for 99 of 182 fishers. Generally fishers living in towns of residence in the north and south of the state, purchase some major items in their respective areas, with Sydney having trade with a range of areas. There is a major purchase link between fishers residing in the Clarence region using Brisbane for major OH business purchases.

Table G16c: Table of town of residence versus town of major purchase location, in which OH fishers made an expenditure of over $1,000 in last 12 months (Source: RM-SS).

	Town with major purchase over $1,000												
Town of residence	**Brisbane**	**Lismore**	**Yamba**	**Grafton**	**Coffs Harbour**	**Forster/ Tuncurry**	**Newcastle**	**Sydney**	**Batemans Bay**	**Nowra**	**Eden**	**Melbourne**	**Total**
Clarence River	10	2	-	2	5	-	-	2	-	-	-	-	21
Iluka	2	-	-	1	-	-	-	1	-	-	-	-	4
Nambucca	-	-	1	-	5	-	-	1	-	-	-	-	7
South West Rocks	2	-	-	-	-	-	-	-	-	-	-	-	2
Port Macquarie	-	-	-	-	-	-	-	1	-	-	-	-	1
Manning River	-	-	-	-	-	-	-	-	-	-	-	-	-
Crowdy Head	2	-	-	1	-	-	1	2	-	-	-	-	6
Wallis Lake	1	-	-	-	-	-	1	1	-	-	-	1	4
Port Stephens	3	-	-	-	-	1	8	4	-	-	-	1	17
Lake Macquarie	-	-	-	-	-	-	1	-	-	-	-	-	1
Tuggerah Lakes	-	-	-	-	-	-	-	1	-	-	-	-	1
Hawkesbury River	-	-	1	-	-	-	1	2	-	-	-	-	4
St Georges Basin	-	-	-	-	-	-	-	-	1	1	-	-	2
Lake Illawarra	1	-	-	-	-	-	-	3	-	1	-	-	5
Jervis Bay	-	-	-	-	-	1	-	3	-	1	-	-	5
Ulladulla	-	-	-	-	-	-	-	1	-	2	-	-	3
Bermagui	-	-	-	-	1	-	1	4	-	-	2	1	9
Eden	1	-	-	-	1	1	-	2	-	1	1	-	7
	22	2	2	4	12	3	13	28	1	6	3	3	99

(2) LIKELY ECONOMIC IMPLICATIONS OF IMPLEMENTING THE PLAN

Under the DUAP Director's Guidelines the likely economic implications of implementing the Fisheries Management Strategy must be evaluated against six criteria (a)-(f). Economic impacts of the FMS are presented in section G and social impacts in section H.

The available descriptive economic information has been described in the previous section. There is insufficient economic data available to appraise many of the issues proposed in the fisheries management strategy (FMS). This limit should be recognised by the reader and where insufficient data is available this will be indicated.

Economic assessment

The economic issues section will follow the DUAP Director's guidelines and notes that the economic impact assessment process in NSW has also been addressed in several other documents (NSW Government, 1997c and DUAP, 1997). The purpose of economic appraisal in an environmental context is "to achieve a socially efficient allocation of scarce resources ie. one which maximises the return, including the environmental capital stock, in order to maximise economic welfare of all citizens over time" (NSW Government 1997c; annex 5). This requires that benefits and costs are measured through market values. Total social costs and benefits also include running down, or building up of the environment (NSW Government 1997c; annex 5). This would include the fish stock in the current analysis.

The major economic assessment technique is cost-benefit analysis (CBA), which quantifies in money terms all major costs and benefits, providing a consistent basis for evaluating costs and benefit, though it does not necessarily show the distribution of benefits or costs (NSW Government 1997c). CBA requires transparent information.

There are different types of impacts to be considered in an Environmental Economic Assessment process. According to Thomas (1998) these are:

- Direct impacts of proposal;

- Indirect impacts, being one step removed;

- Cumulative impacts coming from the interaction of proposal elements;

- Predicted residual impacts, impacts not avoided or mitigated;

- Predicted probability, magnitude, distribution and timing of expected impacts;

- Forecasting of what will happen to affected components of the environment if the proposal goes ahead.

The various types of impact will be considered in the analysis of economic impacts.

The assessment framework

Given the DUAP Director's guidelines and other available material examined it is proposed that the following approach will be taken to analysis of economic impacts of the fisheries management strategy. There is no objective economic data that can be ranked and the following process is used:

i) Describe the fisheries management objectives and the responses with economic impact under the management strategy and present impacts in a Table form. Identify the impacts of each strategic response on the fishers and community, and rank impacts into three levels – High. Medium and Low. The ranking will reflect an opinion of the predicted scale of economic impact from available information

or on a qualitative basis. The most highly impacting issues will be appraised, and low impact economic issues will be discussed generically;

ii) For each of the high impact economic issues, changes and measurable impacts on sectors will be presented for each issue following the DUAP criteria. These include:

- market trends that effect the fishery (DUAP, 2001: section G2a);
- implications of the strategy on access rights and economic viability (DUAP, 2001: section G2b), and
- changes in resource allocations within the fishery sector (DUAP, 2001: section G2c) including multiplier effects, mitigation and also between fishery sectors (CF, RF and NF), including multiplier effects and mitigation (DUAP, 2001: section G2d). For each highly impacting management response an overall economic benefit will be presented where information is available.

iii) Discuss the likely economic implication of maintaining the present resource allocation rules for all issues identified (DUAP, 2001: section G2e).

iv) Justify the preferred approach under the FMS in terms of the Ecologically Sustainable Development principles, concluding the assessment (DUAP, 2001: section G2f).

The assessment

(i) Describe the fisheries management objectives and the responses with economic impact under the management strategy and present them in Table form. Identify the impacts of each strategic response on the community and fishers and rank it into three levels of impact from the FMS – High, Medium and Low.

The management goals from the FMS document (FMS, 2001) and responses with economic impact are described in Table G17. The responses are ranked into high, medium and low economic impact categories.

The basis of the ranking in Table G17 is by highest potential economic impact, ranking prioritising the most significant resource allocative issues affecting the whole fishery, rather than a sector or individuals. The extent of economic impact is estimated as a function of the number of businesses/persons affected and the degree of economic change to each business, potential impact on other sectors and the effect on the fish stock.

For example, the use of minimum shareholdings at the business level, through category 2 share management to reduce fisher effort, has a high economic impact ranking. This is due to every business being impacted financially with potential community costs and benefits. A medium ranked issue, such as a development of a cost recovery framework, is of more limited impact for industry. Issues ranked low have limited economic impacts from the FMS.

From Table G17 three responses are ranked as highly impacting: Minimum business shareholdings; closures to protect species and the implementation of minimum shareholding provisions to protect garfish.

Medium impact parts of the FMS are assessed, such as team based minimum shareholdings, category 2 share management, including upper limits on shareholdings in a region, improved marketing through fish penning and a new cost recovery framework. Several allocation issues involving historical fish sites, inter-relationship with the Commonwealth and with the indigenous fishing strategy are evident.

Low impact parts of the FMS involve changes in icing and food safety practices, allocation and effort containment issues, as well as some gear regulations. Optimising biological and economic return is noted and codes of conduct are recommended to improve added value through icing practices and safe food marketing. The responses also involve maintaining and improving the integrity of the catch and effort data.

Table G17: Responses ranked by potential economic impact

RESPONSE	DESCRIPTION OF RESPONSE	GOALS	Econ. issues	Priority
2.2(c)	Species closures for short term constraints on active fishing effort	1,4,5	effort	HIGH
2.3(a)	Min. shareholdings at the fishing business level to prevent increases in effort	4,5	effort	HIGH
2.5(h)	Identify active effort for garfish hauling net and Implement minimum shareholding immediately	1,4,5	effort	HIGH
2.2(h)	Continue to apply the national policy on licence splitting	4,6	access	MEDIUM
2.2(d)	For each team based method, use minimum shareholdings to determine access to the method	4,5,8	access	MEDIUM
5.3 & 5.3(a)	Provide secure fishing entitlement for OH-implementing category 2 share management	6	access	MEDIUM
5.1	Optimise the biological yield of fish and max. economic return	5	alloc	MEDIUM
2.2(h)	Continue to implement transfer guidelines to ensure new businesses form from existing businesses	4,5	effort	MEDIUM
4.3(a)	Include in maximum shareholding on the minimum number of businesses within each region or method	5	effort	MEDIUM
5.2(a)	Consider purse seiners penning live catch for short periods		market	MEDIUM
5.2	Promote long term econonomic viability of OH		viability	MEDIUM
5.2(c)	Cost recovery framework for services	6	viability	MEDIUM
4.5(d)	Define and declare RFGs over high use historical fish sites	5,6	alloc	LOW
2.2(e)	Develop a policy to manage the harvest of bait for Comm. tuna fishery	1,4,5,7,8	alloc	LOW
4.2(a)	Monitor the catch levels and management of fisheries outside NSW jurisdiction with potential impact	3,8	alloc	LOW
4.4(a)	Participate in development and reviews of indigenous fishing strategy	6	alloc	LOW
4.5(a)	Use fishing closures to equitably share OH resources	1,2,6	alloc	LOW
2.5(c)	Recovery plans for overfished species	6	effort	LOW
2.5(i)	Remove concession to use 25mm mesh in garfish hauling net	1,5	effort	LOW
2.2(h)	Continue restrict the length of replacement vessels in the OH fishery	4	effort	LOW
2.2(d)& (i)	Continue freeze on boat & net limitations	4	effort	LOW
2.5(f)	Continue zoning scheme to restrict operation to one zone	4,6	effort	LOW
4.5(b)iv	Develop Beach hauling Code of Conduct as part of licencing for use of ice to add value to product.	1,3,5,6,7	market	LOW
4.5(c)iv	Develop Purse seine Code of Conduct as part of licencing for use of ice to add value to product.	1,3,5,6,7	market	LOW
5.4(a)	Development of food safety programs	6	market	LOW
2.1(d)	Size limits to catch adult fish	4,5	size	LOW
2.1(c)	Limit the size of gear in OH	1,4,5,6	size	LOW
5.2(b)	Performance measures for economic viability of fishing business	7	viability	LOW

The access, effort, shareholding and economic viability strategies may also impact fishers.

(ii) Economic Impacts

High economic impacts

The three high economic impacts identified, the generic low impact issues and the overall cost benefit appraisal of the FMS are presented in this section.

1) Minimum business shareholdings

The FMS aims "to prevent the activation of latent (unused) fishing effort by new entrants" (objective 2.3). Active effort can be measured on the broad level when a fisher submits catch returns in one month of the year to NSWF. In contrast, latent effort is when no catch returns are submitted to NSWF, as no fishing has taken place.

There is latent effort amongst the OH endorsed fishers. The potential for activation of latent effort by new entrants is governed by the natural economic brakes of viability, being engaged in alternative fishing or work activities and the cost of fishing effort. Potential activation of latent effort is also contained by a range of regulations in place which control effort.

Under FMS objective 2.3, latent effort is to be contained. The removal of latent effort is not an explicit strategy and would have serious ramifications for industry. It is calculated that to remove latent authorisations would take a 35% increase in shareholdings over 5 years and if we consider the fishers which had OH endorsements and fished in other fisheries, this increases to greater than 170% in shareholdings over 5 years (see Appendix G1a&b, which gives the dimensions of latent effort).

The FMS response 2.3a is to "Establish minimum entry requirements for new entrants at the fishing business level (taking account entitlements held in other fisheries) to prevent increases in effort by small businesses" (FMS, 2.3a). As indicated in the FMS "it is the governments intention to create a full time professional fishing industry" (2.3a). This has implications for economic viability and the access of OH fishers.

Since 1994, entrants to the NSW fishing industry have needed to buy a Recognised Fishing Operation (RFO), which is a business which qualified through the 1986-90 and 1991-93 catch history qualifying period. The qualification level was $10,000 of fish, or 5 tonnes in any 2 of the former qualifying years, and any 1 of the latter qualifying years.

Consolidation through time has been achieved through the RFO policy (Murphy, 1999), though Ocean hauling had a "no transfer" rule in place, from 1995-April 2000. The intention is to roll the RFO requirement into the share system with a minimum shareholding across fishery entitlements held by a business. Given restructuring the proportion of RFOs to FOs has been increasing. Murphy (1999) illustrates that the adjustment has been impacting small businesses grossing below $30,000 per annum, with little impact of larger businesses.

In 1990 there were approximately 2,400 licences and this had reduced to 1,650 businesses in 2001. This represents a rate of decline of 68 licences/businesses per year over the 1990-2001 period or a total decline of 31% in 11 years, approximately 3% per year. The intention of the minimum shareholding scheme is presumably to continue this rate of reduction of business numbers in the next 5 years making a decline of 15% to 1400 businesses state-wide. This possible rate of change will form the basis for assessing economic impacts.

In Ocean Hauling this would translate from 374 businesses in 2001, to 319 by 2006. If the reduction in business numbers were uniform across the OH the impact in each region, of reducing OH business numbers state-wide by 55, is reported in Table G18.

Table G18: Envisaged impact of continued adjustment of business numbers in the OH fishery 2001-2006 at rates continued from 1990-2001.

Zones	Total FBs per region	Estimated FB Nos in 2006	Reduction in FBs?
1	24	20	4
2	37	31	6
3	52	44	8
4	120	102	18
5	26	22	4

6	58	49	9
7	34	29	5
9	24	20	4
	374	319	55

The economic impact under a share trading scheme depends on the method of share allocation. If shares were allocated at 100 per endorsement, then fishers have to gain 15% more shares in the 2001-2006 period to stay in the fishery, at a cost of 15% of the market value of 100 OH business shares as projected in scenario 1.

Assessment scenario 1 – estimate only for envisaging potential impacts

A reduction of 15% of businesses in 5 years equates to each remaining business having to purchase the equivalent of 15% of the value of an OH fishing business in 5 years. The value of the smaller OH businesses choosing to exit may be between $20,000 (Beach haul) to $40,000 (Boat haul). Those left would have to buy 15% of shares in 5 years. This may equate to $3,000 to $6,000 per fishing business left in the fishery in 5 years, about $600- $1,200 per year to remain in the fishery, in addition to new management fees.

The economic survey suggests that this sum plus new management changes would increase the fixed costs of operation in the fishery and adversely impact many small operators. Given the degree of latent effort holdings and fishers grossing less than $10,000 per year, the cost to remain in the fishery may lead to more than 15% of businesses being willing to surrender shares. The cost of share purchase could be borne by more viable businesses, but for the 75% of less viable businesses there may be an incentive to increase effort to cover the new costs. It is essential to monitor latent effort activation and rises in historic effort levels as recommended by the strategy.

The transfer policy in the OH fishery seeks to contain effort by restricting transfer to those businesses that demonstrate sufficient levels of historic participation to minimise any potential increase in effort. The transfer policy will be kept in place and new entrants will have to comply with the business minimum shareholding requirement.

2) Species closures for short terms constraints on active effort

FMS Response 2.2 (c) proposes to use "…species based closures as the preferred means of short term (up to several years) constraints on active fishing effort as required". While this is a short term remedy to limit restructuring among operators, the minimum shareholding requirement for businesses within the share system and increased costs of management may make the cost of holding on for stock recovery an issue for some operators. It may lead to increased effort on other species in the fishery to cover operating costs. The application of species closures and their inter-relationship with restructuring of fisher capacity through the minimum share holdings system would need to be monitored.

3) Implement minimum shareholdings for garfish hauling net.

A minimum shareholding provision at the endorsement level will be implemented within OH for garfish net (hauling) endorsements. There are currently 82 garfish net haulers, mostly in Regions 4 and 6. This endorsement is not traded separately and has a marginal value of several thousand dollars when attached to a general hauling net package (Pers. comm. Newcastle Marine Boat Brokers). This may equate to $2,000-$4,000 share value. A 15% reduction has been envisaged for assessment purposes, equating to a payment of perhaps $400-$800 per year, for five years, to retain a garfish endorsement. It is likely that latent effort

holders and those businesses grossing less than $10,000 per year, will sell. If 15% of 82 garfish endorsement holders exited in the next 5 years, 12 fishers would be impacted to some extent.

The basis of share allocation is to be discussed with industry and impacts are initially estimated on the assumption of equal number of shares per endorsement. A comparison of impacts on both high and low catch history holders between the various forms of share allocation (equal vs catch history based vs mixed) could then be made.

Medium economic impacts

A range of medium impacts are envisaged.

1) National licence splitting policy

The OH strategy seeks to maintain the national policy on licence splitting. The changes to share management within NSW will need to be reconciled with the national licence splitting policy. This could have economic ramifications for operators with business interests in multiple jurisdictions.

2) Minimum shareholdings and teams

Response (2.2d) is "for each team based method in the Ocean Hauling fishery, use minimum shareholdings to determine access to the method". Endorsed fishers are part of teams that are formed in each region of the OH. Team size can vary between regions and can be from 2 to 20+ fishers on occasions. Each team has a skipper as team leader, but will also have other skippers and crew to assist in the beach hauling operation. The inter-relationships among teams and crews are complex and can vary from week to week. Reporting for the fishing operation may be either by the team leader or team members. There is potential for double statement of catch through duplicate reporting, which is addressed by implementing daily logbooks. The connection between individual fishers and reported data is weaker than desirable for economic assessment and management (see data recommendations section 3).

The OH fishers under strategy 2.2b will for "each team based method in the Ocean Hauling fishery, use minimum shareholdings to determine access to the method". In each region a minimum shareholding will be required to make a team of two fishers, being set separately for each region. Teams (or team members) would buy shares from other fishers who wished to sell in order to meet the minimum shareholding required to remain in the fishery. The intent is to link effort and shares together at the team level within a region.

3) Provide a secure category 2 fishing right

Under category 2 share management shares in access are allocated (on a basis as yet undecided) enabling shares to replace the restricted fishery endorsement scheme and to be traded. The rights characteristics of the endorsement have been augmented by the increased divisibility of the shares and increasing the transferability, which enables parts of endorsements to be traded. The category 2 share proposed in the FMS is a share of access to each endorsement type and is different to a share of catch as in the existing category 1 share management fisheries (eg. Abalone, Rock Lobster). It is not currently proposed to use category 2 shares as a direct control on effort levels as the share defines general access, rather than an effort quota. The category 2 share will enable effort at the endorsement number level to be addressed, while a suite of existing regulations such as gear, area and time restrictions, seasonality of fish availability, and economic viability, all contain effort.

4) Maximum shareholding

Aggregation of businesses in a region is to be contained by the strategy (4.3a) having a lower limit on the number of businesses in a region to avoid control by one corporate entity who may use nominated fishers. The OH MAC consider this may have undesirable economic and social consequences.

5) Others

The FMS suggests increasing the market value of the purse seine catch through penning fish until desired market conditions occur. This requires changes in legislation, but would have economic benefits. A cost recovery framework for management services is envisaged and may have impacts on fishers through increased costs of management.

Low impacting measures

Access is potentially altered through closures to improve fish size and optimise economic returns. Minimum fish size lengths may reduce number of fish caught in the short term. Harvesting strategies based on optimal size may also change access in order to improve economic outcomes.

More selective capture methods, processing and icing practices could also be implemented to gain improvements in price. A code of conduct for improving icing practices is advocated under the FMS for both beach and boat based fisheries (4.5b&c).

The OH FMS could potentially be affected by some market trends. The trend in the face of static catch per unit effort and limited potential for increasing catches is to "add value" through more selective capture methods, processing and icing practices in order to gain improvements in price (Ruello and Associates, 2000; SFM, 2000). Given the bulk of many of the species hauled and their relatively low price per kilogram, there are cost and incentive issues for some fishers in using more ice (Ruello and Associates, pers. comm.).

The adoption of safe food practices seeks to address such issues by having minimum standards in fish handling and icing (Safe Food, 2001). Meeting new food handling health requirements is a cost for fishers as payments for audits and annual certification are required (Safe Food, 2001) required. This may be a cost to fishers with no immediate return from market (Ruello and Associates, pers. comm.). The cost implications of food safety may impact small businesses and part time fishers to a greater extent than full time businesses given their implications of fees and the fixed costs of additional hygiene equipment. However, these changes are not directly attributable to the FMS being driven by hygiene laws and standards for safe food production.

Closures are proposed to improve fish size and optimise economic returns. Minimum fish size lengths may reduce number of fish caught in the short term. Harvesting strategies based on optimal size may also change fisher access in order to improve economic outcomes. In each case, this would need to be modelled in a regional context.

COSTS AND BENEFITS OF THE OCEAN HAULING FMS

The economics of fisheries management enables an appraisal to be made of the economic contribution of the fishery to the economy and to analyse the impact of the changes advocated in the FMS. ESD principles dictate that resources should be valued at their market values and that subsidies should be taken into account in the form of an environmental accounting statement as illustrated below in Box G2 for the OH FMS (NSW Government, 1997).

Box G2a: A Management Cost Account for the OH FMS.

For the OH fishery per annum:	Year 2001-02	Year 2006-07	Year 2008-09
Gross revenue from catch (i)	6.65m	7.71m	8.17m
Less:			
Economic cost (of effort)(ii)	6.61m	6.61m	6.61m
Costs of share purchase (iii)	0	0.225m	0.24m
Management charges to industry (iv)	0.27m	0.27m	1.09m
Additional cost of FMS (v)	0	0.263m	0.263m
Operational Economic surplus	- 0.23m	0.342m	0.033m
less cost subsidies (v)	0.71m	0.82m	0.0m
Plus rise or fall in fish stocks (vi)	0m	0m	0m
Total economic contribution	-0.94m	-0.478m	0.033m

(i) This value of catch from fishing in the OH (see Box G1) rises at 3% per annum due to cpi.

(ii) Total costs of fishing less management charges ($6.88m less $0.27m = $6.61m). Total cost of effort to rise by 3% per annum due to cpi, but business numbers reduce by 3% also.

(iii) Share purchase costs in 2002-03 are 374 businesses* estimates of ($600p.a. business share purchase) = $0.225m per annum in share purchase costs to industry. Note: Share purchase cost estimates are minimal and could be twice this level. Business numbers fall to 319 by 2006-07, with share expenditure per operator rising.

(iv) Existing charges paid by industry $0.27m. Costs of management, not attributed to fishers under current cost policy are added in 2006-07 and 2008-09.

(v) Additional costs of FMS are 374 businesses * $700 (maximum estimate) = $0.263m (becoming 319* $822 by 2006-07).

(vi) Subsidised costs of management (ie. management, research, compliance, consulting studies etc). The current commitment of government is to maintain this at $0.71m plus c.p.i. increases until 2006. Full cost recovery is envisaged by 2008-09. Generic subsidies to industry from fuel rebates are not included.

(vi) The change in the value of fish stocks are unknown and a methodology of incorporating these needs to be developed.

Under the FMS the costs of management will be increased with new costs to commercial fishers as reported in Box G2b.

Box G2b: Costs per fisher – 2001 to 2006 under the new FMS.

For the OH fishery per annum:	Year 2001-02	Year 2002-03	Year 2006-07
Management charges (i)	720	720	870
FRCAC/EIS (ii)	230	230	0
FRDC (iii)	115	115	115
New FMS charges (iii) &(iv)	0	700	822
Share rental (iii)	0	100	100
Share purchase (v)	0	600	600
Total costs per fisher	$1,065	$2,465	$2,507

(i) Costs per fisher are $0.27m/375 =$720. By 2006-07 $0.27m/319=$870. (ii) FRCAC expenses are $150 and EIS $80 per fisher in first 3 year only. (iii) c.p.i. is not included. (iv) New FMS charges are based on 374 business *$700 (maximum estimate) each becoming 319 businesses by 2006-7 and $822 each. (v) Share purchase costs are minimum estimates and may be double this, making the total to fishers $3,065 and $3,107 per annum.

The cost per fisher of $1,065 in 2001/02 rises to $2,465 in 2002/03, and is $2,507 by 2006-07. Prior to 2006-07 period the intention is to change the basis of charges, relating management charges to business shareholdings, but without knowing how shares will be allocated, it is not possible to model the impact of that change.

In summary, intention of the FMS is to move towards making the OH fishery become more economically viable within five years (2006-07). The FMS responses 5.2(b) and (c) seeks to develop "a performance measure for economic viability of the individual business" and "…a cost recover framework…" FMS 5.2(c) by 2006. Full management cost recovery will be implemented by 2008-09, potentially returning the entire fishery to an economic surplus. On this basis the plan would have net economic benefits, in comparison to the current situation.

The analysis here assumes the plan can deliver the envisaged economic outcomes in the time available. This remains to be seen, as category 2 share management is new and is based on access shares, which are neither binding on effort or catch levels. The share management scheme needs further investigation as to its effectiveness on implementation. Mitigation may involve moving to a limit on effort, if effort levels are not sufficiently contained by the FMS. The current data on costs and benefits are approximations and elements such as the increase or decrease in the value of stocks, require further research and is a gap identified by this study.

Multipliers

Commercial fishers will be most impacted by the FMS, particularly through the implementation of minimum shareholdings at the business and endorsement level. In share trading to meet minimum shareholding requirements, some fishers may exit due to being latent effort or having low catch in the OH. Other fishers

with high opportunity costs may take the opportunity to exit the industry and work somewhere else. The increased fixed costs of management fees and costs to buy shares are likely to impact part time operations and latent effort endorsement holders more than larger fishing operations. Fishers representing latent effort, low catching businesses and perhaps elderly fishers who do not see a future in the industry, are more likely to sell shares and exit the fishery.

The assessment of the impact of minimum shareholdings on business numbers estimated a reduction of 374 to 319 businesses in the 2001-2006 period, with approximately 55 businesses leaving the industry. It is not clear to what extent there will be cumulative impacts, as the business adjustment may naturally include endorsement adjustments. The regional impact will depend on fisher's responses to keeping or selling shareholdings.

Multiplier effects from the adjustment will be low for two reasons. Fishers who are latent effort and those who catch little, have least industry output and thus generate a small proportion of any multipliers.

Secondly, where consideration is given to a decrease in commercial fishing, it is unlikely that the multipliers as described in section (g) of this Chapter will apply (Dr Roy Powell, pers. comm.). Those multipliers apply where the previously employed resources all leave the local area: a situation that is not likely to occur. The size of the multiplier effects will be smaller because many resources remain in the local area and continue to generate economic impacts.

For example, many of those previously employed will remain taking alternative employment, will receive payment from sale of shares, or move to social welfare programs. Thus, the consumption-induced effects will be limited to the difference between pre and post event income levels. Likewise, any production impacts will reflect the possibility of the resources switching to other activities (eg. boats switching into tourist/recreations uses, transport capacity being used in other industries etc.) Thus, these effects will reflect the capacity of the local area to enable a switch of resources to other industries (Dr Roy Powell, pers. comm.).

With the shareholding provisions, exiting fishers will sell shares and receive payment at market rates. The remaining fishers face increased debt to stay in the fishery and have a range of abilities to meet that debt. It is likely that effort levels may increase to pay the debt incurred, particularly if minimum shareholdings are increased rapidly or by significant amounts.

The FMS will have few implications for multiplier effects for recreational fishers and the community. Mitigation of conflict is a significant issue under the FMS and also due to the current Recreational Fishing Area process which will increase the area access for recreational fishers at the cost of commercial fisher access. The mitigation required under the FMS may be to evaluate the reduction in conflict in the wake of the RFA process and be able to move forward under an FMS with strategies in place to address recreational and commercial fisher conflict. These may need to be generated after the first round of RFA adjustments have taken place.

(iii) Predict the likely economic implication of maintaining present resource allocation rules, compared to likely economic implications of implementing the strategy or feasible option in resource allocation

Currently the number of fishing businesses and fishing endorsements across the NSW fishing industry are greater than desirable for long term economic viability and sustainability. Both vessel capacity and unregulated effort levels are much greater than required to take historic catch levels. There is a significant

amount of latent effort among fishing businesses with OH endorsements. The OH FMS will assist industry to remain economically viable by following the rate of adjustment under the established RFO process and addressing sustainable harvesting by controlling effort through short term access closures and minimum shareholding provisions for species as required.

Under the present resource allocation rules the mechanisms to reduce endorsement numbers are limited and rights are less divisible than under the proposed category 2 access shares. This means there is currently less ability for OH businesses to adjust than under the proposals in the FMS. The linking of access shares to regions enables fisher numbers, access and effort to be discussed, enabling communities to be constructively involved.

Shares are a more flexible trading structure which will allow fishers to change their business structure with the least financial impact. Fishers may sell shares in endorsement types used little or not at all, and use that money to purchase shares in the fisheries, or subsets of fisheries, which are important economically to the business.

(iv) Justify the preferred approach in terms of ESD principles

The ESD principles for economic assessment are presented in NSW Government (1997; annex 5) and are the precautionary principle, intergenerational equity, biodiversity principle and the valuation principle.

The preferred approach seeks to contain latent effort and improve viability of OH business operations through adjustment of active effort by category 2 share management. These measures hold with the objectives of ESD, potentially improving the fishery for future generations (intergenerational equity) by making adjustments now, for an improved future.

The move to share management also is an development in the valuation of the resource through management initiatives and being able to price environmental resources within a management system (valuation principle). Under the strategies, fishers are also paying for goods and services and the higher changes will act as an incentive to reduce effort in the fishery, enabling environmental goals to be pursued in the most cost effective way.

The FMS assessment also includes a transparent incorporation of the economics of the management of the fishery, incorporating subsidies and a proposed pathway towards full cost recovery and environmental accounting.

Management at the regional level in the OH fishery is consistent with ESD, in that the link between fishers and the resource is more defined, potentially leading to improved stewardship among fishers. Regional management of effort through closures and Regional Liaison Committees enable communities to be constructively involved in local and responsible fishery management.

Shares are a more flexible trading structure which will allow fishers to change their business structure with the least financial impact. Fishers may sell shares in endorsement types used little or not at all, and use that money to purchase shares in the fisheries, or subsets of fisheries which are important economically to the business. The adjustment of industry capacity through category 2 share management may run the risk of activating latent effort and increasing effort on the fish stock to pay new management charges. The basis of allocation of share has yet to be confirmed. The FMS is precautionary in monitoring effort levels, but may be vulnerable to rapid changes in industry behaviour at the on set of share trading.

The FMS is a first step in the assessment process and it is a move towards an improved culture in which the impacts of the FMS are identified and appraised with the principles of ESD in mind. The achievement of the FMS goals can also be monitored under a performance appraisal framework in this new process.

(3) DATA REQUIREMENTS IN RELATION TO THE ASSESSMENT OF THE IMPACTS ON THE ECONOMIC ISSUES

(a) Provide reference to technical data and other information relied upon to assess impacts; indicated its reliability and what uncertainties (if any) are associated with the use of the data in the assessment of the FMS.

The data used in the assessment is from several sources.

The catch and effort data is from NSW Fisheries and is logbooks joined with NSW Fisheries licencing data for tables which have endorsements. Effort data at the days fished level is complicated by the logbook system where fishing three methods in one day ends up being records as one day of effort against each of three methods. This limits the potential for accurate production modelling or bio-economic analysis and response 8.2d in the FMS addresses this. In Ocean Hauling the fishing teams and movement of fishers between teams, impacts the collection of reliable fishery data as identified and addressed in the FMS.

A significant issue for fishers is the use of the Sydney index for price imputation on declared catches. The monthly average price for female mullet in Sydney Fish Market is less than prices for in the north of the state, and may on occasions be several times the Sydney price.

In contrast the estimate of price at first sale does not deduct between 11%-23% of gross revenue for market and handling expenses. Therefore to a fisher adjacent to Sydney landing to the fish market, the imputation by the Sydney Index is potentially too high to the extent of marketing fees.

The economic survey asked fishers to declare gross revenue from catch in 1999-2000 and this was compared with the predicted Sydney index for each fisher to see the inter relationship. The Sydney index may under estimate actual prices in OH businesses by 50% and more in some regions

There are also uncertainties in the value of OH businesses and in endorsement values. Diversity among business packages mean the true value of access is difficult to determine. The move to share management will require examination of the structure of business and endorsement values.

(b) Identify where there are gaps in knowledge important for the assessment of the impacts of the fishery

Several gaps are apparent. The major one is the lack of an industry wide profile of the seafood industry in NSW, including processing, wholesaling and the movements and values of seafood in the marketing chain. This would enable an evaluation of the secondary stages of the fish catch including processors, exports, imports and employment derived from the NSW fish resource. It could potentially extend to retailing also.

Multiplier estimates could be verified and contribute to future assessments. The regional importance of the seafood industry in each zone could be evaluated. Part of this could use the Register Fish Receiver annual renewal forms to include more information on processing activity in relation to the fisheries under management.

Fish price information outside Sydney needs to be collected on a regional basis from processors involved with the mullet fishery and other points of sale. This is required as several of the future assessment issues, such as the optimal harvesting time of species, will require bio-value models using biological and size and price information for different species during their migrations.

Economic viability is part of the objectives of the Fisheries Management Act (1994). Business values, endorsement values and shares valuation is an area requiring more research. Similarly longer term planning

needs to be able to monitor the cost of operations and could use existing survey information to establish a representative "fishing cost index". This would monitor cost changes for producers and could parallel the Sydney price index for fish revenues. Economic linkages between fishing communities has been briefly addressed in the current social survey and could be augmented through time.

Category 2 share management is a new allocation mechanism and may not be sufficiently binding on individual producer behaviour as it does not automatically limit effort or catch. This scheme needs monitoring on implementation.

Economic inter-relationships between fishing communities and within the fishing industry has been briefly addressed in the current social survey and could be augmented through time.

An environmental and management cost and benefit account system needs to be investigated, relating value of the stocks to the fishery management regime.

(c) detail a timetable for developing the data sets important for understanding longer term resource issues.

Data needs can be addressed in the next five year period through development of a strategy for improving the following data:

i) Investigation of available fish price data and the accuracy of the Sydney index. This would include a direct comparison of Sydney and non-Sydney price differentials and comparisons of domestic and export markets. Price data is required to monitor fishery value and modelling resource management issue and mullet prices in the north of the state (year 1-2).

ii) Examination of the viability of businesses, business values, endorsement and share values and the basis of share allocation prior to trading. Subsequently, monitoring of share values to ensure industry viability and the achievement of the FMS objectives (year 1).

iii) Surveying the economic performance category 2 share management and of businesses after the implementation of the plan (year 1-2).

iv) Consider developing a state-wide fishing industry economic restructuring model for predicting and appraising fishing business adjustments across fishery administrative divides (immediate).

v) Revising the collection of catch and effort data to enable more sensible modelling of catch per unit effort and productivity data. This would involve changing the fishery data logbook system and needs to happen within five years in preparation for long term sustainability issues, including economic modelling and monitoring (immediate).

vi) Developing an economic profile of the regional fishing and seafood processing industry in NSW. This could include marketing, economic infrastructure and regional benefits such as multiplier effects. This needs to be progressed by area and in conjunction with social community profiling as a basis for longer term planning (immediate).

vii) Development of an environmental accounting approach to fishery management costs and benefits should be undertaken (year 1- 3).

Appendix G1a: What is the management issue with latent effort?

Current fishery endorsement capacity exceeds the level of effort applied to the fishery. This leaves "latent effort" which is an administrative construct as described above.

For example, a firm may hold endorsements to fisheries A, B, C, and D, and currently be fishing in fisheries A, B and C. Endorsement D is regarded as "latent effort" when appraising fishery D, but fishery D is unlikely to be fished by the firm as it is currently fishing in fishery A, B and C. Industry seeks the security of having fishery D as an option if some combination of fisheries A, B and C has a poor period. While this option of sideways movement of effort is desirable from the firm's perspective, the potential influx of effort is deemed to be a problem by managers observing effort levels in fishery D, who may be concerned about sustainable levels of effort in that fishery.

Holding multiple endorsements, including endorsements for fisheries not currently exploited, is a sensible diversification of risk on the part of the fishing firm. Although the vessel in the above example is not exploiting fishery D, its D endorsement has an option value. It provides the firm with some degree of income insurance if fisheries A, B or C experience a downturn for any reason.

Latent effort is seen as a problem by administrators because of the size of the potential shifts of effort among fisheries. Firstly, latent vessels have to have a reason to forgo their current activity and enter the fishery. However with each vessel that shifts into fishery D, for example, conditions may improve in fisheries A, B and C and deteriorate in D, as a result of the effort redistribution. In other words, there is an economic brake on the process, although shifts in effort of this type are not directly managed or coordinated in any way.

Despite the above argument, if there is a large amount of latent effort and a substantial reason for it to be activated, enough effort could shift into fishery D, to cause significant impacts on stock levels. This is the central concern of administrators with latent effort in developing sustainable fishery management plans and is generally a low risk, unless there are strong economic signals, for latent effort to be activated. However latent effort should also be attributed to the excessive number of fishing businesses in the industry, not to the range of activities of each firm. An effective policy response is to reduce the number of businesses, while allowing each firm full opportunity to diversify its activities among fisheries. It is not desirable for a group of vessels being linked to a single endorsement type in an ailing fishery, when other viable fishing opportunities exist, but may be denied by the administrative system.

In summary, it is economically undesirable to limit directly the capacity of fishing businesses to move between fisheries as this reduces the scope of the businesses and their security of operation. However, if there is excess capacity there must be mechanisms to reduce total effort across the industry, through a reduction in the number of businesses (Metzner and Rawlinson, 1999).

Appendix G1b: Latent effort and the OH fishery

There is a large latent effort associated with Ocean Hauling fishery endorsement holders. The potential for activation of latent effort by new entrants is governed by the natural economic brakes of viability, being engaged in other fishing or work activities and the cost of fishing effort. Potential activation of latent effort is also contained by a range of regulations in place which control effort. Under the FMS latent effort is to be contained (objective 2.3). The removal of latent effort is not an explicit strategy and would have serious ramifications for industry. The latent effort issue is investigated below.

The activation and removal of latent effort

We assume each fisher file number is allocated 100 shares. This is an approximation to both business and endorsement shareholding giving the dimensions of the potential impact for assessment purposes. The total number of shares stay in the fishery, with scenario A envisaging the removal of latent shareholdings over 5 years and scenario B, the removal of latent shareholdings and those shares held by fishers currently fishing

elsewhere in 5 years. There are 55 fishers associated with latent endorsements and 151 fishers endorsed in OH and fishing in other fisheries.

In Appendix Table GA1 the Shareholder Index (SH) illustrates how the fisher's shareholding would increase relative to the base period shareholding under each scenario. Scenario A would require a 16% increase in share holdings and scenario B, a 104% increase in shareholdings over five years.

Appendix Table GA1: Two scenarios estimating the reduction of latent effort in the OH fishery in the next 5 years through shares being transferred to remaining fishers.

Scenario A	Latent effort reduced to zero in five years					
	2002	2003	2004	2005	2006	2007
OH shares	40,400	40,400	40,400	40,400	40,400	40,400
made up of						
Latent	5,500	4,400	3,300	2,200	1,100	-
Fished other	15,100	15,576	16,052	16,528	17,004	17,480
50 extra fishers	5,000	5,158	5,315	5,473	5,630	5,788
Mixed fishing	12,700	13,100	13,501	13,901	14,301	14,701
OH only	2,100	2,166	2,232	2,299	2,365	2,431
Average SH index	1	1.03	1.06	1.09	1.13	1.16

Scenario B	Latent effort and fished other reduced to zero in 5 years					
	2002	2003	2004	2005	2006	2007
OH shares	40,400	40,400	40,400	40,400	40,400	40,400
made up of						
Latent	5,500	4,400	3,300	2,200	1,100	-
Fished other	15,100	12,080	9,060	6,040	3,020	-
50 extra fishers	5,000	6,040	7,081	8,121	9,162	10,202
Mixed fishing	12,700	15,343	17,985	20,628	23,271	25,913
OH only	2,100	2,537	2,974	3,411	3,848	4,285
Average SH index	1	1.21	1.42	1.62	1.83	2.04

To remove latent effort would cost each remaining shareholder 16% of 100 shares for scenario A, approximately 16% of the cost of a typical OH business. Under scenario B, the removal of latent and under used effort, would be the equivalent of a remaining fisher buying 104 shares, the equivalent of 1.04 other businesses in 5 years.

During either scenario, and especially scenario B, there is no guarantee that effort will keep within historic levels. In the FMS Part 4, there are performance indicators and trigger points to detect changes in catch, and these will also need to include effort levels and measures to address and contain fishing effort. If latent effort was activated by economic incentives, fishing effort would tend to increase, to enable remaining fishers to fund additional share purchases in order to remain in the fishery. The risk of this is low, but latent effort needs to be monitored at the FMS level.

Appendix G2: The NSW fishery economic survey and the OH fishery

This appendix summarises the methods and results of an economic survey of operators in the OH fishery. A state-wide economic survey was distributed by Roy Morgan Research Ltd (Roy Morgan, 2001b) and analysed for the OH fishery as part of the current study. The purpose of the survey was to determine the operational surplus of a range of fishing operators in the OH fishery.

The resource rent is an economic surplus which is part of the difference between the Total Revenue of effort and the Total Cost of effort across the fishery. Resource rent is made up of different elements and is the surplus attributable to the marginal fisher's last unit of effort, times the units of effort applied to the fishery (Reid and Campbell, 1998). This reflects the value of access to the resource. The balance of total rent and resource rent are intra-marginal rents, attributable to the skills of fishers and reflect innovation and skills in a healthy industry.

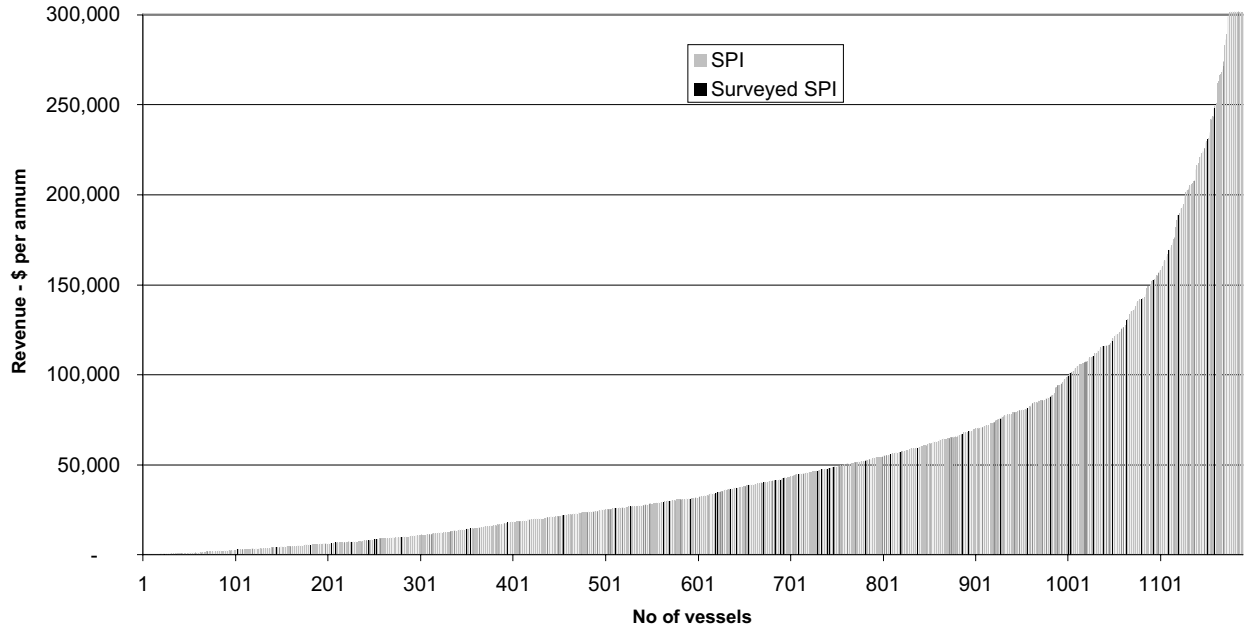
Estimation of rent also requires incorporation of effort and species considerations and is made more difficult by the multiple fishery behaviour of different fishers. Any profitability estimates in fisheries need to be related to the resource through bio-economic modelling to see if they are economically sustainable. This is not possible with information and data currently available.

Fishing operator survey

Fishing businesses and owner operators act as firms fishing among the portfolio of administered fisheries available to them. An economic survey can measure the performance of the firm across all its fishing activities, but to gain a economic rate of return from a single fishery is more difficult. We would need to examine the scope of production of the firms, examining the combinations of fisheries the firms access. An estimate of the returns from the Ocean Hauling fishery would be somewhat arbitrary, depending on the allocation of capital costs and catch between fisheries.

The state-wide survey had 259 responses from 1,640 fishers contacted (15.7%). In the OH fishery 59 of 299 active fishers responded (19.7%). The representativeness of the state-wide survey response is reported is in Figure GA1 below and illustrates that a range of fishers at many different levels of revenue responded to the statewide economic survey. The sample of fishing businesses with OH fishing had a higher response rate and is proposed as being reasonably representative of operators in the OH fishery.

Appendix Figure GA1: The sample of fishers that responded to the NSW Economic survey, presented against the estimated Sydney index revenue for fishers.



Sustainability and fishing firms

In the NSW fishing industry we have fishing businesses and fishers contracted to those entities. The issues for sustainable management of the fishery resources is the overall level of effort exerted by industry on the fishery resources in NSW and the distribution of that effort among the various fish stocks. Under current management measures, effort is contained by regulations, endorsements, limits on fishing times, areas, gears and by the economics of operations. We wish to find if it pays to go fishing. However, the ongoing containment of effort requires a downward adjustment in the number of firms in the industry due to technical advancement, and rises in costs of fishing operations (Metzner and Rawlinson, 1999).

Total effort in the industry can be reduced by direct retirement of fishing businesses where money for voluntary adjustment is available, or by other industry self funded adjustment arrangements. After adjustment, remaining businesses may have improved economic performance for the same or less effort levels, due to more available catch being available in a region, and experience less congestion and competition between fishing operations. In any economically efficient change to the policy regime the winners' gains exceed the losers' losses, and a transfer payment may be possible through a levy on those fishers remaining. A central issue is the exit decision of firms from the industry. Where a firm fishes one fishery, this exit decision may be estimated more readily than if a firm has divided its fishing between two or more administered fisheries.

Current fishery endorsement capacity exceeds the level of effort applied to the OH fishery. This then leaves "latent effort" which is primarily an administrative construct (see Appendix G1), except where fishers are genuinely not able to fish their endorsement due to ill health as previous discussed.

What should be the measure of economic health of the fishing industry?

A healthy fishing industry is one that derives enough sustainable revenue to cover its annual operating, fixed and capital costs which are determined through survey methods. They include wages, including an imputed wage to the owner/operator, running costs, maintenance and repairs, insurance, and levies which reflect fishery management costs. Capital costs are harder to measure, but in principle they represent the annual interest and depreciation on the vessel and gear. Interest cost is the rate of return which the capital could earn in another use: it is calculated as a percentage of the capital value where the percentage is the risk adjusted cost of capital. Depreciation is an annual cost which recognises the finite life of a fishing vessel. In principle, the annual depreciation compounded forward at the market rate of interest should provide a sum large enough to replace the vessel at the end of its economic life.

There are three main measures of the value of the capital of a fishing firm. These are the value of the vessel and gear:

- at historic cost – what was originally paid for the asset;
- at indemnity value –the insured value which is taken to be an estimate of current market value; and
- at replacement cost – what a new vessel and gear would cost.

The replacement cost is the basis for measuring the long-run health of the industry. If firms are able to earn the required risk adjusted rate of return and set aside sufficient funds to purchase a new vessel when the existing vessel is fully depreciated, then it is viable in the long-run. If revenue fell short of that amount then we would expect to see the market value of vessels falling, and perhaps some highly geared firms having trouble meeting loan interest and repayment schedules.

An important proviso to the above discussion is that the calculations are based on sustainable revenue, which may not be the case in a cross-sectional one year financial survey of fishing operations. It is a characteristic of the fishing industry that when stock conditions are bad, vessels are sometimes able to maintain their revenue to some extent by increasing effort; surviving by running down a different form of capital - the fish stock.

Appraising economic viability

Fishing enterprise viability can be estimated through accounting data collected in a survey. This gives an accounting view of a firm's individual performance, but is not good for measuring performance across different businesses in the fishing industry, or between industries. Economists adjust accounting data to gain more useful industry economic performance measures.

The residual of Total Revenue less Operating Costs is Operating Profit. Depreciation and the opportunity cost of capital are deducted to give economic profit or loss (Campbell and Nicholl, 1994). In the study a 7% opportunity cost of capital was included in economic costs after ABARE, (2000) which is 3% less than applied in Reid and Campbell, (1998) and Hassall and Associates (1999). Fisheries management charges and licence fees are included in operational costs, even though they are not technically a factor of production being a transfer payment from industry to government in respect of access and management services.

Labour costs are imputed from questions in the survey regarding days fished and unpaid days worked by the fishers and his family in the fishing industry. Wages rates for non-managerial private sector employment (trades and unskilled labour) were used to calculate an imputed value of labour (ABS, 2001). The basis of imputation was for an annual average wage of $34,320, ($660 per week) imputed on a daily basis. Imputation was made for paid an unpaid days and at a lesser fractional rate for staff and family members.

The discounted annualised sum was calculated in respect of meeting the replacement cost of the assets at the end of their lifespan from current income flows. The great variety in size and ages of vessels and capital equipment in the OH fishery pose interesting questions in the analysis. When capital is valued at its opportunity cost, some small scale fishing operations with fully depreciated capital equipment lead to traditional measures of profitability, such as return to capital, being less applicable than for an industrial fishing fleet. Rates of return may be apparently high, or low, due to minimal capital value.

Ocean Hauling profitability results

(Note: this material is supplied under the normal disclaimer in respect of information supplied by fishers etc).

There were a total of 59 economic surveys from OH endorsement holders. The surveys were divided into three groups for analysis: all OH fishing businesses; OH businesses with more than 20% of gross revenues from OH; and OH businesses with <20% of gross revenue from OH businesses and are reported in Appendix Table GA2. This division was made to recognise the different levels of dependence on active OH fishing among businesses with OH endorsements.

Appendix Table GA2: Respondent numbers, mean business revenue and range of revenues for the three fisher business groups in the NSW Ocean Hauling fishery (Source: RM-ES).

Vessel category	Obs.	Mean Revenue	Minimum Revenue	Maximum Revenue
All OH Businesses	59	$ 123,642	$ 1,800	$ 762,000
OH >20%	25	$ 95,987	$ 13,600	$ 490,000
OH <20%	34	$ 144,592	$ 1,800	$ 762,000

The variety in business categories and activity levels among fishers are evident. For the sampled OH businesses the major fishery overlap is with EG fishing, 42 of the 59 businesses accessing the EG fishery.

Accounting measures

The survey results are reported in Appendix Table GA3.

Appendix Table GA3: The accounting revenues and costs for a representative Ocean Hauling fishing business (Source: RM-ES).

$	OH>20%	OH< 20%	Average Business	OH>20%	OH< 20%	Average Business
Gross revenue	95,987	144,592	123,642	100%	100%	100%
Direct costs*	31,585	82,874	60,755	33%	57%	49%
Indirect costs**	19,184	39,259	30,593	20%	27%	25%
Total costs	50,769	122,133	91,348	53%	84%	74%
Gross operating profit	**45,219**	**22,459**	**32,294**	47%	16%	26%
these costs include:						
* wages	7,693	23,367	16,611			
** Interest	970	1,895	1,489			

The results report that direct operating expenses, such as bait, fuel, boat repairs, fishing gear repairs, freight costs and wages to employees, are 33%-57% of revenue in the two activity groups, the 57% being attributable to businesses with >20% of gross revenue in OH. Indirect costs, such as boat and vehicle registrations, insurances, fishery management charges, rates, bank and business administration expenses, were 20% and 27% of revenue respectively, making total operational costs 53% and 84% of total revenue. The wages recorded for were for employees as opposed to payments to owner operators, and were between 8% and 16% revenue, meaning the survey data for wages did not record payments by the business to the owner as wages. About 50% of the OH fishers sampled had no interest payments to meet and 25% had annual interest payments of greater than $1,600 per annum. Operating profit in the two business categories, is apparently 47% and 16% of gross revenue. Owner/fishers draw wages from their operating profit and little accounting profit is probable. In summary, conclusions on long run viability are difficult to draw from the accounting data and requires an economic approach.

Economic results

The economic survey results include adjustments to give the economic depreciation, the imputed cost of labour and opportunity cost of capital and are reported in Appendix Table GA4.

The results for long run viability are presented in Box G1 below.

Box G1: Long run economic viability – covering economic depreciation.

In the long term the following had positive returns in excess of all costs including economic depreciation:

7 of the 25 (28%) OH businesses with > 20% revenue in OH;

8 of the 34 (23%) OH businesses with < 20% revenue in OH.

In total this indicates that 15 from 59 (25%) of all OH endorsed fishing businesses were above long run economic viability, covering opportunity costs of capital, imputed labour and depreciation on the basis of being able to replace capital at the end of the lifespan of their assets.

Long run economic surplus exists for 25% of all OH fishing businesses examined, being greatest in the businesses which obtained more than 20% of total revenue from OH. These businesses had an economic rate of return to capital of 10%, which equates to a 3% economic return net of opportunity costs. Other

businesses had a negative net economic return of –3%, which is an indicator of rent in the fishery, providing conditions for fish sustainable stocks, capital capacity, prices of fish and inputs, and the management structure of the fishery are all met (ABARE, 2000; p16). The average net return was –2%, the median being –12%, with 50% of all OH businesses having less than –12% net return.

Appendix Table GA4: Results of the Economic survey of the Ocean Hauling fishing businesses in the financial year 1999-2000 (Source: RM-ES).

$	OH > 20%	OH <20%	Average Business
Gross revenue	95,987	144,592	123,642
less costs			
Cooperative expenses	2,248	1,063	1,573
Bait	1,702	1,454	1,561
Boat fuel	5,182	24,411	16,123
Fishing gear	3,901	7,699	6,062
Vehicle fuel	3,973	4,373	4,201
Freight	2,823	1,624	2,129
Other costs	920	1,159	1,056
Imputed Labour	48,156	38,189	42,485
Total Direct costs	**68,906**	**79,971**	**75,190**
Boat registration/fees	1,471	2,212	1,893
Vehicle registration	1,395	1,237	1,306
Insurance	1,446	2,606	2,106
Fishery Man. Charges	789	2,440	1,762
Com Fish Licence	1,140	1,743	1,483
Accounts	923	1,394	1,191
Phone	1,628	1,952	1,812
Power	551	1,134	883
Rates	1,166	1,423	1,312
Bank expenses	370	898	670
Economic depreciation	580	4,189	2,633
Repairs	3,421	21,176	13,523
Repairs vehicle	2,009	2,711	2,408
Travel	238	4,350	2,546
Other costs	200	4,017	2,372
Total Indirect costs	**17,326**	**53,482**	**37,901**
Total Economic costs	**86,231**	**133,454**	**113,091**
Economic gross profit	9,756	11,138	10,551
Capital asset value	99,661	295,227	210,932
Gross Economic Return to Capital	**10%**	**4%**	**5%**
less Opportunity Cost of Capital (OCC)	7%	7%	7%
Net Economic Return	**3%**	**-3%**	**-2%**

Discussion of economic viability and the OH fishery

The viability of fishing businesses in the OH fishery is investigated by the economic survey. This was for one financial year only. It should be augmented by a series of annual surveys to see profitability over a longer time horizon. The level of net returns are related to the value chosen for the opportunity cost of capital and the value placed on capital assets in survey responses (ABARE, 2000).

The accounting measure does not include any opportunity costs and indicates that for many fishers payment to the operator will come out of the business after other deductions – "fishing for wages". The economic surplus available varies between the two types of operation examined and is highest for the OH businesses with more than 20% of gross revenue from OH fishing.

The economic net return enables long term viability to be appraised with 25% of businesses having positive net returns and are thus viable in the long run covering economic depreciation by setting aside enough now, to renew capital at a future date. This infers that 75% of operators are performing below the long run viability benchmark. This does not mean they cannot operate on a day to day basis, but that they forgo some element counted in economic costs as presented in Appendix Table GA4.

It is likely that fishers forgo payment for the time involved with the fishing business. The high labour commitment to fishing in the OH is reported in Appendix Table GA5 where the average OH fisher spends 49% of their time on "unpaid" tasks of fishing, delivery time, repairs, maintenance, management and administration. Appendix Table GA5 indicates labour is also contributed by family at a rate of 23% of fisher days and this was also included in the imputed labour cost.

Appendix Table GA5: The annual average unpaid and paid days fishing by businesses in the OH (Source: RM-ES).

	>20% OH	**<20% OH**	**All**
Number of respondents	25	34	59
Fisher days unpaid	143	99	117
Fisher days paid	256	223	237
Fisher unpaid days as % of paid	**56%**	**44%**	**49%**
Family days unpaid	82	35	55
Family days unpaid as % of paid fisher days	**32%**	**16%**	**23%**

For example if the fisher's partner or family member works for less than the imputed pay rate, and the operators earn a satisfactory return, then the imputed wage calculation is possibly unreasonable (Standen, 1972; ABARE, 2000). Fishers may take less wages than the imputed rate to keep the business operational, in the face of alternative earning opportunities. Opportunity costs of capital can be forgone, as can depreciation, with fishers hoping to keep current assets operational beyond their envisaged lifespan, or to locate a second hand vessel if a replacement is required.

In discussing efficiency and farmer welfare in the NSW farming sector, Standen (1972) noted that replacement cost based measures for depreciation and off-farm imputed earnings may be invalid measures of opportunity costs of these resources in the rural industry context, tending to overstate off-farm benefits. For some fishers the opportunity costs for labour outside fishing may be close to zero, or if pensionable age, social security payments of up to approximately $10,000 per annum. Commonly fishers indicate they forgo payment for lifestyle and autonomy. This may even extend to short term periods where fishers forgo wages, cease fishing or move to other industries until fishing improves. This substitution between fishing and other industries is likely an efficient strategy for fishers to remain in fishing in the long term.

There are also impediments to fishers exiting the fishing industry. Lack of marketable fishing rights with restrictions on transferability, limit the sale of fishing licenses. Exiting the industry also involves outlays on transport, food and lodgings incurred during an industry transfer period. The prospect of false starts in new employment also restricts exiting and the psychic costs of changing occupation and place of living. The fishers in the OH fishery maybe identify with the following quote made in respect of NSW Dairy Farmers - "If higher incomes are available only with a change in employment or location, then strong attachment to present positions could mean that the individuals would not be better off in the alternative positions" (Standen, 1972). The current analysis does not attempt to value these non-pecuniary values of going fishing and few other economic studies attempt this.

Conclusions

Long run economic surplus exists for 25% of all OH fishing businesses examined, being greatest in the businesses which obtained more than 20% of total revenue from OH. These businesses had a net return to capital of 3%6, while other businesses had a negative net return of –3%. The average economic net return across all the businesses was –2%, the median net return being –12%.

The long term viability of the lowest half of OH fishing businesses is questionable, but has to be interpreted within the context of seasonal and part time nature of fishing operations in the fishery and the concept of the rural lifestyle and impediments to altering that lifestyle as previously discussed. The median rate of net return is –12% to capital, indicating half the businesses were below this rate of return in the 1999-2000 financial year. Many of these fishers indicated that in the survey period, refit or breakdown had impaired their fishing performance leading to costs and limited income.

The current survey results shed light on IPART's previous finding that "70% of fishers will encounter problems in their capacity to pay higher management charges"(IPART, 1998 p 63). Many operators will have difficulty in meeting additional management or additional restructuring costs, as reported in the OH assessment.

Economic return, national income and licence values

The economic survey if representative of industry indicates that 25% of businesses interviewed are contributing to the local, state and national economy in terms of economic profit – ie. producing an economic surplus.

In a fishery which has been under management and restructuring there is an expectation of an increase in endorsement values through time. Available observations of endorsement/ business value data from Newcastle Marine Brokers suggests there has been no significant increase in OH business values in recent years. This may reflect profitability and management rules which limit endorsement transfer. However since 1987 when the licence freeze came into being, licences went from the old $2 administrative charge to the $40,000-$100,000+ business values of the mid 1990s and current period.

Imputed fish market data indicates low increases in fish price trend at less than 1% per annum, though information on mullet prices from outside Sydney indicate that higher fish prices may lead to a potential rise in endorsement and business values. Inference as to the price structure of licence trades is not possible due to a lack of licence purchase information.

Other evidence of perceived economic surplus may include the entry of new fishers, which has happened in recent years (see fishers and licence duration in social section), but this may be as much a social phenomenon due to sons of fishers entering, rather than and indicator of fishing prosperity.

[6] (Note: Net Return is an Economic rate of return of 10%, less 7% opportunity costs, giving 3% net return. ie. return over the opportunity cost of capital).

Appendix G3: Comments from regional fishing industry studies with economic multipliers.

Comments from each study are reported for the southern and northern NSW area.

Southern NSW

In the study by Powell et al. (1989) the flow-on effects of potential policy changes are analysed in 1987-88 when 5,615t of trawl fish, including orange roughy, was landed in Eden and 1,877t of trawl fish in Ulladulla (Powell et al., 1989). The report has some appended information on non-trawling fishing activity, which is of interest to the current study in terms of appraising impacts in the Ocean Hauling fishing community. The study included fishing, processing and fish handling.

Eden - For the trawl fishing in Eden in 1987-88 Powell et al. (1989) have two comments:

"Overall the industry has a ratio of total to initial effect of about 1.5 which is relatively low. It would seem to be accounted for by a high capital intensity in handling and processing operations with corresponding low labour use and low labour income payments. There is also a low use of locally provided inputs (these show up as low production-induced effects). The latter is due to the "smallness" of the Eden economy and its limited capacity to provide inputs to the trawl fishing industry." Powell et al. (1989; p41).

" Impacts of the trawl fishing industry on the Eden economy in 1987-88. The total initial output of the trawl fishing industry of $8.5m generated a further $4.5m, totaling $13.1m in output in the local economy. This represented 8.8% of the total output in the local economy. Trawl fishing also generated household income of $2.97m with 189 jobs, which represented 8.04% and 12% of total income and employment in Eden respectively" Powell et al. (1989; p46).

Ulladulla

The multipliers in Ulladulla were for the trawl fishing industry, trawl handling and total trawl industry, with no processing. Comments made by the authors were:

"Trawl fishing generated almost $5m of output, provided 94 jobs and $1.6m of income to households. The ratio of local industry impacts to initial activity in the trawl fishing sector in terms of income is 1.7. That means for ever $1 paid to trawl workers, all other activities generate 1.7 times this amount" Powell et al. (1989; p51).

"The total output of the trawl fishing industry of $3.2m generated a further $1.8m, totaling $5.0m in output in the local economy. This represented 3.2% of the total output in the economy. The trawl fishing industry also generated a total household income of $1.6m associated with 94 jobs, representing 3% and 3.8% of total household income and employment in Ulladulla" Powell et al. (1989; p56).

Northern NSW

The Northern NSW study was part of an agriculture and fishing community study for the area from Tweed Heads to Tuncurry using data from the 1984-85 period.

Tamblyn and Powell (1988) comment:

"Commercial fishing, local transport to cooperatives, the handling and processing operations of fish cooperatives and transport from the cooperatives to major markets were included. Excluded were local wholesale and retails sales of fish, Sydney Fish market operations and blackmarket sales, which are reported to be sizeable. All amateur and pleasure fishing is excluded." (Tamblyn and Powell, 1988; page 45).

On the economic impact they summarise:

"The industry produced products valued at $48.9m, and employed 1,476 people who received payments of $21m. In employment terms, the impacts are dominated by fishing which comprise 82 per cent of the total effect. This is high given that all fish are processed in some way. However, much of that processing adds only a small amount of value through cleaning, scaling and packing. This also means that the ratio of all effects of fishing is relatively low at about two." (Tamblyn and Powell, 1988; page 45).

In estimating output from Fish Cooperatives the authors adjusted for double counting of output due to fish coops buying fish in. The NSW Government economic appraisal guidelines warn of the potential errors and inaccuracies in Input-Output studies relating to poor data, double counting of output impacts, and inappropriate application of multipliers (NSW Treasury, 1997).

Clarence

In the Clarence the McVerry (1996) study indicated that:

"Estimates of the value of output from the commercial fishing industry in the Lower Clarence for 1992-93 amounted to $14.0 million, with flow-on impacts for businesses supplying goods and services to those in the direct employment of the fishing industry of $12.3 million. The total direct and indirect value of output for the commercial fishing industry in the Lower Clarence region for 1992-93 was, consequently, $26.3 million. Over half of the fisheries production of Northern NSW is derived from the Lower Clarence region, indicative of the productive capacity of the Clarence River and the adjacent offshore fishing grounds" (McVerry, 1996).

"The total number of jobs generated directly by the commercial fishing industry in the Lower Clarence region for 1992-93 was 382, with the flow-on employment impacts resulting in another 190 jobs. The fishing industry in the Lower Clarence provides direct and indirect employment for 572 people, which represents 12.6 percent of the total employment in the area. Any decline in employment from the fishing industry will impact on the employment levels and economic activity in the Lower Clarence region due to the limited number of alternative job opportunities in the area". (McVerry, 1996).

(H) SOCIAL ISSUES

The background to the social assessment of the Ocean Hauling FMS is given at the commencement of the Economic section (G).

The DUAP guidelines for social issues will be followed below. The guidelines are presented in a different font to guide the reader with a response stated below each guideline. The DUAP Directors Guidelines require that we:
"Assess the likely social impacts of the fishing activity proposed under the management plan".

Introduction

The DUAP Directors Guidelines require examination of social information on fishers and their communities. Australian Bureau of Statistics (ABS) data was obtained from the Bureau of Rural Science (BRS) social science unit, to examine the secondary level information available on the communities and fishers in the NSW fishing industry. The results of this fisher community profiling are presented in Appendix H1.

The second approach was a fisher telephone survey of all fishers in NSW to obtain more specific social information of relevance to appraising issues under the Fisheries Management Strategy process. An overview of the state-wide social survey is reported in Appendix H2.

The available information is used to address the social issues surrounding the introduction of the Ocean Hauling Fisheries Management Strategy. Given the lack of previous studies, the review is not complete against the DUAP guidelines and gaps have been identified. The need for future research is presented in section 3.

(1) Review of the existing situation

(a) Describe the demographic profile of those employed in the fishery (by regions/sub-regions/fleets) – including:

(i) direct employment eg boat owners, skippers and crew; identify those with multiple endorsements and those "part-time" fishers (eg with other sources of employment, or semi retired); and indirect employment (cold stores, traders, suppliers);

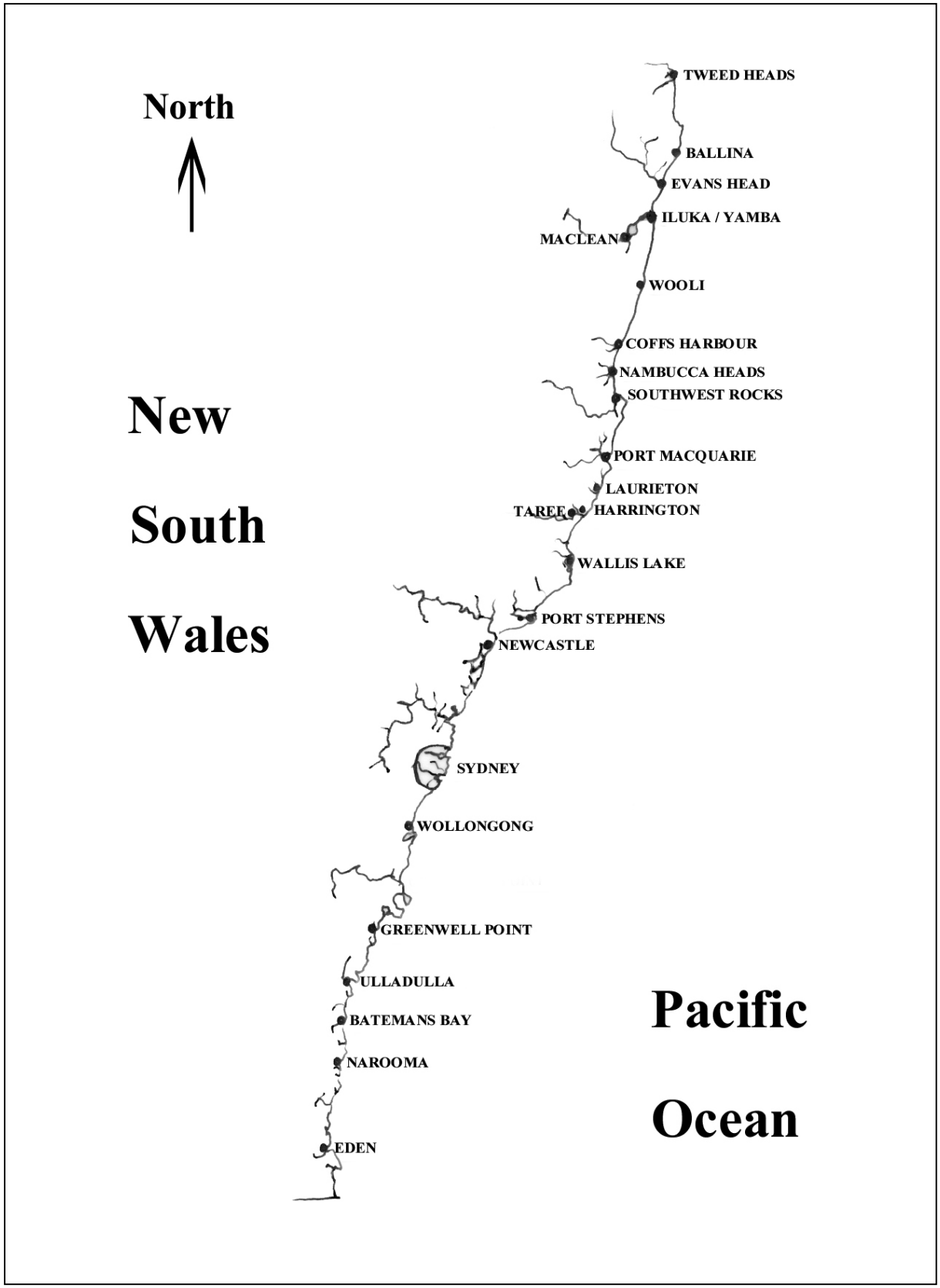
The Ocean Hauling fishers are a diverse fishery group. The distribution of OH fishers North to South along the NSW coast is reported in Table G3 of the economic section. The profile of fisher communities in coastal NSW for all commercial fishers is reported in Appendix H1. The information on OH fishers and their communities has been extracted and are summarised in Table H1, which reports social indices for OH fishers at the zone and district level from ABS and licensing data. This can be used in appraising management impacts. Figure H1 is a map of coastal fishing towns along the NSW coast and can be used in conjunction with district and postcode Tables.

Table H1: Summary table of social indices for OH fishers in zones and districts of NSW (Source: ABS/BRS and NSWF licence data).

Zone	Home District	P'code Population	P'code Fishers	OH P'code Fishers	Unemployed (%)	SEIFA	Med. Ind. Income (wk)	Employed in C.F. as (%) of labour force	Employed in OH as (%) of labour force
1	TWEED	41,938	63	17	16.9	922	250	0.37	0.10
	RICHMOND	24,184	52	6	13.7	972	250	0.52	0.06
	Zone	**66,122**	**115**	**23**	**15.3**	**947**	**250**	**0.45**	**0.08**
2	**CLARENCE**	**43,353**	**259**	**48**	**18.8**	**919**	**222**	**3.12**	**0.58**
3	COFFS HARBOUR	43,777	90	15	18.3	938	203	0.74	0.12
	HASTINGS	61,291	90	25	17.7	936	227	0.68	0.19
	Zone	**105,068**	**180**	**40**	**18.0**	**937**	**215**	**0.71**	**0.16**
4	MANNING	37,878	80	25	17.5	914	203	0.67	0.21
	WALLIS LAKE	22,704	105	36	14.8	939	250	2.78	0.95
	PORT STEPHENS	52,562	101	29	13.0	967	250	1.33	0.38
	HUNTER	27,283	22	7	11.7	954	250	0.30	0.10
	CENTRAL COAST	206,143	102	16	10.6	977	267	-	-
	Zone	**233,426**	**124**	**23**	**11.1**	**965**	**258**	**0.15**	**0.05**
5	**SYDNEY**	**3,276,207**	**189**	**17**	**7.3**	**1,047**	**350**	**-**	**-**
6	ILLAWARRA	51,979	38	23	16.9	891	203	0.10	0.06
	SHOALHAVEN	53,871	75	35	15.1	945	215	0.81	0.38
	Zone	**105,850**	**113**	**58**	**16.0**	**918**	**209**	**0.46**	**0.22**
7	BATEMANS BAY	34,836	105	22	17.0	958	227	1.18	0.25
	MONTAGUE	8,135	53	13	15.9	955	180	1.54	0.38
	FAR SOUTH COAST	3,726	61	23	12.1	916	250	2.56	0.97
	Zone	**11,861**	**114**	**36**	**14.0**	**936**	**215**	**2.05**	**0.67**
Grand Total		3,989,867	1,485	357	15.3	943	235	1.03	0.25

Key: Postcode population as of 1996; postcode fishers-for all NSW and OH fishers; Unemployed by postcode as of 1996 census; SEIFA -Socio-economic index for areas (ABS), Med. Ind. Inc.- median individual income per week as of 1996 census; Employed in commercial fishing (or OH) as percentage of labour force; see Appendix H1 for a fuller explanation of all variables.

Figure H1: Map of fishing towns on the NSW coast.



OH fishers inhabit some small towns and in terms of home ports the social survey identified that there were 222 fishers using 57 home estuaries or ports in NSW. In Table H2 ABS postcode data enables OH fishers to be identified as part of fishing communities in NSW[1]. Maps of ABS socio-economic fisher census data are reported at the post code level in Appendix H4. This is an approximation to towns and fisher communities. The definition of fisher communities is an area for further work.

In Table H1, OH fishers are approximately 24% of all NSW fishers in the analysis. Unemployment by region is higher in rural NSW and will be investigated later in this section. The Socio-Economic Index for Areas (SEIFA) is a measure of socio-economic disadvantage, relative to 1,000 units. In Table H1, most of rural NSW fishing zones are under 950 on the SEIFA index, while Sydney exceeds 1,000. Median weekly income data for regions in 1996 show a similar situation.

In Table H1, the second last column reports all commercial fishers as a percentage of the local working population and the last column reports OH fishers as a percentage of local working population. These are ABS data from the 1996 census. Fishers in the Clarence, Wallis Lakes and Far South Coast areas have the highest percentage of OH fishers in the work force indicating economic and social dependence. In areas of higher population, the fishers as percentage of labour force method does not reflect the size of the fishing community (for example, Central Coast, Hawkesbury and Sydney), where the general work force is large relative to the number of commercial fishers.

Table H2 reports major home post codes for OH fishers within districts and illustrates the diversity in community structures and in the home locations of OH fishers. OH fishers form a substantial part of the NSW fishing community ranging from 0% to 90% of local fisher numbers. A significant number of postcode areas with OH fishers fall below 900 on the SEIFA index of disadvantage and may well be more adversely impacted by changes under the FMS (For example: Iluka, Woombah/others, Harrington/Coopernook, Mayfield, Primbee and Berkeley). Similarly a range of areas record median individual weekly incomes below $200 in the 1996 census. Several postcodes have a high percentage of OH fishers in the work force (for example, Woombah, Maclean, Iluka, Bungwahl, Tea Gardens, Foster-Tuncurry in the north and Greenwell Point, Moruya and Eden in the South). Conversely some postcodes have relatively few OH fishers as a percentage of the work force, though this should be interpreted with caution, given the weakness of this method in areas of high population.

[1] This is explained in Appendix H1, where the available data is for postcodes with over 10 NSW commercial fishers.

The numbers of employees associated with the OH fishery and the multiple endorsement structure are reviewed in the economic section, Chapter (G).

Table H2: ABS social index data on OH fishing communities in NSW at the postcode level (Source ABS/BRS; NSWF licence data).

Zone	Home District	P. code	Town/Suburb	P'code Population	P'code Fishers	P'code Fishers (OH)	OH fishers as % of all NSW	Unemployed (%)	SEIFA	Med. Ind. Income (wk)	Employed in C.F. (%) of Labour Force	Employed in OH (%) of Labour Force
1	TWEED	2485	TWEED HEADS	8,978	22	2	9%	20.0	893	200-299	0.3	0.03
1	TWEED	2486	TWEED HEADS/BANORA POINT	24,984	22	6	27%	14.4	953	200-299	0.41	0.11
1	RICHMOND	2478	BALLINA/OTHERS	24,184	52	6	12%	13.7	972	200-299	0.52	0.06
1	TWEED	2487	CHINDERAH/OTHERS	7,976	19	9	47%	16.2	921	200-299	0.41	0.19
1	RICHMOND	2472	BROADWATER/CORAKI	1,761	10	-	-	19.5	919	200-299	1.02	-
1	RICHMOND	2473	EVANS HEAD	2,613	25	-	-	16.8	900	160-199	1.02	-
2	CLARENCE	2460	LAWRENCE/OTHERS	29,145	24	2	8%	14.8	951	200-299	1.212	0.10
2	CLARENCE	2464	YAMBA/OTHERS	5,340	64	4	6%	17.1	954	200-299	4.46	0.28
2	CLARENCE	2469	WOOMBAH/OTHERS	933	10	4	40%	27.2	854	160-199	1.02	0.41
2	CLARENCE	2463	MACLEAN/OTHERS	6,072	96	14	15%	16.2	946	200-299	4.46	0.65
2	CLARENCE	2466	ILUKA	1,863	65	24	37%	18.6	891	160-199	4.46	1.65
3	COFFS HARBOUR	2450	COFFS HARBOUR	32,488	52	3	6%	15.8	971	200-299	0.24	0.01
3	HASTINGS	2431	SOUTH WEST ROCKS	3,965	33	4	12%	18.6	926	160-199	0.78	0.09
3	COFFS HARBOUR	2462	WOOLI/OTHERS	2,599	20	5	25%	20.0	917	160-199	1.19	0.30
3	COFFS HARBOUR	2448	NAMBUCCA/OTHERS	8,690	18	7	39%	19.1	927	160-199	0.8	0.31
3	HASTINGS	2440	CRESCENT HEADS/OTHERS	23,164	20	10	50%	19.3	916	200-299	0.78	0.39
3	HASTINGS	2444	PORT MACQUARIE	34,162	37	11	30%	15.2	966	200-299	0.48	0.14
3	COFFS HARBOUR	2456	WOOLGOOLGA/URUNGA	11,848	20	-	-	20.5	944	200-299	0.46	-
4	PORT STEPHENS	2301	NELSON/SALAMANDER BAYS/OTHERS	25,046	27	1	4%	11.1	997	200-299	1.04	0.04
4	CENTRAL COAST	2256	WOY WOY/OTHERS	14,168	12	1	8%	11.1	941	200-299	0	0.00
4	CENTRAL COAST	2257	EMPIRE BAY/OTHERS	25,326	10	2	20%	11.6	957	200-299	0	0.00
4	CENTRAL COAST	2261	BERKELEY VALE/OTHERS	32,623	19	2	11%	14.1	935	200-299	0	0.00
4	MANNING	2443	LAURIETON/OTHERS	8,093	21	3	14%	20.6	909	160-199	0.595	0.09
4	HUNTER	2280	BELMONT/OTHERS	22,225	10	3	30%	10.5	989	200-299	0.05	0.02
4	CENTRAL COAST	2259	MANNERING PARK/TACOMA/OTHERS	46,846	40	3	8%	10.6	972	200-299	0	0.00
4	CENTRAL COAST	2251	AVOCA BEACH/OTHERS	29,370	11	3	27%	8.5	1032	200-299	0	0.00
4	HUNTER	2295	STOCKTON/OTHERS	5,058	12	4	33%	12.8	918	200-299	0.555	0.19
4	CENTRAL COAST	2250	ERINA/OTHERS	57,810	10	5	50%	7.7	1025	300-399	0	0.00
4	WALLIS LAKE	2423	BUNGWAHL/OTHERS	3,247	17	7	41%	14.5	939	200-299	2.78	1.14
4	PORT STEPHENS	2324	TEA GARDENS/OTHERS	19,123	20	9	45%	13.6	937	200-299	1.91	0.86
4	MANNING	2427	HARRINGTON/COOPERNOOK	1,473	24	10	42%	18.0	883	160-199	0.71	0.30
4	MANNING	2430	TAREE/OTHERS	28,312	35	12	34%	14.0	950	200-299	0.71	0.24
4	PORT STEPHENS	2315	NELSON BAY/OTHERS	8,393	54	19	35%	14.3	966	200-299	1.04	0.37
4	WALLIS LAKE	2428	FORSTER/TUNCURRY/OTHERS	19,457	88	29	33%	15.1	939	200-299	2.78	0.92
4	HUNTER	2281	SWANSEA/OTHERS	11,349	15	-	-	14.3	935	160-199	0.05	-
4	HUNTER	2304	MAYFIELD/WARABROOK	13,925	18	-	-	17.6	890	200-299	0.07	-
5	SYDNEY	171400	SYDNEY NORTH & SOUTH	3,276,207	189	17	9%	7.3	1047	300-399	0	0.00
5	HAWKESBURY	2083	MOONEY MOONEY	1,450	12	-	-	5.7	1042	300-399	0	-
5	HAWKESBURY	2775	SPENCER	930	18	-	-	9.2	967	200-299	0	-
6	ILLAWARRA	2500	WOLLONGONG	32,326	10	3	30%	12.6	998	200-299	0.1	0.03
6	SHOALHAVEN	2541	NOWRA/OTHERS	29,663	16	3	19%	12.0	957	200-299	0.81	0.15
6	ILLAWARRA	2502	PRIMBEE/OTHERS	13,000	10	9	90%	18.9	847	160-199	0.1	0.09
6	ILLAWARRA	2506	BERKELEY	6,653	18	11	61%	19.0	827	160-199	0.1	0.06
6	SHOALHAVEN	2540	GREENWELL POINT/OTHERS	24,208	59	32	54%	18.2	933	160-199	0.81	0.44
6	ILLAWARRA	2533	KIAMA	13,553	12	-	-	7.6	1067	200-299	0.23	-
7	BATEMANS BAY	2536	BATEMANS BAY/OTHERS	14,335	32	3	9%	15.5	970	200-299	1.175	0.11
7	BATEMANS BAY	2537	MORUYA/OTHERS	9,002	10	8	80%	18.2	960	200-299	1.54	1.23
7	BATEMANS BAY	2539	ULLADULLA/OTHERS	11,499	63	11	17%	17.4	942	160-199	0.81	0.14
7	MONTAGUE	2546	NAROOMA/OTHERS	8,135	53	13	25%	15.9	955	160-199	1.54	0.38
7	FAR SOUTH COAST	2551	EDEN	3,726	61	23	38%	12.1	916	200-299	2.56	0.97
			Total		**1615**	**357**						

The social survey enabled a social profile of OH fishers to be developed as reported in Table H3.

Table H3: The demographics of fishers in the Ocean Hauling fishery (Source: RM -SS and NSWF licence data).

Statewide profile			All NSW	OH
Mean age of fisher (years)			54.4	48.4
Age range			16-88	20-88
Percent males			99.2%	98.6%
Mean years resident in town			24.2	28.3
Mean years in Fishing Ind.			20.8	24.2
Generations in Fishing Ind.			1.9	2.3
Median Hours /week in fishing industry			54.1	58.8
Percent currently employed in other industries			19.1%	17.2%
Housing Tenure				
Own			49.9%	47.7%
Paying off			32.8%	37.2%
Renting			15.8%	14.2%
Other			1.4%	0.9%
Education				
Did not finish PS			2.0%	2.3%
Did finish PS			3.6%	2.7%
Year 7			4.1%	3.6%
Year 8			9.6%	12.3%
Year 9			17.4%	23.2%
Year 10			32.1%	35.0%
Year 11			3.8%	2.3%
Year 12			11.4%	7.7%
Trade cert.			10.1%	6.8%
Ind/ business			1.7%	1.8%
Uni			3.3%	1.4%
Other			0.9%	0.9%
Marital Status				
Married or relationship			81%	83%
Single			11%	8%
Other (Divorced, separated, widowed)			8%	9%
Partner employed in Fishing Business			40%	38%
Mean number of Children <16 years			1.2	0.9
(Other) Dependants				
None			63%	61%
Spouse			23%	24%
Children - over 16 and other			14%	16%
Employed Status				
Owner operator			88%	92%
Non fishing owner/other			4%	3%
Nominated fisher/skipper			8%	5%
Employees (%)	**0**		65%	68%
	1 or more		35%	32%
Mean Individual net taxable income (all industries)		$	39,634	41,270
Mean Household net taxable income		$	42,483	40,406
< 6,000			3%	2%
6,000-9,999			2%	2%
10,000-19,999			7%	5%
20,000-29,999			20%	23%
30,000-39,999			20%	22%
40,000-49,999			11%	11%
50,000-59,999			8%	9%
60,000-69,999			8%	8%
70,000-79,999			5%	6%
80,000-89,999			5%	2%
90,000-99,999			1%	0%
100,000+			11%	11%

Table H3 reports that the average age of NSW commercial fishers is 54.1 years and is higher than the 45.3 years recorded for all Queensland fishers (Fenton and Marshall, 2000). The average age of the OH fishers is 48.4. Participation of females in direct fishing is low (1.4%), though 38% of fishers' partners are employed in OH fishing businesses. Approximately 92% of OH fishers are owner operators, average over 24 years of fishing experience, work a median of 58.8 hours per week, and 17% of OH fishers work in other industries. Fishers have high levels of residency, averaging 28 years and home ownership, with 85% owning or paying off a home.

The 222 OH fishers interviewed had low rates of formal education, with 79% achieving year 10 education or below. Only 8.6% had a trade or business training. Fishing forms a significant part of individual fishers income, as described in Table G9 of the economics chapter. Fisher net taxable income from all industries was $41,270 after tax, indicating the overall contribution of fishers to household income. Individual income apparently exceeded mean household income and may indicate confusion among some fishers surveyed and should be treated with caution.

In examining dependants, it was found that 56% of OH fishers had no dependent children below 16 years of age as reported in Box H1.

Box H1: Dependent children below 16 years of age (RM-SS).

No. of Children	Freq.	Total Children	%
0	124	-	[56% of 222]
1	38	38	20%
2	38	76	40%
3	16	48	25%
4+	6	27	14%
Total	**222**	**189**	**100%**

The balance of 98 fishers had 189 dependent children under 16, representing families with an average of 1.92 children per family. Table H3 reports about 61% of 222 OH fishers had no financial dependents, 24% had dependent spouses (51 persons) and 16% had dependent grandparents, parents, stepchildren and children over 16 years.

Of 222 OH endorsement holders contacted, 178 had been fishing in OH in the previous 12 months. The balance of sampled endorsement holders were fishing elsewhere with the exception of others who had not fished in any fishery. For those who had not been fishing in the last 12 months in the OH fishery, old age and other reasons were given by 3 operators.

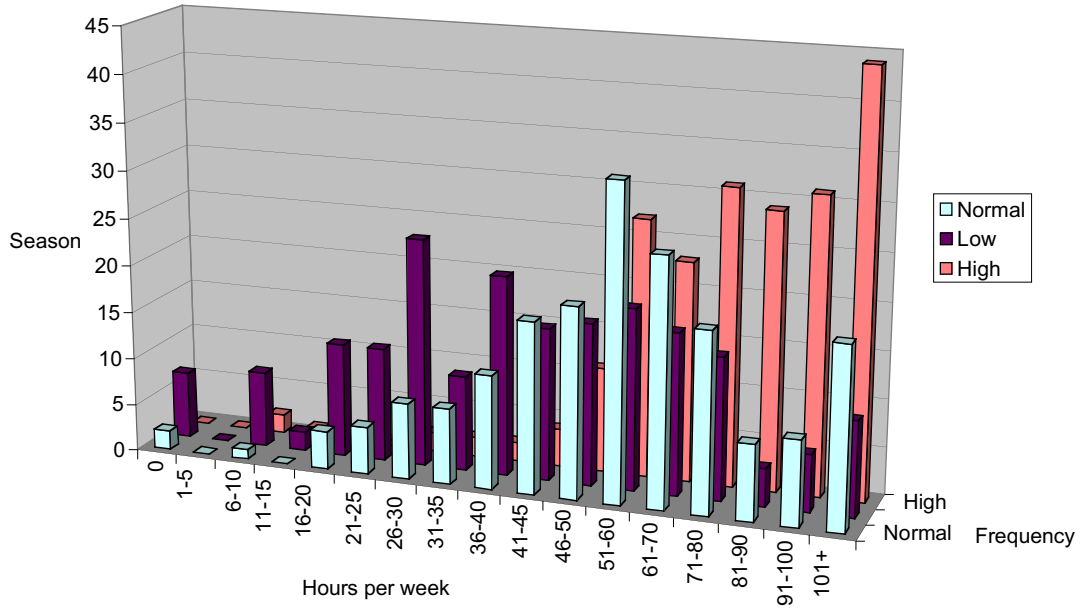
(b) Outline the community values associated with commercial fishing, in particular :

(i) fishers' ways of life; fishing communities and trends associated with changes in fishing technology, communications and estuary management practices.

Industry working practices

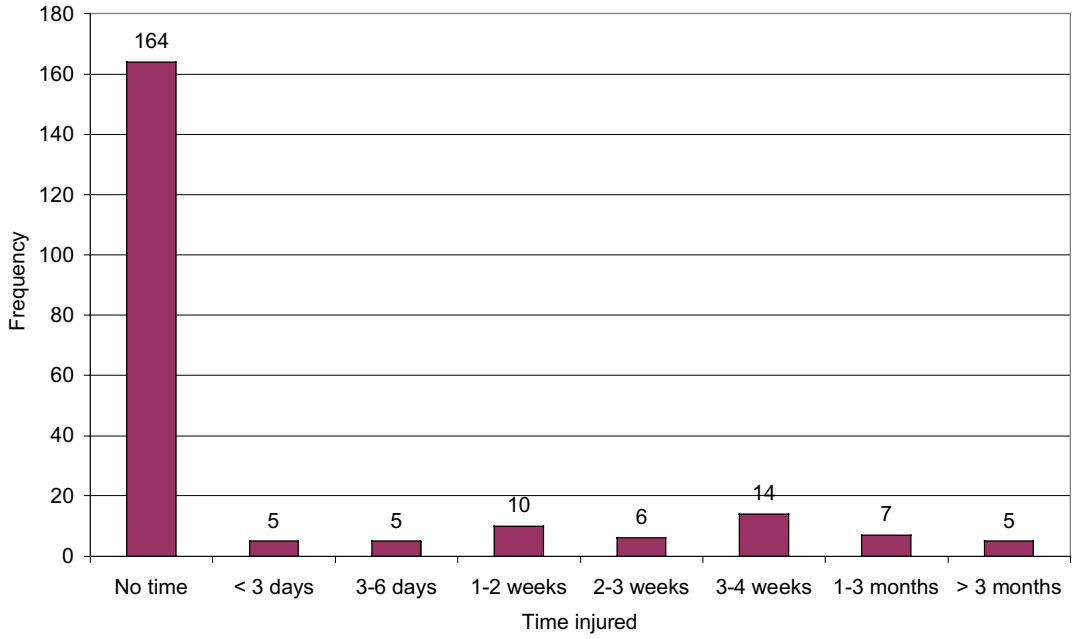
The social survey asked questions to provide information on the fishers' working practices. Part of the fishers life style is that fishing takes more hours than the conventional 40 hour week fishers being asked to estimate their average working week in normal, low and high seasons. The estimates from the telephone interview are reported in Figure H2. Normal working hours average 58.8 per week. This is significantly in excess of the 42 hours per week estimated by ABS for fishers nationally (ABS, 1996). High season estimates are 77 hours / week while low season are typically 45 hours/week (RM-SS).

Figure H2: Hours worked in the Normal, Low and High seasons in the OH fishery (Source: RM-SS).



Fishing is a diverse activity but can also lead to industrial injury. About 1% of the 222 fishers were inactive from the fishing industry in 1999-2000 for a variety of reasons (RM- SS). Injuries from fishing also impacted fishing time as reported in Figure H3. The graph indicates that 81% of fishers had no fishing injuries in the previous 12 months, but that 15% of fishers were out of fishing for 2 weeks or more in the year 1999-2000 through industrial injury (32 fishers).

Figure H3: Duration of non-working time from industrial injury in commercial fishing in the OH fishery (Source: RM-SS).



Investigate community/regional aspects of fishers

The regional location of fishers by district is reported in Tables H1 and H2. There is no accepted definition of "fishing communities" and this requires further analysis of economic and social interactions and linkages between fishers and between communities (Fenton et al. 2000).

The regional location of fishers by district has been reported in Tables H1 and H2. Fishers were also asked about their pattern of travel for their main fishing activity. In Table H4a about 12% of fishers show significant traveling behaviour of over 50km per day in their fishing operation. This may reflects the one region policy implemented in 1995, which limited OH fishers to one region.

Table H4a: Travel distance to main fishing site in the OH fishery (Source: RM- SS)

	Frequency	**%**		
<25 km, 1hr by boat	139	64%		
25-50 km, 1-2hr by boat	43	20%		
50-100 km, 2-3hr by boat	15	7%		
>100 km, > 3hr by boat	10	5%		
Can't say	11	5%	n =	218

The residency of OH fishers is reported in Table H4b and shows 87% of fishers have been living in the same postcode area for 10 years or more. Less than 8% have moved their postcode in the last 5 years. Apparently 74% of OH fishers have remained in the same postcode for the last 20 years or more. These long term residents are likely a substantial part of the community, with greater attachment to place and community than less resident fishers.

Table H4b: Residency of OH fishers at current postcode (Source: RM-SS)

Years	Freq.	%	Years	Freq.	%
<1	5	2%	21-25	25	11%
1-5	14	6%	26-30	29	13%
6-10	10	5%	Over 30 yrs	108	49%
11-15	16	7%	Can't say	1	1%
16-20	14	6%	n=	222	100%

The OH fisher population is reasonably sessile and has a significant number of fishers who have been resident in a local area for a long time indicating their involvement in social networks and their contribution to social capital.

(i) social capital issues; age distribution of fishers; skill base and transferability of skills; consider trends by region or sub –region affecting entry or exiting of fishers, employees or boat owners in the sector

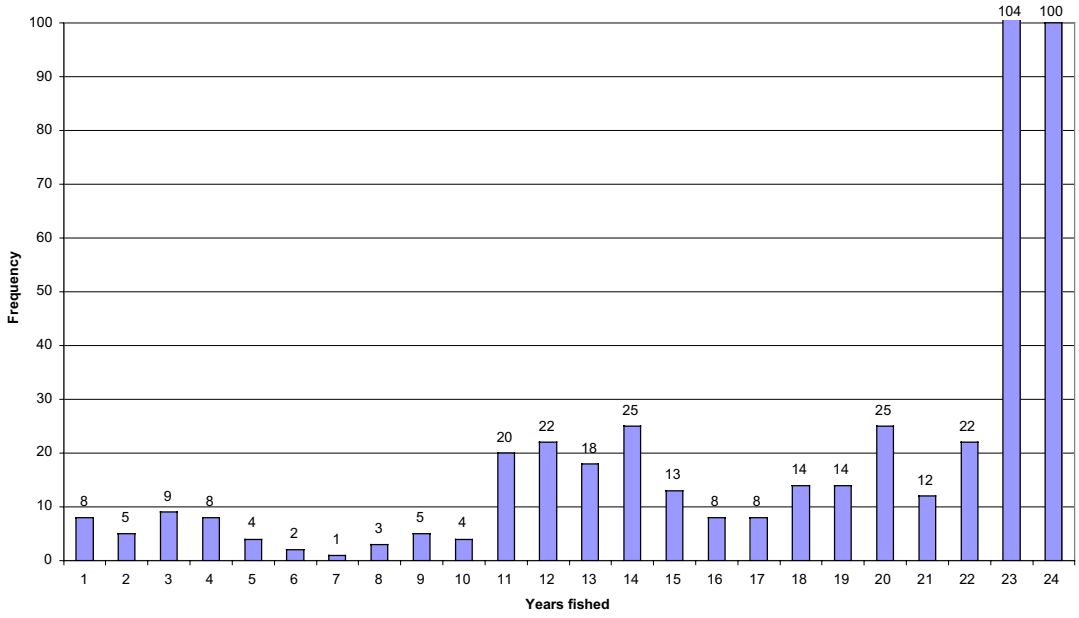
There is no one accepted measure of social capital (NSW government, 1997b). Fishers are often a significant part of the social infrastructure in small coastal communities. For example, an illustration of the potential contribution of fishers to local social capital is reported in Table H5 from McVerry (1996). Fishers and their club memberships in the Clarence community are reported. Clubs can be a place for fishers to socialise with other fishers, workers and the community. There is no other available information on fishers and social capital in NSW.

Table H5: Fishers as a percentage of club memberships in the Clarence region (McVerry, 1996).

Type of Club	Fishers as % of club membership
Bowling Club	41
Golf Club	27
RSL	18
Soccer, Football, Coastguard	4
Surf, Cricket, Lions Clubs	3
Softball, Rowing, Horse, Clarence Catchment Management	2
Bike Club, Naval Reserve	1

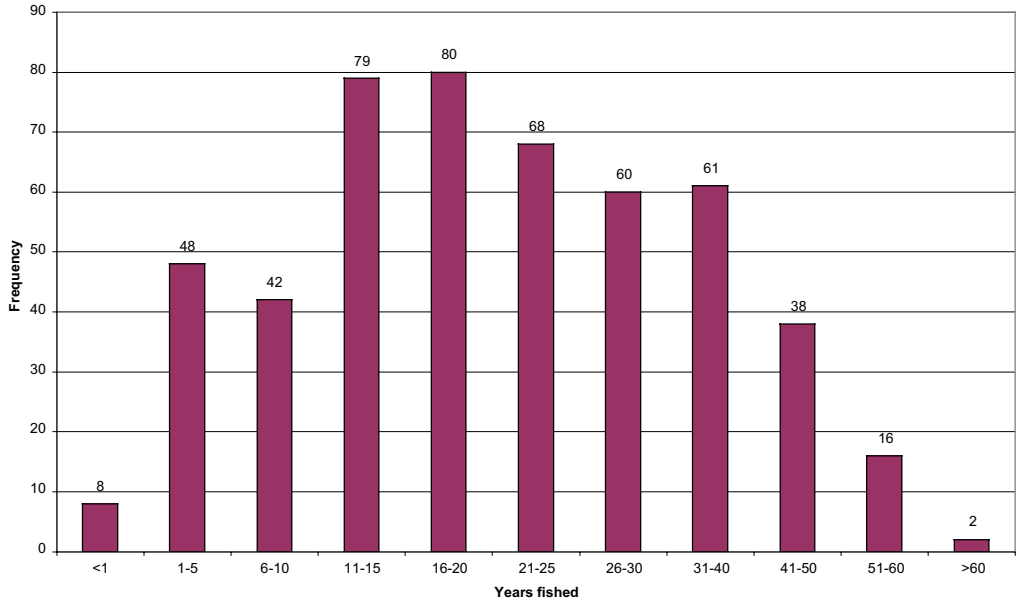
The years of fisher involvement with the industry is a measure of a fisher's experience and contribution to the sense of fishing industry involvement, camaraderie and community, is. License record information goes back to 1977 for the OH fishers, have been summarised in Figure H4 and shows that 20% of fishers interviewed were fishing prior to 1977 when current electronic licence records began.

Figure H4: Number of years all OH fishers have been licensed in NSW (NSWF licence data).



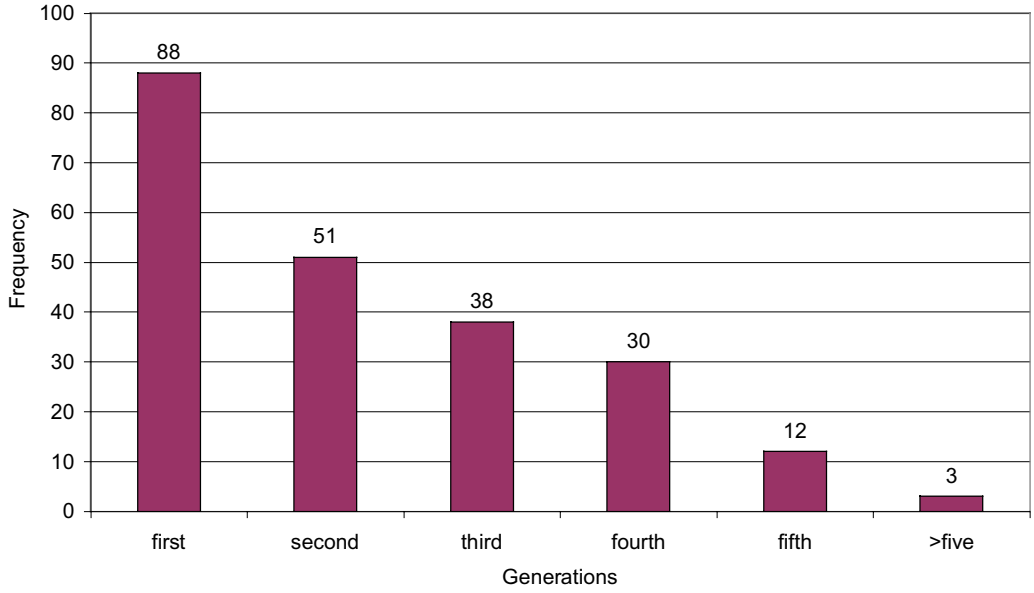
The mean licence duration is 18.2 years representing 8,300 person years fishing experience among 299 fishers. Of the 637 for whom records are available, 50% have over 20 years of experience. Fishers have also been entering the OH fishery in recent years. Figure H5 reports how many years fishers had been in the NSW fishing industry as recorded in the social survey (sample = 222 OH fishers). Approximately 43% of OH fishers have over 25 years of fishing experience.

Figure H5: Frequency plot of years fished by OH fishers in NSW fishing industry (Source: RM-SS).



Both private and social capital are potentially seen in family involvement in fishing. Fishers were asked how many generations their family had been in the NSW Fishing industry and results are reported in Figure H6.

Figure H6: Frequency plot of number of generations in the OH Fishery (Source: RM-SS).

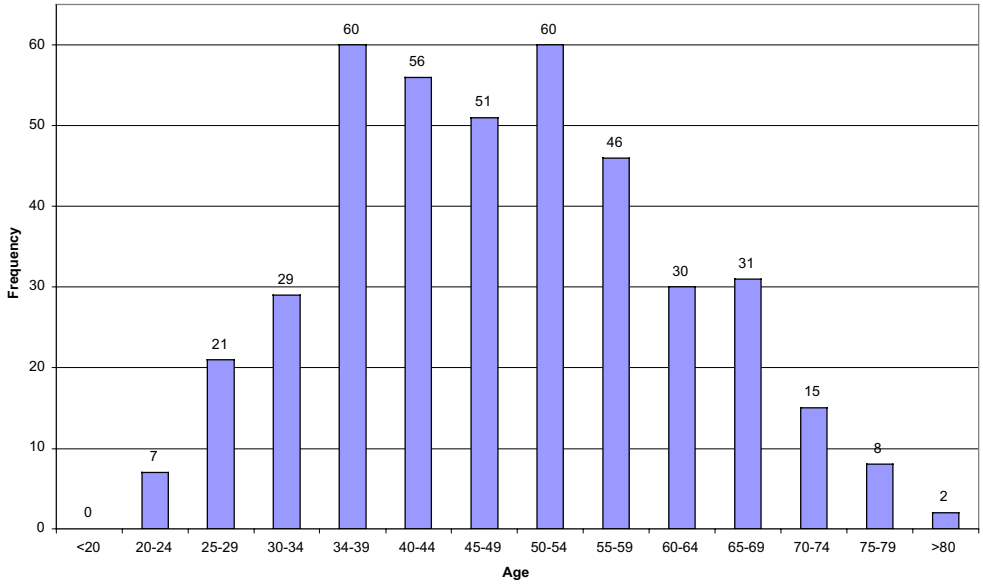


There are 39% of fishers who are first generation fishers, 23% who are second generation and that 38% of OH fishers were third or more generation. The 39% of first generation fishers, reflect entrants who may be more capable of adjustment, than multi-generational fishing family members. There are 61% of fishers with a two or more generations of involvement in fishing, which may indicate longer term social association and integration with communities and potential to be significant contributors to social capital.

Age profile of licensed OH fishers

The ages obtained from licence records of fishers operating in the 1999-2000 period are reported in Figure H7 for all OH fishers and those active in 1999-2000. For 413 records the mean age is 48.4 years, with a standard deviation of 13.1 years. Of these, 21 % are aged greater than 60 years and will be entitled to the age pension within the lifetime of the FMS.

Figure H7: Age distribution of all OH fishers and active OH fishers (Source: NSWF licence records).



Skill sets among fishers

The extent of part-time and full-time fishing is reported in the economic issues Chapter G, Table G9. The fisher skills base was investigated through questions in the social survey. Fishers were asked about their current work in other industries and their capacity and willingness to transfer from fishing to other industries. Of 38 OH fishers (from 222 interviewed) who were undertaking paid work outside the industry:

- 19 (39)% would consider earning all their income from that other industry;
- 15 (50)% would not; and
- 4 (11)% were undecided.

All 222 OH fishers were asked about their capacity to consider alternative employment either full-time, part-time, or could not get employed outside fishing, as fishing is "all I know":

- 14% (32) could get FT employment outside fishing;
- 12% (26) could get PT employment outside fishing; and
- 71% (158) could not get employed outside fishing – fishing is "all I know";
- 3% (6) Don't know/ can't say.

The 158 fishers from 222 who answered "I probably could not get employed outside fishing, as fishing is all I know" were asked if they would consider retraining. A total of 19% (30) would and 78% (124) would not consider re-training. The 124 fishers who would not consider retraining, were asked about their reasons and this information is given in Table H6. Participants generally gave more than one response.

Table H6: Reasons for OH fishers not considering retraining to industries outside fishing (Source: RM-SS)

	OH	%
Fishing is only industry I know	57	26%
I'm too old	67	30%
I enjoy fishing	40	18%
It's a family business	19	9%
I've invested in equipment	17	8%
Bad health/injuries	6	3%
Risk of unemployment	3	1%
Illiterate/Low education	1	0%
Language barrier	0	0%
Other	10	5%
Can't say	0	0%
n=	128	100%

Age was the major reason for not considering retraining for 30% of the sample, followed by only having experience in the fishing industry. Both of these are inhibitors to the mobility of labour. Those who indicated a willingness to retrain were asked about their interest in retraining into other industries. The results are reported in Table H7.

Table H7: Industries which OH fishers may consider retraining into (Source: RM-SS)

Industry	OH	%
Tourism	5	17%
Charter fishing	3	10%
Landscaping	1	3%
Retailing	1	3%
Government	1	3%
Other	11	37%
Can't say	12	40%
n=	30	100%

Fishers indicated that tourism and charter fishing would be considered as industries for OH fishers to retrain into.

Discussion

The social survey information show the OH fishers to be dependent on the fishing industry with approximately 78% of fishers indicating they have limited capacity or willingness to move from fishing to other employment. Approximately 22% would be able to consider retraining, but of the 78% who would not, experience, age, education and a high level of fisher self identification, inhibit fishers' capacity to move to other industries. This "psychic income" from fishing is highly regarded by fishers, who do not feel they would be satisfied by other work in the same way. This reduces fisher mobility in the work force.

There has been little investigation of fisher mobility in the Australian fishing industry, but some notable social studies, such Bell and Nalson's seminal study in 1974, focus on issues for NSW dairy farmers facing industry viability and restructuring issues. Farmers were found to have strong identification with the land, farming and had low mobility. A range of quotes about the mobility of farmers from Bell and Nalson, (1974) is presented in Box H2 and may apply to fishers in the OH fishery.

Box H2: Quotes on social mobility issues for dairy farmers in northern NSW (Bell and Nalson, 1974).

It is not necessarily the worst farmers who leave the industry, but those who recognise other opportunities and are prepared to take the risk of turning to some other occupation. …..those that remain could will be a hard core residue of economically and socially depressed farmers.

Farmers with off farm work were less inclined to be in poverty, compared with those without dual occupations
Few respondents had alternative work. Social explanations are that farmers are farmers by tradition and it may also reflect lack of available opportunities for alternative work in different areas.

Social reasons for exiting farming may be the long hours involved in the industry, affording little leisure time, the advanced age of respondents and their wives, a potential labour shortage through sons leaving the industry, and reasons such as sickness and disputes around farming issues.

Old farmers, with no one following in the business, were not prepared to invest in new equipment.

Parents may not be encouraging children into the industry, but encourage education etc.

"Retreat farming" with the farmer holding on until eligible to receive the old age pension. Wife dissatisfaction is a major social influence in the dairy sector.

Many respondents were third generation and value farming as a way of life. With the independence it affords, are loath to leave their local social environment, friends, neighbours and relatives and the voluntary associations in which they have been active.

Away from farming they will have to compete with others for land based jobs. There may be a shortage of part-time labouring jobs.

The intergenerational nature of occupational mobility - most farmers transfer from one type of farming to another. Socially many farmers stay within 30 miles of place of birth. These ties may prevent farmers taking opportunities outside their area.

Farmers are independent and have a history of shunning government initiatives preferring voluntary adjustment.
They also tend to shun the CES (Commonwealth Employment Service) and rely on their own initiative.

A study analogous to the Bell and Nalson's work, is required across all fishers in NSW to confirm this material. There are significant social issues for fishers below retirement age seeking other employment. These will vary from area to area as indicated later in the social assessment.

Regions fished and regional unemployment statistics

The regional importance of the OH fishery to the local community is reported in Table H1 and H2.

Unemployment data is available from current ABS statistics (ABS, 2001) only at a more aggregated level than the 1996 census data, which is available for each postcode. Table H8a reports recent ABS unemployment data as of February 2001 for rural areas of coastal NSW.

Table H8a: ABS statistical regions and rural coastal area male unemployment (ABS, Feb. 2001).

	Labour force ('000)	**Unemployed Feb. 2001 ('000)**	**% Male**
Richmond-Tweed & Mid-North Coast SRs	106.1	15.8	14.9%
Gosford -Wyong SR	71.4	6.2	8.7%
Hunter SR	171.8	18.1	10.5%
Newcastle SR	149.8	17.4	10.5%
Sydney	-	-	6%
Illawarra SR	112.2	8.4	7.5%
South Eastern SR	152.9	12.2	8.0%
NSW Total			**7.2%**

Regional unemployment data indicates higher rates of unemployment in areas away from Sydney, being higher in the north than in the south. Male unemployment by age group also varies in NSW as reported in Table H8b.

Table H8b: Percentage male unemployment in NSW (ABS, Feb. 2001).

Age	**15-19**	**20-24**	**25-34**	**35-44**	**45-54**	**55 and over**
%	21.9	10.6	6.6	5	4.8	4.9

The fishing population in the OH fishery is almost entirely male with approximately 6 female fishers (from 400). More detailed statistics for unemployment by regional postcode are available from ABS 1996 census statistics in Table H2, and are reported on maps in Appendix H4. This gives a longer term view of regional unemployment in postcodes of coastal NSW.

Fisher numbers and unemployment at the postcode level are reported in Table H1 and H2. The range of unemployment is from 7% in Sydney, to 27% in Woombah/Others area in the Clarence region. The impact of the FMS and unemployment are assessed in the second part of this report.

(ii) community views and perceptions

Views of community

The OH fishers are a part of the rural coastal NSW community. In 1995 committees were established to address the issues of equitable sharing of resources amongst beach users in order to reduce conflict and fine tune aspects of rules in each region. These Regional Liaison Committees (RLCs) include representatives from Local Councils, National Parks and Wildlife Service,

recreational fishers and a variety of community groups. The RLC was to become an important link with the community in each region.

Many of the public are aware commercial fishers exist, but given many fishing activities are undertaken at first light, their fishing activities are not generally visible. The public often note odours and wastes associated with fishing landing sites and are concerned with the potential loss of amenity. Definitive public views on fishing are also difficult to obtain given the differing views on fishing issues within the community.

A public telephone survey was undertaken by Roy Morgan in 1999 investigating general community attitudes to a recreational fishing licence. There was a general community concern that the marine environment should be looked after. The Roy Morgan (1999) survey of 500 persons in NSW indicated that 95% of person felt it was important "that our fish stocks are well looked after". In the same survey 44% of responses prioritise "looking after the environment" as the most important aspect of managing fisheries.

Other opinions from the public, have been aired as part of the Recreational Fishing Area (RFA) process. The views reflect the context of the RFA debate and are not cited here.

Local Council policies suggest the public are generally concerned over fish odours and wastes associated with commercial and recreational fish landing sites and the potential loss of local amenity. The community expect OH fishers to provide fresh seafood for the majority of the population who do not catch their own fish. This again is difficult to measure.

(c) Identify current interaction of commercial fishing with the community including

(i) other recreational activities – boating, swimming, diving, whale/seal watching and other eco-tourism activities, discuss the potential for conflicts and synergies on a regional/subregional basis through interaction with recreational fishers, eco-tourism and related activities;

Regional marine leisure activity and integrated sea use between competing user groups

Coastal NSW has a great diversity in marine leisure activities. There is no definitive study on marine leisure activities in NSW coastal regions, but they tend to follow population distributions, or population movements, such as annual holidays to estuary regions.

Charter fishing usually goes offshore, while recreational fishers use beaches for some types of fishing, depending on the region. There is little formal whale watching activity, but general pleasure cruises occur in tourist venues close to Sydney (eg. Port Stephens etc). Recreational boating takes place along the NSW coast, but also in estuaries where many sail schools and water skiing activities prefer the shelter of the estuary environment. Diving takes place along the coast and in estuaries, where spear fishing may also take place or be subject to restrictions.

The potential for conflict between recreational and commercial fishers is minimised by commercial fishers not fishing openly at times of high tourist activity, or only fishing in areas not frequented by tourists. Tourists enjoy the fish and prawns cooked at the local fish shop or Coop, as evidenced by seafood sales in tourist destinations, but are also concerned over loss of environmental amenity (Roy Morgan, 1999).

Coastal NSW has a great diversity in marine leisure activities. There is no definitive study on marine leisure activities in NSW coastal regions, but they tend to follow population distributions or population movements such as annual holidays to beach regions. Under existing OH management certain beaches are closed to hauling operations in an annual or seasonal regime as explained in Attachment 1 of the OH FMS. This minimises conflict with other beach users in peak seasons.

The Recreational Liaison Committees in the Ocean Hauling fishery have sought to:

- identify and nominate traditional hauling grounds along beaches (Recognised Fishing Grounds, RFGs);
- close nominated beaches to hauling to reduce social conflict;
- have a local code of conduct; and
- identify the main target species in a region.

The RLC process has addressed issues in regions 1 to 4 and region 7. Regions 5 and 6 will be addressed in the term of this OH FMS (section C, I, xiii).

Anglers in the community are aware of hauling and netting taking place, and are concerned that fish are being taken in large numbers reducing recreational amenity and opportunities. This can lead to conflict between different commercial fishers and between commercial and recreational fishers. Some concerns are being addressed through the Recreational Fishing Area process in which some areas will be set aside for recreational fishers. Further work is needed to gain an on-going independent view of the community's views on fishing issues.

(ii) the visual and amenity issues

Ocean Hauling fishers can both contribute and detract from visual amenity. Tourists may expect to see some evidence of beach hauling, but object to fish odours, nets drying and fish offal/ frames disposed of in inappropriate ways, such as being dumped on the beach. Similarly, processing establishments and recreational fish cleaning areas can attract pelicans and birds to feed on scraps, which may not be seen as a visual or health amenity. Many of these issues can be addressed at the local council level and through responsible practices among fishers. In Ocean Hauling the RLC process is a social mechanism to assist in addressing these issues.

2) Likely social implications of implementing the plan

Introduction

This section evaluates the social impacts of implementing the OH Fisheries Management Strategy according to the criteria set out in the DUAP Director's guidelines document. Social impact assessment (SIA) of fishery management plans is a recent innovation in NSW. This is an assessment of social issues under the DUAP Director's guidelines related to the implementation of the OH FMS. The analysis is constrained by the available information, the resources available to the study and the lack of background information in this emerging area.

There is not an accepted fishery specific methodology to assessing social issues and relevant approaches are available from other natural resource industries. In the NSW Government's *Guidelines for assessing social impacts* (NSW Government 1997b) the following measure of community well being are recommended:

- Economic and financial measures - income measures, poverty lines, household expenditure, unemployment rates and indicators of business activity;
- Quality of life measures - leisure time, air and water quality, rates of illness and life expectancy, educational attainment levels, housing size and density, availability of social services;
- An assessment of intangible factors- quality of life measures, such as community spirit, levels of social cohesion, confidence in public institutions and intangible aspects of social well being including "social capital".

The NSW Government guidelines indicate there is no one measure of social well being and that while economic measures dominate many assessments, the quality of life measures and intangibles should be considered in policy assessment. Governments can use social assessments to "better anticipate the effects on policies and programs". When social impacts are made more transparent, policy trade-offs are highlighted and subsidiary policies to deal with negative impacts on particular areas and groups may be formulated" (NSW Government, 1997b). The social impact assessment in fisheries management plans in Australia is a new development.

Methods of Social Impact Assessment (SIA)

The NSW Government Guidelines suggest "it is not possible to establish a single SIA methodology to apply at a state-wide policy and program level because of the nature and impact of the policies often extend across regions and groups" (NSW Government, 1997b, p9). The guidelines set a broad

perspective or framework for social assessment summarised in a "quick test summary table" (NSW Government, 1997b, p23) as shown in Box H4.

Box H4: Quick test summary table (adapted from NSW Government, 1997b, p23).

1)Describe the policy objective

2) Identify the social impacts of the proposed policy

3) Measuring change and social impacts

4) Evaluating social impacts and social justice principles

5) Responding to impacts (monitoring, management and mitigation)

Further Government guidelines extend to the *Rural Community Impacts Statements* (NSW Government 1997a). In these the economic and social characteristics of rural communities in NSW are specifically recognised and recommended to be included in government decision making as summarised in Box H5. It is likely that rural fishing communities in coastal NSW struggle with similar issues.

Box H5: Summary of Characteristics Rural Communities after NSW Government, (1997a).

Geographic isolation - business being based at a distance from suppliers or markets;

A narrow and variable economic base- being dependant on one industry, coal mining, forestry, fishing etc, also being influence by public sector employment changes;

Physical isolation and small population size – individual families may live outside community centres and a greater distance from a more substantial regional service centre. Isolation limits social interaction, cultural and employment opportunities and access to public sector services and facilities. Communities may have small populations and express feelings of vulnerability being at a distance from the central decision making process.

A strong 'self help' culture – rural and regional communities are often "typified by values of self reliance, resourcefulness and independence, often responding to opportunities or threats with a strong and cohesive communal spirit".

A strong attachment to place – strong emotional/cultural attachments to as geographical location or place.

Rural industries have a major impact in the environment - rural and regional communities are custodians of most of the land of the state and intensively use natural resources.

Economic performance is dependent on environmental conditions – primary industries depend on environmental resources used as their inputs.

Social impacts and fisheries management

The social impact assessment of Fisheries management strategies in NSW is a new development and requires some adaptation of accepted analytical frameworks for assessment to suit the fisheries issues and to fulfil the DUAP Director's guidelines. In natural resource studies a four stage procedural framework is proposed by Fenton et al. (2000) as: Assessment (including scoping and profiling); Prediction; Mitigation; and Monitoring.

These steps concur with the DUAP and NSW Government Social Impact guidelines (NSW Government 1997b). However, the appraisal of social impacts of management of a natural resource also needs to incorporate the linkages between the changes in the social system induced by management and the affect on the resource system, and how changes in the resource system impact the social system. Fenton et al. (2000) recommend that the direction, strength, duration and positive and negative effects of the social system/resource system interactions, also need to be recognised. This can happen at several levels, but has a high information requirement beyond the scope of the current study and is recommended work in section 3.

Assessment of the social impacts of the FMS

It is proposed that the following approach will be taken to analysis of social impacts of the fisheries management strategy against the DUAP Director's guidelines under section H2.2.

Social issues arising from implementing a new management plan fall into several categories.

Firstly, there are socio-economic impacts arising directly from how the fisheries management strategy impacts the resource and the social system, including the community. Secondly, a plan brings change with social issues to be addressed by fishers. The socio-economic impacts are most readily quantified. Other measures of the capacity and willingness of fishers to respond or incorporate change are more difficult to estimate, requiring substantial fisher consultation and communication.

The current study prioritises the socio-economic impacts from the FMS. Other elements may be deemed to be important to individual fishers, but there is insufficient baseline information to independently evaluate fishers' opinions. The intention in a co-management consultation process, is that the development of the FMS has taken the fisher's viewpoint into account through the management advisory committee system and port meetings, outlining the intention of the FMS.

The following procedure was used to identify and rank social impacts. The fisheries management objective, with potential social impact and the response under the management strategy, are described and presented in Table form.

The generic social impacts of each management strategic response are identified on fishers and the community and responses ranked into two levels of impacts – High and Low. The ranking will reflect the predicted scale of social impact. For example, social impact may be determined as a function of the number of fishers affected by a policy, times the degree of impact of the policy on each fisher, or on the community. From this, the most highly impacting social issues are identified. Low impact social issues will be discussed generically.

The assessment

The management goals and the responses in the FMS were examined and those with potential social impacts are presented in Table H9. They were then ranked in order of predicted social impact. Priority was given to the socio-economic dislocation arising from impacts identified in the previous economic assessment, given their potential impact greatest numbers of fishers and families in the fishing community.

Ranked second after socio-economic dislocation, are social impacts with implications for fisher practices, the community, or which may be socially contentious, or require social cooperation. There are numerous responses which have social implications for industry harvesting practices, compliance issues and communication within the fishing community. The numerous responses are socially impacting in that the failure to keep addressing conflict, codes of conduct, compliance and communication issues, will adversely impact the co-management process and hence management of the fishery, to the detriment of the community. These issues are central to the functioning of the new management strategy and to the reduction of conflict among stakeholders and with the community. Social impacts will be addressed in section 1.3 (ii) below.

Table H9: Ranking of socially impacting responses for the OH Fisheries Management Strategy.

RESPONSE	DESCRIPTION OF RESPONSE	GOALS	Category	Ranking
4.5(a)	Fishing closures to control time & area fished - equitably share OH resources	1,2,6	EQ	HIGH
4.5(d)	Define and declare RFGs over high use historical fish sites	5,6	EQ	HIGH
2.2(c)	Species closures for short term constraints on active fishing effort	1,4,5	SE	HIGH
2.3(a)	Minimum entry shareholdings at the fishing business level	4,5	SE	HIGH
2.5(h)	Implement minimum shareholding immediately for garfish hauling net	1,4,5	SE	HIGH
5.3 & 5.3(a)	Provide secure fishing entitlement- category 2 share management		SE	HIGH
8.2(d)	Data on landings, effort and crew composition	1,2,4,6,7	SE	HIGH
2.4(a&b)	Ensure beach issues are considered by other Gov. agencies	1,5,6,7	COMM	LOW
2.4(c)	NSWF to comment on proposals which impact coastal resources	1,7	COMM	LOW
6.3(a&b)	Use OH MAC as primary consultative body & Independent Chairs	4	COMM	LOW
6.4(a)	Manage with other programs (MPAs etc)	1,3,4,5	COMM	LOW
7.1(a)	Provide continuing education strategy for fishers and contact officers	4,6	COMM	LOW
7.1(b)	Make FMS and EIS available to public	4,6	COMM	LOW
7.1(c)	Produce brochures and educational material	4,6	COMM	LOW
7.1(d)	Respond to inquiries from public	4,6,8	COMM	LOW
7.2(a)	Publish educational information on habitat	4,6	COMM	LOW
8.1(d)	Consult with stakeholders re research priorities	6,7	COMM	LOW
2.1(c)	Limit the size of gear in OH	1,4,5,6	COMP	LOW
2.3(b)	Implement renewal restriction for non-payment of fees	4,5	COMP	LOW
6.1(a)	Develop and monitor fishery & voluntary compliance program	2	COMP	LOW
6.1(b)	Implement an endorsement suspension & share forfeiture scheme	2,4	COMP	LOW
6.1(c)	Publish successful prosecution results for nominated offences	5,8	COMP	LOW
8.2(b)	Periodic review of catch and effort data	1,2,4,6,7	COMP	LOW
1.1(a)	Industry funded observer program to monitor habitats, by catch & data	2,3,4,7,8	IND	LOW
1.2 (a)	Protect habitat	2,6,7	IND	LOW
1.4(a)	Implement Marine Pest and disease Management Plans	2,6	IND	LOW
2.2(e)	Develop a policy to manage the harvest of bait for Comm. tuna fishery	1,4,5,7,8	IND	LOW
2.2(g)	Develop a nomination policy for all sectors of OH fishery	1,4,5,6,7,8	IND	LOW
2.5(a&b)	Implement recovery plan for major and minor harvesters	1,4,5,6	IND	LOW
2.5(c)	Precautionary action under species recovery plan	6,7,8	IND	LOW
2.5(e)	Remove Bullringing from OH to EG fishery	4,6	IND	LOW
3.1(a)	Modify the catch and effort returns on threatened species	6,7,8	IND	LOW
3.1(b)	Implement any threatened species recovery/ abatement plans	6	IND	LOW
4.1(a)	Assess non commercial and illegal catch	2	IND	LOW
4.2(a)	Monitor the catch levels and management of fisheries outside NSW jurisdiction	2,8	IND	LOW
4.5(b)ii	Develop Beach Hauling Code of Conduct in vicinity of rec. fishing areas	1,3,5,6,7	IND	LOW
4.5(c)ii	Develop Purse seine Code of Conduct in vicinity of rec. fishing areas	1,3,5,6,7	IND	LOW
2.1(a)	Monitor quantity, length, age & sex of commercial landings	1,4,5,7,8	SE	LOW
2.1(d)	Size limits to catch adult fish	4,5	SE	LOW
2.2(a)	Improve management control of engine size in beach fishery	4	SE	LOW
2.2(b)	Continue to apply the national policy on licence splitting	4,6	SE	LOW
2.2(d)	Hauling based methods- minimum shareholdiings to determine access	4,5,8	SE	LOW
2.2(g)	Restrict the length of replacement vessels in the OH fishery	4	SE	LOW
2.2(h)	Continue transfer policy- new businesses form from existing businesses	4,5	SE	LOW
2.2(i)	Continue net limitations and freeze on new nets	4	SE	LOW
2.2(o)	Maintain policies on provisions for individual circumstances	5	SE	LOW
2.5(f)	Continue zoning scheme to restrict operation to one zone	4,6	SE	LOW
2.5(i)	Remove concession to use 25mm mesh in garfish hauling net	1,5	SE	LOW
2.5(j)	Seasonal weekend closure on garfish	1,4	SE	LOW
4.3(a)	Lower limit on number of businesses shareholdings within each region	5	SE	LOW
4.4(a)	Participate in development and reviews of indigenous fishing strategy	6	SE	LOW
4.5(b)iv	Beach hauling Code of Conduct- for use of ice to add value to product.	1,3,5,6,7	SE	LOW
4.5(c)iv	Purse seine Code of Conduct- for use of ice to add value to product.	1,3,5,6,7	SE	LOW
5.1	Optimise the biological yield of fish and max. economic return		SE	LOW
5.2(a)	Consider purse seiners penning live catch for short periods		SE	LOW
5.2(b)	Performance measures for economic viability of fishing business	7	SE	LOW
5.2(c)	Cost recovery framework for services	6	SE	LOW
5.4(a)	Development of food safety programs	2,4,6,7	SE	LOW
6.3(c)	Monitor access restrictions from other jurisdictions	4,5	SE	LOW
8.2(e)	Reporting fish observed, but not caught	1,2,7	SE	LOW

Categories: SE socio-economic, EQ Equity, IND Industry practices, COMP Compliance, COMM Communication.

(1.2) Health issues - NOT IN TOR

(1.3) Social implication for fishers of any changes in resource allocations

(a) predict the likely social implications of maintaining the present resource allocation rules.

Appraise rules and social impact

The current rules in the OH fishery impact fishers in several ways. The high number of OH entitlements and relatively few fishers with high activity in Ocean Hauling, reflects a diverse fishing industry where many fishers are part time and earn seasonal income from Ocean Haul fishing. Many fishers are highly dependent on fishing as both a family business and a way of life, and look to access to the beaches or boat methods in OH to augment income on a seasonal basis. There may also be fishing to provide sustenance for families, fishers selling most of the catch and retaining some for own consumption. While only 21 fish OH only, other multiple and part time fishers also access many seasonal fishing opportunities for different species in the OH fishery.

Responses proposed under the FMS are to do with the endorsement structure in the fishery and the introduction of category 2 share management. This will continue the degree of restructuring as seen in the RFO process previously, but will give fishers stronger fishing rights and a market for shares, enabling fishers to exit with a payment on sale of shares. The low ranked issues, such as communication, industry cooperation and compliance, are important to the social processes in the fishery and to the integrity of management in the community.

The predicted social impact of maintaining the present rules are that they may not sufficiently address resource sustainability concerns and may increase social conflict within industry sectors and between industry and other sectors. The FMS will enable sock concerns to be addressed by seasonal closures and by minimum shareholding provisions, as illustrated by the case of garfish hauling nets.

The predicted outcomes from maintaining current rules are that in five years time there will be many older, low or non catching fishers, who will not readily be able to financially realise the value of their fishing endorsement or business. The move to shareholdings will enable fishers to exit the fishery with a payment. The resource will also be more adequately safeguarded through the ability of industry to respond to fluctuations through more transparent access mechanisms.

(b) outline any implications on fishers, their families or any local communities from any changes in the resource allocations including the likely social impacts on particular sectors (eg in certain locations, sub-regions or regions) if changes in the resource allocations were implemented; outline any possible measures which could be taken to mitigate any impacts

Implications of FMS changes

Significant social impacts are identified from Table H9 in the FMS. The implications of major impacts are examined on fishers, families and communities.

Managing businesses by minimum shareholdings

The FMS proposes to address industry viability and capacity through the implementation of category 2 share management and the use of minimum shareholdings at the business and endorsement level (response 2.3a). Estimates of adjustment in the OH fishery in the economic issues section (Chapter G) indicate that 55 businesses may be removed by share trading in the 2001-2006 period. Continuing at the rate of exiting as under the RFO policy in the next five years would lead to 15% of 404 endorsed fishers, approximately 60 fishers being displaced. These may be mostly elderly fishers or latent effort holders and low catchers grossing less than $10,000 per year.

The use of minimum shareholdings to address garfish net hauling (response 2.5h) will also impact 12 fishers, but the extent in terms of exiting the fishery depends on their other endorsement holdings. It is likely that the impact of adjusting businesses and at endorsement level will have a minimal cumulative effect. Given the number of multiple endorsements with Estuary General endorsements in the OH fishery, there may be significant cumulative impacts of the EG FMS on OH business numbers. Similarly the RFA process will reduce OH endorsement holdings to an unknown extent.

It is predicted that the removed businesses would be a mix of latent effort holders, and fishers who catch below $10,000 per year. The profile of these groups is investigated via the social survey and results reported in Appendix H3. Latent effort in the OH is almost 50% of all endorsements numbers in regions 5 to 7 in the south of the state, whereas 15-17% of all endorsed fishers earn less than $10,000 and are highest in regions 1, 3 and 5.

In summary, latent effort is held by fishers who have fished in the past, are not necessarily old and are probably undertaking some alternative employment. They have a mix of fishing experience and

family connections with the fishing industry and have a limited capacity to retrain. Fishers earning less than $10,000 are not significantly different, but were hesitant about stating income from fishing, whilst portraying themselves as full time fishers. In both cases there is a limited capacity and willingness to retrain.

Other high ranking social issues are to promote harmony through continued use of closed areas and time restrictions in consultation with the community, through the Regional Liaison Committees and to work towards having Recognised Fishing Grounds (RFGs – responses 4.5a&d). The intent of the RLC was that "the consultative process aimed to ensure social sustainability in the fishery" (FMS, 2001; response 4.5d).

Discussion

Regional impacts of any changes under the FMS can be estimated from the information reported from ABS social data in Table H1. The impacts of a 15% reduction in fisher numbers across the OH fishing communities is assumed, as there is no way to predict who sells businesses or endorsements. A 15% reduction in OH fisher numbers is reported in Table H10.

Table H10: Summary table of social indices for OH fishers with an estimated reduction of 15% in fisher numbers shown by district and zone (adapted from Table H1).

Zone	Home District	P'code Population	P'code Fishers	OH P'code Fishers	15% of OH P'code Fishers	Unemployed (%)	SEIFA	Med. Ind. Income (wk)	Employed in C.F. as (%) of labour force	Employed in OH as (%) of labour force
1	TWEED	41,938	63	17	2.6	16.9	922	250	0.37	0.10
	RICHMOND	24,184	52	6	0.9	13.7	972	250	0.52	0.06
	Zone	**66,122**	**115**	**23**	**3.5**	**15.3**	**947**	**250**	**0.45**	**0.08**
2	**CLARENCE**	**43,353**	**259**	**48**	**7.2**	**18.8**	**919**	**222**	**3.12**	**0.58**
3	COFFS HARBOUR	43,777	90	15	2.3	18.3	938	203	0.74	0.12
	HASTINGS	61,291	90	25	3.8	17.7	936	227	0.68	0.19
	Zone	**105,068**	**180**	**40**	**6.0**	**18.0**	**937**	**215**	**0.71**	**0.16**
4	MANNING	37,878	80	25	3.8	17.5	914	203	0.67	0.21
	WALLIS LAKE	22,704	105	36	5.4	14.8	939	250	2.78	0.95
	PORT STEPHENS	52,562	101	29	4.4	13.0	967	250	1.33	0.38
	HUNTER	27,283	22	7	1.1	11.7	954	250	0.30	0.10
	CENTRAL COAST	206,143	102	16	2.4	10.6	977	267	-	-
	Zone	**233,426**	**124**	**23**	**3.5**	**11.1**	**965**	**258**	**0.15**	**0.05**
5	**SYDNEY**	**3,276,207**	**189**	**17**	**2.6**	**7.3**	**1,047**	**350**	**-**	**-**
6	ILLAWARRA	51,979	38	23	3.5	16.9	891	203	0.10	0.06
	SHOALHAVEN	53,871	75	35	5.3	15.1	945	215	0.81	0.38
	Zone	**105,850**	**113**	**58**	**8.7**	**16.0**	**918**	**209**	**0.46**	**0.22**
7	BATEMANS BAY	34,836	105	22	3.3	17.0	958	227	1.18	0.25
	MONTAGUE	8,135	53	13	2.0	15.9	955	180	1.54	0.38
	FAR SOUTH COAST	3,726	61	23	3.5	12.1	916	250	2.56	0.97
	Zone	**11,861**	**114**	**36**	**5.4**	**14.0**	**936**	**215**	**2.05**	**0.67**
Grand Total		3,989,867	1,485	357	53.6	15.3	943	235	1.03	0.25

The number of OH fishers in zone 2, (Clarence), zone 3, (Coffs Harbour to Hastings) and zone 6 (Illawarra to Shoalhaven) are highest.

An estimate of OH fishing community vulnerability to social and economic impacts is reported in Table H11. This ranks OH fishers as proportion of labour force, ranked highest to lowest to show dependence, and the SEIFA index, ranked lowest to highest to show relative disadvantage. They are combined to give a joint ranking of community vulnerability.

Table H11: Joint ranking of community vulnerability for OH fishers (from ABS and NSWF data).

District	Employed in OH as (%) of labour force	Rank labour	SEIFA	Rank SEIFA	Joint rank score
FAR SOUTH COAST	0.97	1	916	3	**3**
ILLAWARRA	0.06	10	891	1	**10**
MANNING	0.21	6	914	2	**12**
CLARENCE	0.58	3	919	4	12
WALLIS LAKE	0.95	2	939	8	**16**
SHOALHAVEN	0.38	4	945	9	**36**
HASTINGS	0.19	7	936	6	**42**
MONTAGUE	0.38	4	955	11	**44**
TWEED	0.10	9	922	5	**45**
PORT STEPHENS	0.38	4	967	13	**52**
COFFS HARBOUR	0.12	8	938	7	**56**
BATEMANS BAY	0.25	5	958	12	**60**
HUNTER	0.10	9	954	10	**90**
RICHMOND	0.06	10	972	14	**140**
CENTRAL COAST	-		977	15	-
SYDNEY	-		1,047		**-**

Table H10 indicates the potential impact on fishing communities of a 15% reduction in fisher numbers. Table H11 is an index of the vulnerability of OH fishing communities generated from ranking of community dependence and the ranked SEIFA index giving each equal weighting.

This indicates that the OH fishing communities in Far South Coast, Illawarra, Manning, Clarence, and Wallis Lakes are most vulnerable to changes from the socio-economic impacts under the FMS given their higher dependence, lower SEIFA score, or a combination of both. For these communities, high unemployment, such as seen in the Clarence, also indicates potential difficulty in fishers finding alternative employment.

It is apparent in Table H11, that outside of Sydney and the Central Coast, OH fisher communities are more vulnerable to changes in their economic well being. This does not mean that fishing families in the Sydney/Central Coast area are less impacted by policies, but that these communities have more socio-economic alternatives than small rural isolated communities in coastal NSW.

Table H2 presents SEIFA data at the postcode level. Those postcodes within vulnerable districts with low SEIFA indices are identifiable and illustrate how small numbers of fishers in certain postcodes are vulnerable to socio-economic impacts. For example, Woombah in the Clarence region with SEIFA 864 and unemployment of 27.2% in the 1996 census (see Table H2)[2].

Under the FMS trading fishers can sell shares and receive a payment. This opportunity to exit may be taken by fishers over 60 years of age as a "superannuation package". Licence records indicate that approximately 85 OH endorsement holders (21%) are likely candidates in the next five years. This indicates that the desired 15% adjustment in the fishery, could be filled by elderly OH fishers alone.

The majority of fishers are below 60 years of age and wish to operate in OH fishing as a business or way of life. The results of the social survey indicate that both business and lifestyle are important aspects of familial and social identity among OH fishers. Some fishers are rural, low income part-time fishers, representing a "cottage industry", rather than the professional full time industry proposed under the FMS (response 2.3a). This requires further study (see section 3).

The social impacts of displacement of 60-70 fishers over 5 years are estimated in Table H12 using data from the social survey results in Table H3.

Table H12: The number of dependants impacted by the removal of fishers in the 2002-2007 period (Source: RM-SS).

		Numbers	
Exiting Fishers		**60**	**70**
Dependents			
Mean number of dependent children	0.9	54	63
No dependents	61%	0	0
Spouse	24%	14	17
Other dependents	16%	9	11
Total dependents		**77**	**91**

The numbers of dependants associated with 60-70 typical OH fishers, is between 77 and 91. This is an upper estimate, as if older fishers exit the fishery, then the number of dependent children below 16 reduce towards zero, approximately 23 to 28 dependants.

[2] As noted in Appendix H1, the Tables combining ABS and NSWF licence data are for postcodes with more than 10 NSW fishers. In the OH analysis approximately another 20% of fishers live in postcodes with fewer than 10 fishers in the NSW fishing industry. The OH analysis does not include these 20% of fishers and their communities could be relatively more impacted than those postcodes with more fishers.

The impact of fisher displacement on the communities will also depend on the exiting fishers' catch levels (their current contribution towards output) and their alternative income source on leaving fishing. A multiplier of 1.5-2.0 (Dr R. Powell, pers. comm.) would apply to impacts where no other income, including social security was available. Displacing 15% of fishers under share management will only reduce catch by a few percent. Many of the fishers will move to other opportunities, or to the age pension and welfare. Any negative multiplier effects from any the change would be small in the regional economy. However, there may be local impacts in small townships were fishers live. Payment received from selling shares may assist the local economy, depending on the pattern of trade. Debt levels among remaining fishers would likely rise with economic and social consequences. Should an area have a large number of low income, elderly fishers, the impact of adjustment might be greater in that area. The pattern of trading under share management should be monitored.

Other social impacts

Other social impacts are ranked as Low impact. Most social issues identified in Table H9 require good communication among fishers and with the community. Some FMS industry developments require the cooperation of fishers in supporting codes of conduct and food safety initiatives.

From the social survey, there were 16% of fishers interviewed state-wide who refused to complete social surveys. Such levels of resistance to FMS initiatives, could also impact the acceptance of new operating rules, or codes of conduct, to the detriment of the fishery and the community. Most of the low impact social responses in the FMS require the cooperation of fishers and management, in order to increase compliance. The policy changes have been discussed at the OH Management Advisory Committee and through a series of port meetings about the FMS. Fishers reactions have been noted by NSW Fisheries staff as part of the FMS consultative process.

The reduction of conflict is a major need in the OH fishery. This involves all parties and work needs to be undertaken in terms of social attitude and mechanisms for better cooperation among fishers and improved interactions between fishers and management through the co-management process. Communication and the management advisory committee process are central to reducing conflict in the OH fishery and the continuation of the RLC approach is essential.

Many social issues are larger than can be resolved by the FMS and will only be resolved in longer time frames. For example, does a " full time professional industry" give a more sustainable industry, than one comprised of part time fishers? In Ocean Hauling seasonal access can be either by full time or part

time fishers, with justification for both. The social and ESD aspects of this issue needs to be examined in NSW, and even nationally, and is recommended in further work.

(d) Identify the likely change in attitudes to compliance and the likely changes in the level of compliance.

The implementation of the FMS will bring several challenges for compliance. It is envisaged that if the FMS responses are followed and communication and compliance are recognised in the co-management framework, then this will assist with the levels of compliance. The increases in the cost of operations and displacement of fishers may lead to an increase in illegal fishing. This would have to be monitored, particularly through information from fishers in that region.

(c) Justify the preferred approach in terms of ESD principles.

The ESD principles for economic assessment are presented in NSW Government (1997; annex 5) and are the precautionary principle, intergenerational equity, biodiversity principle and the valuation principle.

The OH FMS intends to contain latent effort and adjust active effort across the fishery, through business adjustment and specific seasonal access closures to address resource concerns. The management process has previously had insufficient economic and social input and insufficient mechanisms and incentives for fishers to adjust effort in the face of resource issues. The FMS addresses this and thus it is pursuing the inter-generational objective of ESD. Implementing the changes to business numbers through minimum shareholdings is also a positive step in developing incentive and value. As adjustment takes place, the fish resource should start to develop more value to remaining fishers.

There are major social issues that may not be sufficiently addressed by the OH FMS. The economic review has indicated some commercially viable fishers and many low income, part-time, life style fishers. In seeking more sustainable resource use it is unlikely that the desire of government to create a professional full time fishing industry will suit the majority of fishers in the seasonal OH fishery. The seasonal nature of the Ocean Hauling resources and the most appropriate style of harvesting need further discussion and evaluation under ESD criteria. The strategy, is a first step in management of the OH fishery under ESD principles.

(3) Data requirements in relation to the assessment of the impacts on the social issues

(a) Provide reference to technical data and other information relied upon to assess impacts; indicated its reliability and what uncertainties (if any) are associated with the use of the data in the assessment of the FMS.

Prior to this study there was little social information on commercial fishers in NSW. The survey data comes from a Rapid Social Appraisal questionnaire executed by a telephone survey which is a first step towards the incorporation of social information in the management of fishers in NSW. The survey is not a definitive fishing survey social profiling exercise. Given the complexity of the fisheries production inter relationships, multiple communities and political climate among industry members facing significant allocation issues, the survey sought to gain a rapid over view of social issues raised under the FMS.

The survey revealed some inconsistencies in answers involving fisher income and these have been investigated by matching with the available Sydney index information and preliminary results from the economic survey.

(b) Identify where there are gaps in knowledge important for the assessment of the impacts of the fishery

The social profile of OH fishers can be augmented through time by further studies. Regional analysis of fisher communities is a priority integrating with economic information on the importance of the fishing activity to the community infrastructure of towns in NSW. Other approaches examine community linkages such as expenditures by businesses, employees, employee residential locations, social infrastructure services and existing social networks (Fenton and Marshall, 2001). Future social survey work should address community structure and inter-relationships at a regional level and articulate with regional economic studies previously recommended in section G. It is important to understand the fishing community in order to appraise the impacts of the fishery management strategies being developed in the next few years, which will have cumulative effects on fishing communities.

(c) detail a timetable for developing the data sets important for understanding longer term resource issues.

Fuller social profiles and regional analysis should be commenced in the next two years to assist in monitoring the impacts of adjustment and in preparation for appraisal of future management strategies. The survey information recently obtained can have existing NSWF data added to it for analysis, but has a limited shelf life.

More complete regional industry and fishing community studies need to be undertaken recognising the fishing communities can be cumulatively impacted by multiple fishery management strategies. In time it is desirable for the fishing community profile and characteristics to be more clearly identified. This would enable impacts from different FMSs to be monitored. In the longer term repeating social impact assessments for each fishery FMS risks ending up as a piecemeal and duplicative process if progress is not made in more fundamental fishery community profiling and monitoring in the next five years commencing as soon as possible.

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Appendix H1: Fisher community profile of commercial fishers in NSW (Source BRS/ABS data).

There has been no previous attempt to present a fishing community profile of the NSW Fishing Industry. The relevant social data of fishers in NSW was obtained from the ABS statistics via the Bureau of Rural Science Social Science unit and the fisher numbers in NSW from NSW Fisheries. These are reported in Appendix Table HA1. Maps are reported in Appendix H4.

Appendix Table HA1: Social index data for NSW Fishing communities at the for postcode level (Source: ABS, 1996 /BRS and NSWF).

Zone	Home District	P. code	Town/Suburb	No. Fishers	Total Population	Unemployed (%)	SEIFA	Med. Ind. Income (wk)	Employed in C.F. (%) of labour force
1	TWEED	2485	TWEED HEADS	22	8,978	20.0	893	200-299	0.3
1	TWEED	2486	TWEED HEADS/BANORA POINT	22	24,984	14.4	953	200-299	0.41
1	TWEED	2487	CHINDERAH/OTHERS	19	7,976	16.2	921	200-299	0.41
1	RICHMOND	2472	BROADWATER/CORAKI	10	1,761	19.5	919	200-299	1.02
1	RICHMOND	2473	EVANS HEAD	25	2,613	16.8	900	160-199	1.02
1	RICHMOND	2478	BALLINA/OTHERS	52	24,184	13.7	972	200-299	0.52
2	CLARENCE	2460	LAWRENCE/OTHERS	24	29,145	14.8	951	200-299	1.212
2	CLARENCE	2463	MACLEAN/OTHERS	96	6,072	16.2	946	200-299	4.46
2	CLARENCE	2464	YAMBA/OTHERS	64	5,340	17.1	954	200-299	4.46
2	CLARENCE	2466	ILUKA	65	1,863	18.6	891	160-199	4.46
2	CLARENCE	2469	WOOMBAH/OTHERS	10	933	27.2	854	160-199	1.02
3	COFFS HARBOUR	2448	NAMBUCCA/OTHERS	18	8,690	19.1	927	160-199	0.8
3	COFFS HARBOUR	2450	COFFS HARBOUR	52	32,488	15.8	971	200-299	0.24
3	COFFS HARBOUR	2456	WOOLGOOLGA/URUNGA	20	11,848	20.5	944	200-299	0.46
3	COFFS HARBOUR	2462	WOOLI/OTHERS	20	2,599	20.0	917	160-199	1.19
3	HASTINGS	2431	SOUTH WEST ROCKS	33	3,965	18.6	926	160-199	0.78
3	HASTINGS	2440	CRESCENT HEADS/OTHERS	20	23,164	19.3	916	200-299	0.78
3	HASTINGS	2444	PORT MACQUARIE	37	34,162	15.2	966	200-299	0.48
4	MANNING	2427	HARRINGTON/COOPERNOOK	24	1,473	18.0	883	160-199	0.71
4	MANNING	2430	TAREE/OTHERS	35	28,312	14.0	950	200-299	0.71
4	MANNING	2443	LAURIETON/OTHERS	21	8,093	20.6	909	160-199	0.595
4	WALLIS LAKE	2423	BUNGWAHL/OTHERS	17	3,247	14.5	939	200-299	2.78
4	WALLIS LAKE	2428	FORSTER/TUNCURRY/OTHERS	88	19,457	15.1	939	200-299	2.78
4	PORT STEPHENS	2301	NELSON/SALAMANDER BAYS/OTHERS	27	25,046	11.1	997	200-299	1.04
4	PORT STEPHENS	2315	NELSON BAY/OTHERS	54	8,393	14.3	966	200-299	1.04
4	PORT STEPHENS	2324	TEA GARDENS/OTHERS	20	19,123	13.6	937	200-299	1.91
4	HUNTER	2280	BELMONT/OTHERS	10	22,225	10.5	989	200-299	0.05
4	HUNTER	2281	SWANSEA/OTHERS	15	11,349	14.3	935	160-199	0.05
4	HUNTER	2295	STOCKTON/OTHERS	12	5,058	12.8	918	200-299	0.555
4	HUNTER	2304	MAYFIELD/WARABROOK	18	13,925	17.6	890	200-299	0.07
4	CENTRAL COAST	2250	ERINA/OTHERS	10	57,810	7.7	1025	300-399	0
4	CENTRAL COAST	2251	AVOCA BEACH/OTHERS	11	29,370	8.5	1032	200-299	0
4	CENTRAL COAST	2256	WOY WOY/OTHERS	12	14,168	11.1	941	200-299	0
4	CENTRAL COAST	2257	EMPIRE BAY/OTHERS	10	25,326	11.6	957	200-299	0
4	CENTRAL COAST	2261	BERKELEY VALE/OTHERS	19	32,623	14.1	935	200-299	0
4	CENTRAL COAST	2259	MANNERING PARK/TACOMA/OTHERS	40	46,846	10.6	972	200-299	0
5	HAWKESBURY	2083	MOONEY MOONEY	12	1,450	5.7	1042	300-399	0
5	HAWKESBURY	2775	SPENCER	18	930	9.2	967	200-299	0
5	SYDNEY	171400	SYDNEY NORTH & SOUTH	189	3,276,207	7.3	1047	300-399	0
6	ILLAWARRA	2500	WOLLONGONG	10	32,326	12.6	998	200-299	0.1
6	ILLAWARRA	2502	PRIMBEE/OTHERS	10	13,000	18.9	847	160-199	0.1
6	ILLAWARRA	2506	BERKELEY	18	6,653	19.0	827	160-199	0.1
6	ILLAWARRA	2533	KIAMA	12	13,553	7.6	1067	200-299	0.23
6	SHOALHAVEN	2540	GREENWELL POINT/OTHERS	59	24,208	18.2	933	160-199	0.81
6	SHOALHAVEN	2541	NOWRA/OTHERS	16	29,663	12.0	957	200-299	0.81
7	BATEMANS BAY	2536	BATEMANS BAY/OTHERS	32	14,335	15.5	970	200-299	1.175
7	BATEMANS BAY	2537	MORUYA/OTHERS	10	9,002	18.2	960	200-299	1.54
7	BATEMANS BAY	2539	ULLADULLA/OTHERS	63	11,499	17.4	942	160-199	0.81
7	MONTAGUE	2546	NAROOMA/OTHERS	53	8,135	15.9	955	160-199	1.54
7	FAR SOUTH COAST	2551	EDEN	61	3,726	12.1	916	200-299	2.56
			Total	**1615**					

Explanation of Relevant Social Data for NSW Fishing Post Code Areas.

The data contained within Appendix Table H1 has been acquired from the Australian Bureau of Statistics (ABS) Housing and Population census 1996. The data on zones, districts, postcodes and fishers numbers is from NSWF.

Population -The total population is for the postcodes as in the 1996 census data (ABS, 1996).

Unemployment -Unemployment is the proportion of the labour force seeking either part-time or full-time employment, expressed as a percentage at postcode level from the 1996 census data (ABS, 1996).

SEIFA Index of Disadvantage - The Australian Bureau of Statistics (ABS) developed the Socio-Economic Index for Areas (SEIFA) of relative disadvantage from the 1996 population census. Areas with the greatest disadvantage have high proportions of low income families, unemployed people, people without educational qualifications, households renting public housing and people in low-skilled occupations. The SEIFA score for Australia as a whole is standardised at 1,000. Australia's non-metropolitan average is 972, so, a SEIFA[3] score of 941 (as is the case with Woy Woy/others), which is 31 points lower than Australia's non-metropolitan average, would indicate the town's residents are more disadvantaged than most of non-metropolitan Australia.

Weekly Median Individual Income - The ABS' 1996 housing and population census derives information about individual income from income categories. The median income is that income category that splits the population, ie. it refers to the category where 50 percent of the population from an area selected area has income categories either above or of the same category as the median. For example, in Spencer, 50 percent of the population earned between $0 and $299 per week and 50 percent earned $200 or more per week. Sydney's median individual income ($300 - $399) is one of the highest in this sample, compared to Wooli's in the Coffs Harbour district, which is one of the lowest ($160 - $199).

Employment in Fishing -Employment[4] in the fishing industry has been expressed as a percentage of the Total Labour Force (TLF). For example, 2.78 percent of Forster/Tuncurry's labour force is employed in commercial fishing. The commercial fishing category includes all of the following possible sub-categories: Rock lobster fishing; Prawn fishing; Finfish fishing; Squid jigging; Line

[3] "The ABS does not supply SEIFA values at the post code level. Supply options are at the level of the Statistical Local Area (SLA) or census Collection District (CD). To present SEIFA values at the postcode level it was necessary to calculate a mean score from all SLAs that intersected the post code in question. While this method results in an estimated SEIFA value for postcodes, it can be regarded as a fairly accurate estimation because SEIFA scores are strongly correlated with local geography"(BRS, 2001).

[4] "The BRS do not have a NSW data set on employment in commercial fishing at the postcode level. Data is at the SLA level. For consistency, the data is again presented at the postcode level by calculating a mean score from all SLAs that intersected the post codes. Again, it is considered that this is fairly accurate estimation given the circumstances of local geography" (BRS, 2001).

fishing; Marine fishing; Marine fishing undefined; Aquaculture; and Commercial fishing undefined. The inclusion of aquaculture and fishers from all jurisdictions, means that the ABS commercial fisher data is likely an over estimate of commercial fishers in managed fisheries in NSW.

The data in Appendix Table H1 is for postcodes with more than 10 NSW commercial fishers. This means that 1,615 fishers from a total of 1,920 are included in the analysis. The other 305 live in postcodes areas with less than 10 fishers, and are omitted. This should be borne in mind in the analysis of results.

Maps of ABS data on unemployment, SEIFA index, employment in commercial fishing and weekly average income from the national census are reported in Appendix H4.

Appendix H2: The telephone Social Survey (Roy Morgan, 2001a).

The available information in NSW was previously limited and relied entirely on the NSWF licensing system. Recognising this a social survey was undertaken by telephone in May 2001 by Roy Morgan Research (Roy Morgan, 2001a). The social survey had 870 replies from 1,751 businesses contacted in NSW as reported in Appendix Table HA2.

Appendix Table HA2: The response rate for the NSW social telephone survey (Source: RM-SS).

	Frequency	**%**		
Completed questionnaires	870	50%		
			50%	
No reply	115	7%		
Engaged	36	2%		
Unobtainable	136	8%		
Appointments	59	3%		
Repeated calls (6)	78	4%		
Total unable to contact	424		24%	
Refusals	278	16%		
Terminations	179	10%		
Refusals/terminations	457		26%	
Total	**1751**			**100%**

The response rate across all fishers in NSW was 50%. These figures compare favourably with the telephone survey of Queensland fishers (Fenton and Marshall, 2000), though there are 26% of refusals/ terminations and approximately 24% of fishers were unable to be contacted.

Some 10% of interviews were terminated, usually due to language problems during the interview (Roy Morgan, 2001a). The completed interview results may not adequately reflect fishers from non-English speaking backgrounds. Approximately 16% of fishers refused to participate in the survey. This was due to a variety of reasons which can only be surmised, but which may indicate significant social discord between fishers and management in relation to the FMS and the Recreational Fishing Areas process and perceptions of management among fishers.

Of the 870 state-wide replies, 222 replies (25.5%) were from Ocean Hauling endorsement holders who constitute 23% of all licence holders state-wide. Of 222 OH endorsement holders contacted, 80% interviewed in the social survey had been fishing in the OH in the previous 12 months. Given there are 404 endorsement holders in the OH and 299 of these went fishing in 1999-2000, the surveyed fishers are more active than the endorsed population. Given the total number of licences is twice the number of interviews, this means that doubling the responses of the social survey may considerably overestimate the fishing population.

Appendix 3: Social profiling of fishers likely to exit the OH fishery under the FMS

It is predicted that many elderly fishers will likely exit the fishery in the next five years. Two other categories of fishers are examined here to see their social profiles. They are those who are currently constitute latent effort and OH fishers grossing under $10,000 from all their fishing.

The social profile of latent effort share holders.

There are OH endorsed fishers who are latent in all fisheries. This means they did not catch fish in any commercial fishery administered by NSW Fisheries in 1999-2000, but have previously fished in NSW. Appendix Table HA4 reports the regional dispersion of OH fishers considered as latent effort and the proportion who responded to the social survey. Their characteristics can then be identified from the survey results.

Comparisons of latent effort holders and total endorsement numbers by zone are also presented in Appendix Table HA4. The average zone has 34% of total endorsements latent. Adjustment of endorsements by zoning will mean that a generic state-wide minimum shareholding rate would impact zones differently. If considering social impacts by numbers of latent fishers, then zone 4 has the largest number of latent effort fishers who may be potentially impacted by the FMS, whereas zone 7 has the highest percentage of latent endorsements.

Appendix Table HA4: The social survey coverage of latent OH endorsed fishers (Yes is a SS response) (source: RM-SS).

Zone	Yes	No	Total Latent	Total endorsed	Latent as % of endorsed
1	2	9	11	35	31%
2	4	8	12	51	24%
3	4	11	15	50	30%
4	16	22	38	149	26%
5	2	7	9	20	45%
6	13	24	37	80	46%
7	15	18	33	64	52%
Total	**56**	**99**	**155**	**449**	**35%**

The following information is available on latent endorsement holders from the social survey:

- The median age bracket was 45-49 years old, with over 75% of these fishers having lived in their current residence for over 20 years.
- The median number of children is 1.

- The median years fished was 21-25 years.
- The median number of generations fished was two generations.
- Gross income: 29% of the interviewed fishers chose not to reply. Of those who did, the median income was $35 - $40,000, while 13% apparently earned over $100,000 pa. 80% of those interviewed said that 90-100% of their income is from fishing.
- Most (62%) had no employees, while a further 20% had one or two employees.
- A minority (18%) claimed to have employment in other industries, and 16% claimed they could get full time work in another industry, and another 9% that they could get part-time employment in other industries. Only 21% would consider retraining, with the most common reasons for refusal being that they enjoy fishing, fishing is all they know, or they are too old.

Latent effort holders in the OH fishery have little revenue from fishing in NSW and means their apparent fishing income was either not within NSW, was in the processing sector, or from welfare or other sources. Observation of the survey responses suggests that many of the fishers may have been reluctant to give full details of their alternate work, or overstated income from all sources.

In summary, latent effort is held by fishers who have fished in the past, are not necessarily old and are probably undertaking some alternative employment. They have a mix of fishing experience and family connections with the fishing industry and have a limited capacity to retrain.

The social profile of OH endorsement holders grossing less than $10,000 per year.

Social impacts are also likely to be found among low catching OH fishers with catch revenue estimated by the Sydney index at below $10,000 across their fishing activities. It is likely that these fishers may sell shares rather than trading up to the minimum shareholding. For the OH endorsement holders there were 149 fishers in 1999-2000, who grossed less than $10,000 in all their fishing in NSW. Appendix Table HA5 reports the regional location of low earning fishers in the OH fishery and the proportion sampled in the social survey.

Appendix Table HA5 reports fishers numbers (< $10,000 per annum) as percentages of total active fishers in each area. On average it is 12% state-wide with least fishers by percentage in zone 7 and most by number in zone 4. Zone 1 has the highest percentage of small fishers.

Appendix Table HA5: Survey Coverage of OH Endorsed Fishers earning less than $10,000 in the fishing industry (Yes is a SS response).

Zone	Yes	No	Total < 10K	Total end.	<10K as % of endorsed
1	1	5	6	35	17%
2	4	2	6	51	12%
3	4	4	8	50	16%
4	9	10	19	149	13%
5	2	1	3	20	15%
6	3	4	7	80	9%
7	2	3	5	64	8%
Total	**25**	**29**	**54**	**449**	**12%**

The characteristics of the OH fishers involved with fishing businesses grossing less than $10,000 of fish in 1999-2000 are:

- The median age bracket was 50-54 years old, and the median years fished was 16-20 years. 52% of fishers have more than 1 generation of fishing history, and 56% of these fishers have lived in their current residence for over 20 years.
- Dependents: 52% of fishers had no children under 16, only 20% have more than 1 child under 16.
- Gross income: 48% of the interviewed fishers chose not to reply. Of those who did, the median income was $40,000 - $45,000, while 68% of those interviewed said that 90-100% of their income is from fishing.
- Most (76%), had no employees.
- Employment in other industries: A minority (28%) claimed to have employment in other industries. When asked if they could get full-time employment in another industry, most (68%) chose not to reply. Of those who did reply, only 25% claimed they could get full time employment in other industries. Only 12% would consider re-training, with the most common reasons given being too old (36%) and fishing is all I know (20%).

In summary, fishers earning less than $10,000 a year in 1999-2000 have a range of ages, and length of involvement with the fishing industry. A significant number chose not to answer the income question and nearly 70% indicated they were full time fishers. Approximately 25% could get employment in other industries and 56% considered themselves unable to retrain.

Appendix H4: Socio-economic maps for NSW fishers.

Maps of ABS data on unemployment, SEIFA index, employment in commercial fishing and weekly average income, from the national census (ABS, 1996). Thanks to BRS social science unit for this material.

NSW FISHERIES

NSW OCEAN HAULING FISHERY MANAGEMENT STRATEGY ASSESSMENT OF IMPACTS ON HERITAGE AND INDIGENOUS ISSUES

Prepared by:

Umwelt (Australia) Pty Limited
Environmental and Catchment Management Consultants

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NSW FISHERIES

NSW OCEAN HAULING FISHERY MANAGEMENT STRATEGY
ASSESSMENT OF IMPACTS ON HERITAGE AND INDIGENOUS ISSUES

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1.0 INTRODUCTION

The draft Ocean Hauling Fishery Management Strategy (October 2001) has been prepared by NSW Fisheries to fulfil the requirements of the Fisheries Management Act 1994. The strategy sets out the objectives of this sector of the NSW commercial fishery, together with a vision for the future sustainable management of the fishery. It also documents how the fishery will be managed, including rules for access and operation, performance indicators, monitoring regimes and triggers for review.

Prior to the finalisation of the Ocean Hauling Management Strategy (OHFMS), an environmental impact assessment under the provisions of the Environmental Planning and Assessment Act 1979 (EP&A Act) is required. The Department of Urban Affairs and Planning (DUAP) has provided Director General's Requirements for the preparation of an Environmental Impact Statement and a Planning Focus Meeting has been held to clarify the issues of concern to key stakeholders, that must be addressed in the EIS.

In the case of the OHFMS, the activity for which approval is sought under Part 5 of the EP&A Act is the commercial taking of finfish for sale from ocean waters using hauling nets shot from and retrieved to beaches or shot from and retrieved to licensed fishing boats, and the use of purse seine nets. The use of the lift net by licensed commercial fishers to take bait for tuna operations is also managed by the ocean hauling fishery.

A wide range of species are landed within this fishery however, more than 99% of the catch comprises 19 species. These include Australian salmon, yellowtail, mackeral, sea mullet, sweep, whiting, bream, trevally, dart, garfish and pilchard.

Not all beaches and ocean waters are open to the ocean hauling fishery. The Fisheries Management Act authorises a number of beach and ocean water closures that restrict the areas in which the ocean hauling fishery may operate. Some areas are also closed because they have been declared marine protected areas or marine extensions of National Parks.

The activity that is being assessed in this EIS includes the actual fish catching activities from beaches and boats. Land based activities that are peripheral to the various methods of catching fish are not included in this environmental impact assessment. These land based activities include boat launching, storage and maintenance areas, and net storage and maintenance areas. In general, these activities are likely to be covered by a range of existing development consents under the planning regulations applying in the local government area in which they are located.

A Code of Conduct for ocean hauling specifies that fishers will operate only on the beach, using designated access ways that have been approved by NPWS. Commercial beach haulers must not drive on frontal dune systems or use other parts of coastal dune systems in any way.

This document addresses the issues that have been noted in the Director General's Requirements in relation to heritage and Indigenous matters.

1.1 DIRECTOR GENERAL'S REQUIREMENTS

The issues that must be assessed in relation to heritage matters are noted in Section 2.3 of Part H (Social Issues) of the Director General's Requirements:

(a) Identify shipwreck sites or other sites of historic heritage that are likely to be affected by fishing activities and outline measures to minimise risk of harm to these sites.

(b) Identify any important Aboriginal heritage sites/places used by fishers and outline protocols/measures to be developed in consultation with representatives of the Aboriginal community to minimise risk of harm to these sites.

The issues that must be assessed in relation to Indigenous issues are noted in Section 3 of Part H of the Director General's Requirements:

(a) Identify the interests of Indigenous people in the resources harvested by the fishery and in habitats that may be impacted by the proposed activity.

(b) Assess the impacts of the activities proposed to be authorised by the management strategy on Indigenous interests. In particular, assess the impacts of implementing the strategy on:

1. traditional fishing, including access, participation and culture (such as places of significance - middens, totemic symbols etc);

2. Indigenous communities' well being, including economics, employment and community viability; and

3. government policies on Indigenous fisheries issues, including the NSW Indigenous Fishery Strategy.

(c) Mitigation and management measures.

1.2 SCOPE OF STUDY AND ASSESSMENT

This assessment is presented in three main parts.

Section 2 of the document deals with European heritage issues. European heritage sites, reflecting the importance of maritime activities in the past development of NSW, are widely distributed along the NSW coastline, with (for instance) some 1500 shipwreck sites recorded. This assessment considers potential impacts of ocean hauling fishing activities on those European heritage sites that are listed in inventories maintained by The NSW Heritage Commission, the National Estate, and the Australian Shipwreck register. It is considered that there is a low risk that ocean hauling fishing activities will impact on these sites, although some shipwreck sites may present safety risks to ocean hauling fishers in boats. In this context, the assessment does not explore the historical details for European heritage sites.

The assessment presented in **Section 2** uses the historic heritage information for one section of the coastline (Newcastle and Stockton Bight) to illustrate the types of information that is available and the possible interactions between ocean hauling fishers and historic heritage items.

The Director-General's Requirements in relation to Aboriginal heritage sites relate to the identification of Aboriginal sites or places that are used by (ocean hauling) fishers, and preparing protocols to minimise the risk of harm to these sites by ocean hauling fishery activities.

There is abundant ethnographic and archaeological evidence for past use of beaches, headlands, dunes and nearshore waters by Aboriginal people, and of the importance of resources from these environments to Aboriginal economies and lifestyles. This evidence is described in **Sections 3.2.1** to **3.2.4**.

Known Aboriginal sites are recorded in the NPWS Aboriginal Sites Register, and there are many hundreds of known sites located along beaches and in associated coastal dune systems. Middens are reported from many beaches (although the distribution of known midden sites is heavily

influenced by the nature of the beach and dune system). In addition to the known sites in this landscape context, there is potential for archaeological evidence to be present that is not yet recorded in the NPWS Register. Some of this evidence may be known to local Aboriginal people, and some is sub-surface evidence that has no surface expression unless disturbed by processes such as excavation and land clearing.

In assessing the existing and potential impacts of activities that would be authorised under the OHFMS on known Aboriginal sites, a strategic approach has been taken.

Within the seven main beach hauling regions along the NSW coast, there are hundreds of beaches that are used by commercial fishers for at least part of the year. The major commercial fishing grounds in each region are designated traditional hauling grounds and, for example, there are 17 traditional hauling grounds identified within region 7 (far south coast). Shared hauling grounds refer to most of the coastline, where commercial fishing activities occur with other users.

A search of the NPWS Aboriginal Site Register for each of these beaches would require consultation with each coastal Land Council, to obtain permission to gain access to large amounts of culturally sensitive data. This is not practical within the scope of this EIS process. In addition, the extent of the impact of ocean hauling fishing on physical evidence of past Aboriginal occupation does not justify the mapping of every known site along beaches. Neither is it appropriate that the locations of such a large number of coastal Aboriginal sites be made public in one publication.

Instead, **Sections 3.2.1** to **3.2.4** synthesise the information that is available about the ways that Aboriginal people used and valued coastal resources in the past, and discuss the types of risks to sites that could be associated with ocean hauling fishery activity. **Section 3.3** discusses options for minimising the risk to Aboriginal sites and places.

The extent of Aboriginal cultural heritage and contemporary Indigenous issues related to the ocean hauling fishery is not directly related to the size of the commercial fishery with any region. The total ocean hauling catch, and the most important species vary considerably between zones. For instance, Region 1 (far north coast) has the highest total ocean hauling catch and the highest Pilchard catch, but no Australian Salmon is landed in this zone. The biggest Australian Salmon catch is in Region 7 (far south coast) which has very small catches of sprat and pilchards. Issues about Indigenous access to the ocean hauling fishery are reported by the Aboriginal community from many other locations. The issues are frequently associated with the regulatory framework for the fishery, rather than the scale of individual enterprises in any one location. This matter is discussed further in **Section 4**.

It is important to note that there are several other concurrent policy development initiatives by NSW Fisheries that will affect the interaction of Aboriginal fishers with the commercial ocean hauling fishery. In particular, NSW Fisheries is currently working with the Aboriginal community to develop an Indigenous Fishery Strategy that will provide a new framework for the management of Indigenous and commercial fisheries. The information presented in this assessment draws on the work in progress towards the Indigenous Fishery Strategy, and outlines a process for ongoing review of regulatory relationships, but in no way pre-empts the outcomes of that strategy.

2.0 HISTORIC HERITAGE

This section reports the results of a review of the historic heritage that is located within the precincts of the 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 ocean hauling commercial fishing operation might have some impact on an element or vice versa.

For the purposes of this report, historic heritage has been differentiated between the transport and structural contexts. This differentiation is essentially dictated by the base source(s) or recording database(s) from which data has been derived. The transport context is specifically represented in the record of shipwrecks. The structural environment includes such resources as landing ramps, seawalls, breakwaters, piers and boat harbours, but also includes such developments as groynes and piles.

2.1 TRANSPORT HERITAGE

This section addresses shipwrecks that have been recorded along NSW beaches. It is heavily based on data contained in the Australian National Shipwreck Database (ANSD), which is maintained by the Australian Institute for Marine Archaeology. Only a sample of the information from the ANSD has been analysed (for the Newcastle / Stockton coastline). This area has a strong maritime history and high concentration of beach / nearshore shipwrecks and is a recognised ocean hauling fishing ground. This section of the coastline is also subject to significant wind and wave erosion, so that there is a risk that old features may be exposed after storms. In this sense, this example illustrates the "worst case" potential interaction between ocean hauling fishers and coastal historic heritage features.

2.1.1 Methodology

For this component of the study, the sources of data were the ANSD with additional source material obtained from:

- *The Register of British Shipping;*
- Annual reports of government departments, particularly in the latter quarter of the 19th Century;
- The Register of the National Estate, maintained by Environment Australia;
- The (NSW) State Heritage Register, maintained by the NSW Heritage Council;
- The (NSW) State Heritage Inventory, maintained by the NSW Heritage Council;
- *Bar Dangerous: A Maritime History of Newcastle* (Callan 1986) and *Bar Safe* (Callan 1994);
- Index of shipwrecks on the NSW Coast Between the Hawkesbury and Manning Rivers, 1788-1970 (Fletcher nd);
- *Australian Shipwrecks* (Loney 1980);
- *Shipwreck Atlas of New South Wales* (NSW Heritage Office 1996);
- *Centenary: NSW Steamship Wrecks* (Parsons 1995);
- *Scuttled and Abandoned Ships in Australian Waters* (Parsons & Plunkett 1998);
- Navigational charts of the coastline and estuaries; and
- Information from statewide and local newspapers.

The sources of data are collectively referred to as 'the marine archaeological record' and are appropriately referenced in the following material and particularly in appendices.

Search of the marine archaeological record indicated that nearly 1500 shipwrecks have been recorded along the New South Wales coastline. One of the difficulties posed by the ANSD, and by the marine archaeological record generally, was that the location of many shipwrecks could not be specified with any degree of accuracy, particularly regarding shipwrecks of the 19th Century. The judgment involved in differentiating inshore from estuarine and offshore shipwrecks was guided by the following criteria:

1. Detail of the geographical location of the wreck and/or precision in description of geographical features relevant to the wreck. For example, while a wreck described as located on the oyster bank is relatively definitive, one that refers to the wreck location as being simply 'Port Stephens' may refer to the estuary, or offshore or inshore but a reference to 'Hannah ([sic: Anna] Bay' will probably place the wreck in inshore waters;

2. The nature of the vessel's voyage, eg. international, inter-colonial, coastal intra-state, or port service. Thus, a vessel described only as having been wrecked 'off Sydney' in transit from Valparaiso to Newcastle will have been unlikely to have been inshore at that stage of the voyage;

3. The origin and destination of the voyage: for instance, a vessel (particularly a sailing packet), engaged on a late 19th Century voyage from Brisbane to Sydney, wrecked off Port Macquarie will be considered sufficiently likely to have been wrecked inshore to be scheduled;

4. The circumstances of the loss, eg. navigation error, failure of equipment, condition of wind and/or weather. The examples of such causes are boundless and need to be read in conjunction with criteria 3 and 4 above.

Greater precision in describing the disposition of shipwrecks could only be achieved by research of primary sources.

2.1.2 Results

By an application of the judgment criteria to the raw results of researching the marine archaeological record, approximately 1100 shipwrecks appear to be located within New South Wales non-estuarine inshore waters. Of these approximately 150 are recorded along the Newcastle / Stockton coastline.

It is clear from **Appendix 1** that it is difficult to pinpoint the locations of these wrecks, or the amount of wreckage that may still remain, with any certainty.

2.2 STRUCTURAL HERITAGE

This section is concerned, essentially, with all historic heritage resources, other than shipwrecks, that have been recorded along NSW beaches and is based on data contained in National, State, regional and local heritage reviews.

2.2.1 Methodology

For this component of the study, research was directed mainly to the following base records:

- The Register of the National Estate (RNE), maintained by Environment Australia;
- The (NSW) State Heritage Register, maintained by the NSW Heritage Council; and

- The (NSW) State Heritage Inventory, maintained by the NSW Heritage Council.

Other sources considered for some specific sites were:

- Statutory studies and reports at local and regional level of historic heritage resources;
- Studies relating to coastline and estuary management strategies;
- The studies and reports by archaeologists, of specific historic heritage resources;
- Navigational charts of the coastline; and
- Information from statewide and local newspapers.

The sources of data are collectively described as 'the archaeological record' and are appropriately referenced in the following material (see also **Appendix 2**).

The level at which a site is recorded, on the RNE, the SHR, or in a REP or LEP, is a basic indication of the level of cultural significance attached to the site. An abstract of the concept of cultural significance is contained in **Section 2.3**.

Some questions regarding the relationship of individual resources to inshore waters were raised by the heritage records. In general, the location of resources in the RNE and SHR were specific but those of REPs and LEPs were less so. In cases of doubt, the following criteria were applied:

1. the probable limit of tidal influence and navigability in inshore waters by reference to maps and charts;
2. more precise location of sites by the use of peripheral or explanatory data. For example, reference to connection to another known inshore heritage site or material.

2.2.2 Results

As for the shipwreck data, an example of the types of information that can be obtained from various sources in relation to structural historic heritage is presented in this analysis. The features that are listed in **Appendix 2** relate to the Newcastle local government area.

Appendix 2 sets out:

- the name of the site, item or resource;
- the status of the site, item or resource in the RNE process;
- the date of construction or an indication of the age of the resource;
- the location of the resource;
- the reference to the database entry of the resource in the RNE (the RNEDB), SHR or SHI; and
- the level of heritage listing, which indicates the level of significance that has been accorded to the resource.

All of the structural features listed in **Appendix 2** relate to the headlands and rocky coastline, or to beaches or features constructed at the back of the beach. It is highly unlikely that any licensed ocean hauling fishers would be operating in a manner that would affect any of these features.

Apart from access and interaction with other users, commercial fishers would not risk their equipment on these rocky shorelines or small pocket beaches.

2.3 THE CONCEPT OF SIGNIFICANCE

The extent to which an item of historic heritage is a constraint to future development depends largely on the assessment of its significance. This section explains the concept of cultural significance and the following section notes the significance that has been attributed to various heritage resources. The protection afforded by Commonwealth and State heritage and planning legislation is also noted.

The Heritage Act, 1977 (NSW) defines items of environmental heritage to be:

> *Those buildings, works, relics or places of historic, scientific, cultural, social, archaeological, architectural, natural or aesthetic significance for the state of New South Wales.*
>
> *In the context of this report, significance is the measure of the value and importance of elements of the archaeological record to cultural heritage. While the fabric of the archaeological record is the subject of the assessment of heritage significance, the assessment itself is conditioned by the environmental and historic context of the site. Furthermore, an evaluation of heritage significance is not static but evolutionary, as a function of evolving community perspectives and cultural values.*

The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance (the Burra Charter) classifies the *nature* of cultural significance in terms of historical, aesthetic, scientific and social criteria. The implications of these classifications are as follows:

- Aesthetic significance addresses the scenic and architectural values of an item and/or the creative achievement that it evidences. Thus, an item achieves aesthetic significance if it has visual or sensory appeal and/or landmark qualities and/or creative or technical excellence;

- Historical significance considers the evolutionary or associative qualities of an item with aesthetics, science and society, identifying significance in the connection between an item and cultural development and change;

- Scientific significance involves the evaluation of an item in technical and/or research terms, considering the archaeological, industrial, educational and/or research potential. Within this classification, items have significance value in terms of their ability to contribute to the better understanding of cultural history or environment and their ability to communicate, particularly to a broad audience within a community; and

- Social significance is perhaps the most overtly evolutionary of all classifications in that it rests upon the contemporary community appreciation of the cultural record. Evaluation within this classification depends upon the social spiritual or cultural relationship of the item with a recognisable community. (Marquis-Kyle & Walker 1992, 21-23).

Historical study looks to the documentary record of human development and achievement, as interpreted by the authors of the documents that comprise the primary and secondary resources. In parallel, historical archaeology is concerned not only with the documentary record but also with material evidence. The archaeological record may provide information not available from historical sources. An archaeological study focuses on the identification and interpretation of material evidence to explain how and where people lived, what they did and the events that influenced their lives. Considerations material to archaeological study include:

- Whether a site, or the fabric contained within a site, contributes knowledge or has the potential to do so (perhaps, whether the archaeological record validates or contradicts the historical). If a site can contribute knowledge within the *nature* criteria above, the availability of comparative sites and the extent of the historical record should be considered in assessing the strategies that are appropriate for the management of the site; and

- The level at which material evidence contributes knowledge in terms of current research themes in historical archaeology and related disciplines.

The 'level of contribution' is thus a critical determinant and is assessed according to the same protocols as is cultural significance, that is, in terms of representativeness/rarity and local/regional/state associations.

In relation to "research themes and historical archaeology and related disciplines", the direction of historical archaeology implies, and is conditioned by, consideration of historic, scientific, cultural, social, architectural, aesthetic and natural values. It is a convenient method of classifying the values of material evidence, within the Nature criteria above, in terms of the following broad model:

- *Historical* value lies at the root of many of the other values by providing a temporal context and continuity, thereby providing an integrating medium for the assessment of social, cultural and archaeological significance;

- *Scientific* value depends upon the ability of an item to provide knowledge contributing to research in a particular subject or a range of different subjects;

- *Cultural* value attaches to artefacts which embody or reflect the beliefs, customs and values of a society or a component of a society and/or have the potential to contribute to an understanding of the nature and process of change and its motivation;

- *Social* value derives from the way people work(ed) and live(d) and from an ability to understand the nature, process of change and its motivation. Social significance is closely related to cultural significance, in its concern with the practicalities of socio-cultural identification;

- *Architectural* value depends on considerations of technical design (architectural style, age, layout, interior design and detail), the personal consideration (ie. the work of a particular architect, engineer, designer or builder) and technical achievement (construction material, construction technique, finish);

- *Aesthetic* value addresses the manner in which an item comprises or represents creative achievement, epitomising or challenging accepted concepts or standards; and

- *Natural* value attaches to items that either support or manifest existing natural processes and/or systems or which provide insights into natural processes and/or systems.

Within this general framework, the assessment of significance is made in the light of two distinct measures : the degree of significance and the level of significance.

- The *degree of significance* of heritage material is evaluated as being either *representative* or *rare*. *Representative* items are those which are fine distinctive, characteristic and/or illustrative examples of an important class of significant item or a significant aspect of the environment. *Rare* items are those which singularly represent or represent an endangered, discrete, or uncommon aspect of, history or cultural environment. By derivation, items considered within

the context of broader investigation as being insignificant may be dismissed by an evaluation of *little or none;*

- The *level of significance* of heritage material is assessable in five classifications depending upon the breadth of its identifiable contemporary community or historical or geographical context. Thus –

  - a *local* classification recognises an item as being significant within a local historical/geographical context or to an identifiable contemporary local community;

  - a *regional* level of significance recognises the item as significant within a similar regional historical/geographical context or identifiable contemporary regional community; and

  - a *state* level of significance identifies that item as significant in a statewide historical/geographical context or to an identifiable contemporary statewide community (Heritage Office 1996, 4-7).

  and by derivation:

  - a *national* level of significance attaches to an item that is significant in a nationwide historical/geographical context or to an identifiable contemporary nationwide community; and

  - an *international* level of significance has the appropriate connection to international context or the international community.

2.4 ISSUES FOR FUTURE MANAGEMENT

This section identifies issues that are material to the management of heritage resources in the context of the use of NSW inshore waters for commercial fishing.

2.4.1 National Constraints

Appendix 1 tabulates the shipwrecks that are recorded in the marine archaeological record. Apart from general heritage and planning legislation at Commonwealth and State levels, these shipwrecks may be protected under the *Historic Shipwrecks Act* 1976. The Act applies within Commonwealth waters and, upon the declaration by a State that the Commonwealth act so applies, to the waters of a State. New South Wales has made such a declaration. The *Historic Shipwrecks Act*, s4A, sets out the base criteria for consideration of a shipwreck as historic as being that the shipwreck be:

> *(a) situated in Australian waters, or waters above the continental shelf of Australia, adjacent to the coast of a Territory; and*
>
> *(b) at least 75 years old.*

The Act further provides that:

- the Minister may declare historic the remains of disturbed or fragmented shipwrecks and artefacts related to shipwrecks (s4A(5), –(6), –(7));

- whether or not within the base criteria, the Minister may declare historic individual shipwrecks, the individual remains of disturbed or fragmented shipwrecks and individual artefacts related to shipwrecks (s5);

- whether or not within the base criteria, the Minister may make a provisional declaration of a shipwreck or of artefacts associated with a shipwreck pending determination (s6);

- the Minister may declare a 'protected zone' not exceeding 200 hectares as the curtilage of a shipwreck (s7);

- upon publication in the Gazette of a notice declaration a shipwreck and/or site and/or article historic, a person holding an artefact related to the declaration must give it to the Minister (s9) and the minister is empowered to demand the surrender of such an article by notice (s10);

- the Minister may give directions as to the custody of material the subject of declaration (s11);

- It is an offence to destroy, damage, disturb or interfere with an historic shipwreck or artefact or to attempt to dispose of any material to which a declaration applies (s13);

- It is an offence to enter a protected zone with tools, explosives, equipment for diving and/or conducting any prohibited activities; to trawl, dive or undertake any other underwater activity; or to moor (s14);

- the Minister is empowered to issue permits to allow the exploration or recovery of a shipwreck or artefacts associated with a shipwreck (s15); and

- Any person discovering a shipwreck or artefacts from a shipwreck must report the find to the Minister (s17).

and provides penalties for offenders against its provisions.

In addition to the above, **Appendix 2** tabulates resources that have been assessed as being of National significance. For these items/places the requirements of the *Australian Heritage Commission Act* 1975 must be taken into account in management planning that affects those resources. The *Australian Heritage Commission Act* contains few constraints other than against Commonwealth agencies and against the removal of resources from Australia. However, the Commonwealth Government currently proposes to extend substantial protection to resources registered in the RNE by devolution of heritage administration to the *Environment Protection and Biodiversity Conservation Act* 1999 from the *Australian Heritage Commission Act* 1975. It is anticipated that the levels of protection afforded by this amendment will be at least as stringent as that provided by the (NSW) *Heritage Act* 1977.

2.4.2 State Constraints

Appendix 2 tabulates resources that have been assessed as being of State significance. The requirements of the (NSW) *Heritage Act* 1977 must therefore be taken into account by any management planning that affects those resources. The *Heritage Act* established measures for the protection of heritage resources. Heritage sensitivity may be indicated by historical research and/or by various on-site archaeological surface surveys. The discovery of relics is highly likely once soil is disturbed in circumstances where either historical research or archaeological surface survey indicates sensitivity. The *Heritage Act* defines a relic as:

> *Any deposit, object or material evidence –*
>
> *(a) which relates to the settlement of the area that comprises NSW, not being Aboriginal settlements; and*

(b) which is 50 or more years old.

The Act further provides that:

- Sites and relics in a range of descriptions are protected from disturbance and damage (ss. 24-34, 35A-55B, 130, 136-7, 139);
- Relics may be the subject of conservation orders (ss. 26(2)(b), 35A,36,37, 44);
- Relics are protected on the ground on all sites (ss. 26(2)(a), 35A36, 37, 44);
- Approval of excavation is required if a development site is listed on the NSW Heritage Register (s. 60);
- No disturbance or excavation may proceed for the discovery of relics (not subject to a conservation instrument) except with an Excavation Permit (s. 139);
- An excavation permit is required if a site is not the subject of an order under the Heritage Act (s. 140);
- Location of sites must be reported to the Heritage Council (s. 146); and
- Recovery of relics from excavation must be reported to the Heritage Council (s. 146A).

and provides penalties for offenders against its provisions (s. 157).

2.4.3 Regional and Local Constraints

Appendix 2 also tabulates 11 resources that have been assessed as being of Regional or Local significance. The requirements of the (NSW*) Environmental Planning and Assessment Act* 1979 must be taken into account by any management planning relating to those resources. The *Environmental Planning and Assessment Act* established measures for the protection of heritage resources, substantially the equivalent of the protection provided by the *Heritage Act*. The *Environmental Planning and Assessment Act* provides for sites to be scheduled as:

- Heritage items in terms of local, regional and State significance (ss. 24-72);
- Sites in development control plans or subject to development controls (ss. 37-9, 76); and
- Subject to planning controls or additional conservation provisions (ss. 37-9, 76);

and provides further that relics fixed to land may be scheduled, as may relics associated with heritage items in schedules (ss. 24-74). The Act also specifies penalties for offences.

2.4.4 The Interaction of Commercial Fishing with Historic Heritage Resources

The activities associated with commercial fishing are limited to associated boating, foreshore access and the use of a variety of nets.

The physical and spatial presence of heritage resources along ocean beaches is likely to have only a marginal effect on commercial fishing operations. With regard to shipwrecks, it appears likely that commercial fishing will have no impact on residual material evidence, having regard to the likely nature, bulk and mass of any residual material and the potential for sub-surface material to be

covered by silt/sand. Nonetheless, in the reverse situation, it is possible for residual wreckage to pose a hazard, as a potential snag for nets or trailed lines.

Otherwise, it is appropriate to observe that the greater potential for impact on historic heritage resources will arise from the construction, maintenance and repair and/or extension of shore-based infrastructure, peripheral or complementary to commercial fishing activity. Some such activity may be directly subject to external regulation, but it is pertinent to draw attention to the need for care in the management and/or repair of shore-based facilities.

2.5 RECOMMENDATIONS

These recommendations are made on the basis of:

- the limited review of historical context of the coastal precincts contained in this report;
- the review of the archaeological context of the coastal precincts contained in this report;
- the limited descriptions of the fabric and the precise locations of some of the material evidence of estuaries, particularly relating to shipwrecks;
- synthesis of the archaeological and historical contexts that is available from the reviews;
- the appreciation of the significance of the heritage resources;
- consideration of the management issues and potential impacts of the proposed use;
- discernment of the potential affects of commercial fishing styles; and
- recognition that the greater potential for impact on historic heritage resources is likely to arise from activities peripheral to commercial fishing.

It is recommended that:

1. In general in connection with the development, the attention of all authorities and agencies has been, and that of all commercial fishers, their contractors and employees will be, directed to the provisions of the NSW *Heritage Act* 1977 and in particular to:

   (i) the definition of relic under that Act;

   (ii) the provisions of sections 24-34, 35A-55B, 130, 136-7, 139 and 140 of that Act;

   (iii) relics may be exposed on beaches and frontal dune systems that are frequented by licensed ocean hauling fishers, particularly after storms. If an item suspected of being part of a historic site (shipwreck or other) becomes visible when it was previously buried by sand, it should be reported to the heritage office and local Council.

   (iv) if any activity is proposed that will, or may, cause the disturbance of a resource that is registered on the SHR, the requirement for grant of an Approval under s.60 of the Act;

   (v) if any activity is proposed that will, or may, cause the disturbance of a resource that is not registered on the SHR, the requirement for grant of an Excavation Permit under s.140 of the Act;

   (vi) the basic requirements that, in relation to any development, if:

- a relic (whether *transport* or *structural* within the definition of this report) is suspected, or there are reasonable grounds to suspect a relic in ground, that is likely to be disturbed damaged or destroyed by excavation;

- any relic is discovered in the course of excavation that will be disturbed, damaged or destroyed by further excavation;

the developer must notify the Heritage Office of New South Wales and suspend work that might have the effect of disturbing, damaging or destroying such relic until the requirements of Heritage Office have been satisfied (a requirement capable of being obviated by the prior issue of an Excavation Permit).

2. In relation to any proposed development of ancillary facilities associated with commercial fishing activities from ocean beaches, potential to impact on heritage resource(s) must be considered. The developer shall commission a study and report by an appropriately qualified person of the heritage values of the area potentially to be affected by the proposed development. Presumably any such report would form part of the process of the development application to the relevant approval authority.

3.0 ABORIGINAL HERITAGE

3.1 STATUTORY CONTEXT

All evidence of past Aboriginal occupation in NSW is protected under the provisions of the National Parks and Wildlife Act 1974 (NPW Act), regardless of its significance or the tenure of the land on which it is located. Each individual item of physical evidence of past Aboriginal cultural activity in the landscape is defined by the NPW Act as a "relic". Aboriginal sites are localities that include or display one or more pieces of this evidence. For instance, a site may be identified by the observation, on or below the ground surface, of a single piece of flaked stone (isolated artefact), or by an accumulation of many (often thousands) of pieces of flaked stone (open campsite or open artefact scatter). Aboriginal sites also include middens, rock shelters with cultural deposit or art, stone arrangements and structures, scarred and carved trees, and burials. Open campsites or artefact scatters are the most common type of occupation evidence in NSW generally; however, along the coast, midden sites are very common, reflecting the importance of shellfish and fish in the coastal diet and the robustness of shellfish remains in the landscape.

Aboriginal places that have been declared by the Minister for the Environment and duly gazetted are also protected by the NPW Act. An Aboriginal place is a place in the landscape that has spiritual significance for Aboriginal people, but where there is not necessarily any physical evidence of past Aboriginal occupation.

It is an offence under the NPW Act to knowingly deface, damage or destroy an Aboriginal "relic" (as defined by the Act) or Aboriginal place without the prior written consent of the Director-General of National Parks and Wildlife Service (NPWS). This consent is obtained through an application under Section 90 of the Act for Consent to Destroy. It is NPWS policy that applications for Consent to Destroy must be accompanied by written evidence of consultation with the representatives of the local Aboriginal community, and it is unlikely that NPWS would grant a Consent to Destroy in cases where the local Aboriginal community had not supported the application.

The NPW Act does not define "knowingly". However, NPWS does provide guidance as to what constitutes a "known" site in relation to development that is assessed as integrated development. An Aboriginal site is considered to be known if:

- It is registered in the NPWS Aboriginal sites register; and/or
- It is an Aboriginal site known to the Aboriginal community; and/or
- It is located during surveys or test excavation conducted prior to the lodgement of a development application.

This definition makes it clear that it is incumbent on a proponent to consult with the local Aboriginal community and to conduct appropriate research into records of archaeological evidence, prior to commencing a development that will disturb the land surface.

In this environmental assessment, the risks to specific individual Aboriginal sites have not been identified. Risk has been assessed at a strategic level, in terms of the types of evidence that can be expected to be located along the beaches, headlands and associated coastal dune systems and the aspects of the proposed activity that have the potential to have an impact on those types of archaeological evidence.

3.2 ARCHAEOLOGICAL AND ETHNOGRAPHIC EVIDENCE FOR ABORIGINAL USE OF COASTAL FISHERY RESOURCES IN NSW

In general, the archaeological and ethnographic evidence clearly indicates that fishing and shellfish gathering were of great importance to Aboriginal people in pre-European times, right along the NSW coast, and the evidence suggests an increasing use of the full diversity of coastal resources over time. The evidence also suggests distinct differences in the styles of accessing the coastal fishery resources on the north and south coasts (eg. in terms of seasonality and targeted species). Sullivan (1982) attributes these differences in the first instance to significant geomorphic differences between the north and south coasts. The north coast is dominated by long sandy beaches, and large river estuaries, lakes and bays. The south coast is much more a rocky coastline with numerous headlands and rock platforms, smaller estuarine waterways, and shorter beaches that have a geomorphic history of shoreline retreat. This coastal structure affects the frequency with which specific shellfish and finfish species are present in midden sites, but does not necessarily affect the number or size of sites.

This section reviews and synthesises the ethnohistorical and archaeological evidence for Aboriginal use of and occupation of beach habitats. This evidence provides the cultural context for ongoing Indigenous, recreational and commercial use of beach fishing resources. The archaeological evidence also provides the background to contemporary Indigenous fishing activity on beaches. The analysis shows quite clearly that the modern commercial ocean hauling fishery operates within the same habitats and involves very similar resources to those that were targeted by Aboriginal people in the past.

3.2.1 Ethnographic evidence

3.2.1.1 Descriptions of fishing method and equipment

There are many nineteenth century ethnographic references to Aboriginal people fishing in north and south coast estuaries, along beaches and around headlands. Whilst these descriptions would have been affected by the cultural values of the European settlers at the time, they do provide a clear indication of the ways in which Aboriginal people accessed the resources of the coastline.

Examples of the observations of nineteenth century settlers are provided below:

Ainsworth (1922) - "*the seasons were known to them by the foliage and flowers. They could tell by the natural signs of flowers and fruit when the salmon and mullet were due on the beaches and in the rivers, and also when certain game was likely to be in evidence in particular localities*."

Hodgkinson (1845) - "*fish formed a never failing article of food for (*Aboriginal people*)*."

Henderson (1851) describes Aboriginal people diving for oysters, slowly working their way upstream in estuarine creeks.

Beaglehole (1955) (quoting from Captain Cook) "*on the sand and mud banks are oysters, muscles (sic) cockles etc which I believe are the chief support of the inhabitants, who go into the shoald(sic) water with the canoes and pick them out of the sand and mud with their hands and sometimes roast them and eat them in the canoe, having a fire for that purpose as I suppose*."

Hodgkinson (1845) claims "*the (*Aboriginal people*) at the Macleay and Nambucca Rivers spear in a few minutes sufficient fish for the whole tribe, on the shallow sand banks and mud flats on that part of the river which rises and falls with the tide*."

Crown Lands Commissioner (Fry 1843:653) - "*the subsistence of the natives of this portion of the colony being determined in a great manner from fishing, the localities which they inhabit are consequently the immediate banks of the rivers Clarence and Richmond*". Of the coastal Aborigines, Fry says "*their diet is composed almost entirely of fish and honey*."

Ainsworth (1922) provides detailed descriptions of the fishing methods used by Aboriginal people near Ballina:

> "*They were exceedingly expert hunters and fishermen and in these pursuits brought to their aid many ingenious weapons and contrivances. In catching fish they used what they called a 'tow-row' - that is a finely meshed net attached to a stick of bamboo bent in the shape of a bow about eight feet across between the two ends. This gave a bag effect to the net and with a tow-row in each hand the blacks could surround the fish schools in narrow and shallow waters and catch them by the hundreds. The cordage of these nets which were very strong and beautifully woven, was made from the inside fibre of the stinging tree and from the bark of the kurrajong. They used a similar net in hunting.*
>
> *The tribe usually camped in divisions at different places excepting during the oyster season, when they assembled unitedly at Chickiaba, on North Creek, where the large oyster banks on the foreshores to this day mark the old feeding ground.*" (Ainsworth 1922:28-31)
>
> In addition, Ainsworth describes groups of people moving to the coast in September to take advantage of the huge shoals of salmon in the surf at that time of year. These fish were caught by spearing.

Macfarlane "*As the swamps reached the waterless stage an abundance of eels presented a plethora of the needful for the sustenance of the aboriginal, and there as little trouble capturing the slimy wrigglers in the shallow water. Some of these attained a large size, but the average weight was considered the best for eating. It*

was strange how the swamps produced so numerous a quantity of the eel species, as in drought periods they were cleared of the fish, but breeding was renewed when refilled with water from a flood."

Macfarlane notes that the eels were cooked on a grill made of green sticks, suspended about 60 to 90cm above the cooking fire.

Perry (1839) - May - referred to a group of Aboriginal people living in huts in a sort of temporary village at the head of a deep estuary (Clarence): "*which appears to give considerable command of fishing ground, such a position being essential to their subsistence…., The canoes of these (*Aboriginal people*) were formed with more care than those in the neighbourhood of Port Macquarie and other places that had been visited, and were moored in a line in front of their villages. The* (Aboriginal people*) appear to possess, to a certain extent, habits of industry; their fishing nets, baskets, water vessels and cooking utensils being constructed with peculiar care and neatness. These people were delighted with being presented with some fish hooks*."

Scott, quoted in Brayshaw (1966) - "*the schools used to travel from west to east close inshore on the northern side of the harbour, at high water…. The fishermen, generally about half a dozen at once, would rush into the water up to their middles…, then when the school was within striking distance, the spears would all be landed at once*."

Mackaness (1941) noted that Aboriginal people in the Twofold Bay region built lightweight bark canoes with folder ends. When fishing the Aboriginal people were noted to *"occupy a kneeling position in their Mudjerre or canoes and may be seen like floating specks off the coast spearing salmon; they are expert fishers*."

Mackaness (1941) - "*fish are abundant and the Aborigines may be termed Icthyophagist…. Their mode of taking fish is by net, spearing and line and hook, the latter ingeniously made from bone. Their canoe a sheet of bark from the straight part of a tree folded at the end*." (far south coast)

Anderson (1890) also describes canoes and wooden implements used by Aboriginal people on the south coast. The canoes were made of bark strips and were found along beaches as well as estuaries.

These descriptions provide an insight into the equipment that was used by Aboriginal people and also alludes to the community nature of fishing activity. This theme is strongly supported by Aboriginal people today.

Equipment used for obtaining resources from beaches and headlands included:

- Spears. There are references to spear fishing from the shore, from canoes and within the shallow water. Spears had four or five prongs, and were sometimes tipped with barbs 'of kangaroo teeth'. Spears were also used to catch fish in the surf.

- Fish traps. Traps were sometimes made of stone (such as the structures at Arrawarra, Point Plomer and on Broughton Island), but were frequently made of plant materials, such as matted fences across tidal channels (Enright 1935, Bundock 1898, Burns 1844, Rudder 1925). These authors suggest that very large quantities of fish could be easily caught in these structures, especially during major fish runs (eg. mullet).

- Nets. There is some suggestion that nets on the north coast were made by women. A variety of nets were used in estuaries, including the "tow-row" described by Ainsworth. Nets could also be used in much the same way as fence type fish traps in the shallow (or narrow) upper reaches of estuaries. It is not clear whether nets were used to catch fish off beaches and headlands.

- Hook and line. Hooks and lines were in use by Aboriginal people at Sydney Harbour when Europeans first arrived there. There is some archaeological debate as to whether line fishing was a post European adaptation in some parts of the north coast, but shellfish hooks and slightly conical, ground edge items recorded as fish hook files, are widespread in midden sites on the central and mid north coasts.

- Canoe. Aboriginal people were clearly skilled at the navigation of lightweight craft in sometimes dangerous currents. There are references from the north and central coasts of people cooking fish and shellfish in their canoes. Locations such as Broughton Island, that could only be accessed by water for the last 6000 years, conserve abundant midden evidence (finfish and shellfish).

- Look out trees. There are several references to people climbing trees (using footholds and ropes made from bark and vines) to act as a lookout for schools of fish. One of these trees existed in the Worimi Local Aboriginal Land Council area on the shore of Port Stephens until very recently.

- Hand trapping or collection. This was the principal method for gathering shellfish, although baskets or other containers may also have been used to facilitate transport. In the case of deeper water shellfish (ie. not pipi or rock platform species), there are references to people diving (examples are oyster and more recently abalone on the south coast).

- Poisoning - there are references to the use of a "smart weed" to stun fish in waterholes or estuarine backwaters.

Several of these Aboriginal fishing strategies will not be archaeologically visible.

3.2.1.2 Species targeted and seasonal preferences

The species identified in various ethnographic references as being targeted by Aboriginal people are summarised in **Table 3.1**.

Table 3.1 - Summary of Ethnographic References to Species (North Coast)

Habitat	Species
Estuary	• Fish including black bream, garfish, whiting, flathead, tailor and trevally • Prawns • Oysters, whelks. Oyster diving and collection involved the whole tribe (see also McBryde (1982) re the Wombah middens) • Birds including swan, wild geese, wild duck, redbill and pelican
Tidal creeks and swamps	• Birds - quail and brolga • Eels • Crabs and crayfish, lobster • Mussels, cockles (Anadara), oyster • Tortoise • Food plants including rush (typha), cunjevoi, orchid, blue water lily, blechnum fern • "cobra"
Beach and coast	• Fish - sea mullet, groper, kingfish, leatherjacket, bullseye, salmon, snapper, stingray • Crabs and crayfish • Shellfish - pipi, rock platform species, anadara and mussel (brought from the estuary) • Pandanus, pigface • Terrestrial species such as macropods • Mutton birds • Whales (possible strandings)

There is a widespread view amongst the ethnographic reports, in part substantiated by excavation of midden sites, that people were generally on the coast through late spring, summer and autumn, but lived in the hinterland through the winter. However, some fish that are known to have been targeted by Aboriginal fishers were also far more common (in schools) in the winter months, and it is possible that early observers did not note short visits to the coast at these times to obtain particular resources.

For example, Ainsworth (1922) notes that in September there were the salmon (*Arripis trutta*) runs. Sea mullet were also important. Mullet can be obtained almost continuously throughout the year, except possibly for early summer. From about late April to early September, sea mullet migrate in enormous shoals northwards along the beaches and would have been easily obtained by netting and spearing.

By way of contrast, Sullivan (1982) refers to observations by Robinson (1844) of the apparently healthy appearance of Aboriginal people both on the uplands (of the Monaro) and right along the south coast between Goalan Head and Gippsland Lakes in mid winter, during June and July. These descriptions do not suggest a strongly seasonal pattern of coast and hinterland occupation. Sullivan suggests that wintering on the south coast may have been more common than on the north coast.

Sullivan 1978 notes the size of the population in the north coast valleys at contact, and the rapid demise of traditional life and customs (within 30 years of European settlement). Large groups of people met and camped at one spot for quite lengthy periods; eg. 200-300 at Ballina in 1853 for the "oyster season", 300 at Woodburn, and 600 at Tintenbar. There are also several references to village like settlements (eg at the mouth of the Clarence estuary), suggesting relatively permanent settlement, at least on a seasonal basis.

Villages are also described from the south coast around 1840 (eg near Pambula, Brierly 1843), but there is a strong suggestion that even by this time, Aboriginal occupation patterns on the south

coast had been severely impacted by European settlement (eg whaling) and that the villages were not representative of pre European times.

Figure 3.1 reproduces part of a picture made by an Aboriginal man known as Mickey of Ulladulla, in about 1870. The original of this picture is held by the Grafton Historical Society and is on display in their museum. Although the picture post dates the first interactions of European and Aboriginal cultures on the south coast by many years, it does illustrate some important aspects of Indigenous fishing at that time. For instance:

- Two boats (sailing) are shown, each with a crew of five people, but only one group is actually fishing;
- The fishers are using hooks, lines and sinkers. No nets or spears are visible.
- One fisher holds a club.
- Five or six species of fish, in adult and juvenile sizes are shown, with snapper, leatherjacket and a species of shark readily identifiable.
- Many water birds are also shown, some of them fishing. Perhaps Aboriginal people used these birds to highlight the location of schools of fish?
- More people are shown sitting in shelters along the beach, each with a small fire. This may reflect the larger group associated with / dependent on the fishing activity.
- A kangaroo is also shown on the beach, together with coastal vegetation. This suggests that people were not entirely dependent on fish, even though fish was clearly considered abundant at the time.

3.2.2 Types and distribution of archaeological sites

Sullivan (1982) provides an overview of the archaeology of shell midden sites along the NSW coast. Although a number of middens have been further investigated since that time, most of Sullivan's conclusions remain unchallenged. Key features of the archaeological evidence from middens are noted below. These features provide abundant evidence of the importance of the fishery resource to Aboriginal people, and also point to changing technological and social organisation over time to enhance the return from the fishery. The structure of the NSW coastline, amongst other reasons, underpins some variations from north to south along the coast.

Colley (1987) highlights the difficulties of interpreting Aboriginal economic activity from the remains that are preserved in midden sites, particularly in relation to catch composition and seasonality. Factors include differential preservation of various materials (both plant and fish/shellfish), and the broad seasonal spectrum of some species.

Key features of NSW coastal midden sites include:

- In excess of 1500 midden sites have been recorded along the coast, primarily as open sites. In the Sydney region, a relatively high proportion of middens are situated in rock shelters, reflecting the relative abundance of cavernous overhangs close to the shoreline.
- The largest estuarine middens in NSW are located in the Macleay Valley (Clybucca and Stuarts Point). These mounded midden sites are estimated to contain 150000 to 200000 cubic metres of material. Similarly large middens are also known from the Richmond and Clarence valleys.

McBryde (1982) describes the results of excavations in large middens along the estuaries of the Richmond, Clarence and Macleay rivers. The shell middens of the Richmond estuary near Ballina include mounds up to 400 metres in length and standing 4 metres high, whilst on the Macleay, middens stretch almost continuously near Clybucca for several miles. On the Clarence, middens stretch almost continuously from near Wombah (13 km inland) to the coast. These deposits are located about 100 metres from the present bank of the main channel. In some cases they are situated on two terraces.

Oyster was the dominant shellfish throughout the deposit at Wombah (97% in some levels). Maximum carbon dates range from around 3500BP at the base of the deposit, up to 1500BP in level 2A of the middens. Despite the large volume of oyster shell in these sites, McBryde (1982) estimates that the oyster component in the big middens on the north coast is considered to have provided only 0.1% of the dietary requirements of expected groups visiting the site over the dated period of occupation. McBryde concludes:

- The diet was likely to have been a mixed one and the archaeological evidence overemphasises the shellfish component;

- The period of occupation in any one year was likely to be short, and as hunting and fishing were still practised, the nineteenth century observers could well have missed the significance of shellfish gathering;

- The evidence indicating that occupation was brief and periodic strongly suggests seasonal occupation, ie a segment of an economy exploiting different resources at different times of the year; and

- The shellfish gathering, fishing and hunting economy documented for the site could be an important element in the total annual diet, a refreshing change in activities and food components. Shellfish could be important in this change, even though not providing a high return in terms of energy.

- Mounded middens are also found on the south coast, for instance at Pambula (these are relatively well preserved), at Wagonga Inlet, Wallaga Lake and Sussex Inlet. Smaller middens are widespread from the mouths of estuaries to the upper reaches.

- Estuarine shellfish species comprise approximately 50% of the shell in middens along the coast. On the south coast, rock platform species are more common, reflecting the higher incidence of headlands. Beach pipi middens are common on the north coast, but many of these have been destroyed.

- The mounding of midden sites may have been for cultural reasons rather than for any environmental reason. Sullivan (1982) refers to midden mounds as markers of good places to return to in the landscape, plus a concept that keeping the waste shell together would encourage more shellfish at that location.

- Middens on the south coast tend to be sheltered by headlands and also tend to face to the north and east. In the Clarence Region of the north coast, sheltered middens tend to be located on the western side of dunes. (Note the relatively low frequency of headlands on the north coast, when compared with the south coast). The aspect of sites also reflects winter wind directions and possible seasonality of occupation.

- Midden sites are often located close to supplies of fresh water, such as tributary creeks, springs, fresh ponds in coastal deflation basins and wetlands. Sullivan suggests that 80 to 90% of all midden sites are within 200 metes of a water supply, although occasional very large middens, containing entirely shell, are more than 500 metes from fresh water.

- Coastal sites provide evidence that they were clearly used in summer, but the evidence for winter use is less definitive. Species that are present in midden sites could have been available all year round.

- There is a tendency towards increasing variety of fish species and sizes in the upper layers of sites. Several authors suggest that this is due to the introduction of new fishing technologies (particularly line fishing) over time. Dates for fish hooks are all less than 1000 years. On the south coast, there is a clear change towards hairy mussel and edible mussel in the last 1000 years.

- Fish species that are reported from midden sites include snapper, bream (black and silver), leatherjacket, redfish, wrasse, mullet, flathead, and mulloway.

- Many midden sites have been destroyed by European land uses, with substantial destruction in the early years of colonisation when middens were exploited as a source of lime. Pipi middens along the coast may also be relatively underrepresented in the archaeological record, because many have been destroyed by mining and by coastal erosion and dune transgression processes.

- Human burials have been reported from midden sites right along the coast. Sullivan suggests that many of these burials, which include males and females (adults) and children, are relatively recent (last 200 years). Wherever they occur, and whatever their age, the presence of a burial in a midden deposit is highly significant to the Aboriginal community.

Figures 3.2 and **3.3** show the distribution of known Aboriginal sites along parts of the coastline of the NSW central – lower north coast (within Region 4 of the Ocean Hauling Strategy). These locations are shown to illustrate the characteristics of the archaeological record in this region and potential for interaction between beach hauling fishers and the physical evidence of past Aboriginal occupation. It should be noted that the two sections of coastline that are illustrated are not necessarily indicative of other sections of the coastline because local and regional depositional and erosional history (by waves and wind) greatly impact on the archaeological aspects of cultural heritage sensitivity at any given location. Nevertheless, the occupation evidence illustrates a number of points:

- In this area, sites occur landward of the frontal due system and are frequently exposed along the deflation basin and windward face of transgressive dunes. The frontal dune and incipient frontal dune are relatively recent and may have low cultural heritage sensitivity. Note, however, that on both the north and south coast where coastal erosion has exposed sections of old stable frontal dunes, midden sites may be exposed on the seaward face of the dune (e.g. Arrawarra).

- Site types include shell middens of various species, with or without stone artefacts, and burials. Some locations may also be culturally significant because of past (or ongoing) ceremonial associations.

- The fish and shellfish species included in midden sites vary with proximity to rocky headlands and estuary mouths, and also vary over time. Middens along Newcastle Bight are dominated by pipi shell (and are remote from rocky headland environments). In contrast, the Birubi Point middens and those at Dark Point and Big Gibber include large amounts of robust rock platform shellfish material. Many coastal middens also include bird bone, seal and macropod bone reflecting a diverse diet and the patterning of coastal habitats. Sites that are exposed in lower north coast dune fields are threatened by ongoing transgressive dune processes (both burial by sand and abrasion during periods of exposure). These sites are also heavily impacted where uncontrolled 4WD access is available. As noted above, many sites have been destroyed by past land uses, including widespread mineral sand mining of frontal dunes.

3.2.3 Implications of other types of archaeological evidence and Aboriginal places

Gungil Jindabah Centre (1996), (in NSW NRAC 1996) describes the cultural value of the coastal and estuarine landscape to Aboriginal people on the north coast of NSW, with particular reference to the importance of "country". They note that the coastal component of the region was, and still is, a central component in the culture of many Indigenous communities. The coastal area has the highest population density in the region and the seacoast provides a rich source of fisheries resources. Coastal land, estuarine and marine resources were and still are of major economic, spiritual and cultural importance.

> "*Aboriginal people have continued their associations with their sites and still adhere to the spiritual laws associated with them. This is despite the historical conflict and inbuilt preconceptions adhered to by non aboriginals since the British invasion.*"

One example of a significant site that is well known is the Goanna Headland site at Evans Head. This area contains sacred places as well as archaeological sites that are considered significant. This site physically consists of the Evans Headland, Pelican Island, the land associated with the top end of Bundjalung National Park, and formations of the headland including fresh water sites, the vegetation, the animals and the ocean. The site follows the Evans River upstream to Woodburn and then follows the Richmond River up as far as Coraki. The Gungil Jindabah Centre notes that there are various spots along the Evans and Richmond Rivers where parts of the story are indicated by natural formations. The actual headland cannot be separated from the surrounding areas. To say that the headland alone is significant, is to separate it from all other physical features of the site and diminishes its true extent, nature and cultural integrity.

The Gungil Jindabah Centre (1996) also refers to totemic spiritual associations, observing that these relate to every plant or animal within the natural environment. Every family has a totem which connects them to their existence. These totems bind people together in a spiritual essence to their ancestors and their clan groups. Totems may also relate to the wind, water, or other climatic condition. These places are sacred and should not be interfered with. However, Aboriginal people would not generally discuss these spiritual concerns in the wider community.

3.3 INTERACTIONS BETWEEN OCEAN HAULING FISHERY AND ABORIGINAL HERITAGE SITES

The OHFMS provides a framework for commercial use of ocean fish species.

There are many Aboriginal sites along the ocean beaches and dunes that provide abundant evidence of the value of coastal resources to Aboriginal people, and in fact these sites underestimate the values of the coastal environment because no plant materials are preserved, and only a portion of the more robust animal parts remain.

Ocean hauling fishing, from beaches involves groups of fishers using nets. Nets may also be used from small boats offshore.

Aboriginal sites along the sandy coastline are potentially at some risk of impacts by commercial beach hauling fishers, principally because of access to these areas by four-wheel drive vehicles. It should be noted, however, that commercial beach hauling fishers (i.e. those whose activities are regulated by the beach hauling fishing strategy) comprise only a small proportion of the four wheel drive users of those ocean beaches that were traditional fishing and shellfishing locations for Aboriginal people. Beach midden sites in many areas are also threatened by natural processes such

as storm wave erosion of frontal dunes and the mobility of transgressive dune fields (e.g. see Hughes and Sullivan 1974, Dean-Jones 1990, Umwelt (Australia) Pty Limited 2000). Significant destruction of coastal dune sites also occurred during several decades of beach and dune mining for heavy mineral sands.

Commercial fishers access the traditional hauling grounds and shared beaches via access routes that have been agreed during consultation with local Councils and NPWS. The access routes are generally open to the general public. There are a few locations in each region where access is via a locked gate.

It is assumed that in agreeing to access along various tracks to beaches, that NPWS has considered the risk that ongoing vehicle access could impact on Aboriginal sites.

The activities and behaviour of licensed commercial fishers on NSW beaches is regulated by a code of conduct that is part of the licence. A copy of the Ocean Hauling Code of Conduct is included in **Appendix 3**. The code includes several clauses that, although not stated specifically to protect Aboriginal cultural heritage, would generally do so. These include:

1.1 Endorsed fishers will comply with local Council and NPWS bylaws.

2.1 Endorsed fishers will only use local Council or NPWS approved access points. Endorsed fishers will not make their own access tracks and will comply with any periodic closures of access points by these authorities.

3.7 Endorsed fishers will not drive their vehicles on frontal sand dunes and will minimise, as far as possible, their impact on the landscape.

4.1 Endorsed fishers will leave the beach clear at all times, removing any litter as they leave the beach.

4.4 Endorsed fishers will not bury fish in the dune system.

5.3 Endorsed fishers will co-operate with dune care and environment groups.

In addition, the closure of some beaches in all regions to commercial fishers (as agreed and recommended to the Minister for Fisheries by Regional Liaison Committees) further reduces the risk of impacts on cultural heritage sites at those locations. This is particularly the case for non-metropolitan regions.

Overall the nature of ocean hauling fishing means that although numerous Aboriginal sites are known along NSW beaches and dunes, there is a low risk that sites will be impacted by beach hauling fishing activity.

There is potential for fishery related activities to impact on Aboriginal sites at restricted locations, for instance at boat ramps, and localities that are used for storage and maintenance of equipment. The extent of the risk associated with these activities will vary from one beach to another, and definition of the risk for an individual beach will depend heavily on the availability of local knowledge (e.g. provided by discussions with local Aboriginal people and local NPWS officers).

Where potential impacts on Aboriginal sites are known to exist, it is important that they are addressed by liaison and management actions at the local level. This will ensure compliance with the requirements of the NPW Act, and will also enhance co-operation and understanding of cultural concerns. An example is the presence of Aboriginal cultural heritage material at the boat ramp at Arrawarra. This ramp is also adjacent to a stone structure considered to be an Aboriginal fish trap.

In general, the physical evidence of past Aboriginal occupation along beaches is most severely threatened by land uses and activities other than ocean hauling fishing. Large midden sites in the Hunter estuary and north coast estuaries were exploited for lime in the nineteenth century, and sometimes also for road base. Many sites have also been destroyed by agricultural land uses, urban and tourist development and some have been destroyed by bank erosion (that may have natural or anthropogenic causes). As noted above, many coastal sites were destroyed by mineral sand mining in the 1960s and 1970s, by roads, car parks and ongoing poorly controlled 4WD access.

The overall risk that activities authorised by the OHFMS will detrimentally impact on Aboriginal cultural heritage evidence along NSW beach and dune systems is considered to be small.

3.4 PROTOCOLS TO REDUCE THE RISK OF HARM TO SITES

The discussion presented in **Section 3.3** suggests that overall, the risk that activities that are authorised by the OHFMS will impact on Aboriginal sites (ie. physical evidence of past occupation), is low. Notwithstanding this, several management actions are proposed to ensure that risks to archaeologically and culturally sensitive areas are minimised. These include:

- Consultation with local Aboriginal community representatives in relation to any proposed commercial fishery facility that would be located on an ocean shoreline. This would include maintenance of existing ramps, new launching ramps and regional boat storage or maintenance sites. In general, such facilities will require separate environmental assessment and development consent including assessment of potential impacts on Aboriginal cultural heritage;

- Preparation of cultural awareness information for holders of ocean hauling authorisations. In particular, these operators should be aware of the nature of pipi and other midden sites along ocean beaches, and that such sites are protected by the NPW Act; and

- Ongoing consultation with local Aboriginal communities about developments in the commercial sector. This will occur, for instance, through Aboriginal representation on regional management advisory committees (MACs).

4.0 INDIGENOUS ISSUES

4.1 THE ROLE OF FISHING IN COASTAL ABORIGINAL COMMUNITIES

This section describes the role of beach and other coastal fishing and collection in Aboriginal communities today. The discussion demonstrates the continuity of fishing as an important Aboriginal cultural activity, and highlights the species and habitats that are targeted by Aboriginal people. The discussion also explores, at a general level, the ways in which existing and proposed strategies to manage the ocean hauling fishery interact with and impact on the interests of Aboriginal communities. As noted in **Section 4.5**, this interaction is being explored more fully in the development of an Indigenous Fishery Strategy.

4.1.1 Historical and contemporary fishing by coastal Aboriginal communities

Section 3 described the evidence for pre European Aboriginal use of the coastal fishery, and the ethnographic evidence from the first years of competition for the resources of the NSW coastline with commercial and recreational fishers.

The State Aboriginal Land Council has noted the strong historical dependency of coastal Aboriginal communities on fishing. They provide an Aboriginal perspective of the locations of missions that were established to accommodate Aboriginal people in the late nineteenth century, observing that many missions were located on estuaries or coastal headlands. Aboriginal people who were relocated to these missions would have been expected to provide a substantial proportion of their food supply by fishing and shellfish gathering.

A few publications provide evidence of the continuity of fishing as a lifestyle for Aboriginal people, and illustrate with specific case studies, the general principle described by the State Aboriginal Land Council. An example is the description of the Wreck Bay community on the NSW south coast (Egloff 1981). Schnierer and Robinson (1996) review environmental uses and issues for Aboriginal people on the NSW north coast.

4.1.1.1 The Wreck Bay fishing community - a south coast example of historical Aboriginal estuarine fishing

Egloff (1981) refers to abundant archaeological evidence of Aboriginal fishing and shellfish gathering along the shorelines at Wreck Bay, with extensive middens containing shellfish, fish hooks (using shell) edge ground axes, bone points and flaked stone implements. Axe grinding grooves, open campsites, bora rings and burial sites are also reported from the peninsula. Egloff describes fishing by men using spears that had hard wood prongs tipped with bone points. These spears were used in the bay and in shallow waters over rock reefs. Women also fished using hook and line. Species represented in the midden sits include snapper and bream, as well as pipi and cockle.

The Aboriginal population in this part of the south coast was decimated after European settlement. Eventually the remaining Aboriginal people were settled at reserves at Roseby Park and Jervis Bay (Beecroft Peninsula), although a few people had continued to live in these areas throughout the nineteenth century. Egloff (1981) reports that the Office of the Protector of Aborigines provided a boat and fishing gear to Aborigines at Broughton Creek in 1882, and that a boat was also provided to the Jervis Bay people (at Currambene Creek) the following year.

When the Commonwealth took over administration of Jervis Bay in 1922, there were 25 Aboriginal people living in a fishing village at Wreck Bay and Aboriginal crews had fished this part of the coast throughout the latter part of the nineteenth century.

Egloff's (1981) description of fishing at Wreck Bay in the first half of the twentieth century highlights the following features:

- Net fishing from small boats for mullet, blackfish, jewfish, kingfish, whiting and bream. 200 to 300 cases of fish could be caught at a single shot (see also **Figure 3.1** that shows line fishing for snapper from small boats);
- Snapper caught off the reefs with hand lines;
- Spotters stationed at vantage points (including high trees on the beach);
- Fish were carted to the railway at Bomaderry for transport to markets;
- Each catch was divided into five parts - one part for each crew member and one for the boat and gear which needed constant repair;
- In the 1940s and 1950s there were seven to eight crews of Aboriginal fishermen operating at Wreck Bay, and a rotation system was used to provide equitable access. Each crew had rights for 24 hours in turn;

- Most fishing was done between Christmas and Easter, and at other times men worked at local timber mills or picking vegetables;

- Catches declined in the late 1950s and 60s, and so did prices fetched for fish; and

- During the depression, families camped on the southern beaches of the bays and collected pipis, mussels and oysters. People also gathered abalone at this time. It was sun-dried on wire racks and sold to traders from Sydney.

Egloff (1981) also notes that the Office of the Protector of Aborigines also provided fishing boats to reserves and camps along the far south coast:

> "*In the Bodalla district, Aborigines were considered by ME Mort to be destitute without a boat. These Aborigines had sold fish for a living until their boat was wrecked while going to the assistance of a sinking vessel. Another image shattered; most white Australians do not realise the extent to which coastal Aborigines quickly adopted European maritime technology and became net fishermen capable of making their own gear and surprisingly enough, also pursued large whales. Recently buried at Wreck Bay is one of the great whalers of Twofold Bay, Aden Thomas. Before him were Hadigadi and Adgeree, two coastal Aborigines famous for their whaling exploits.*" (p 23)

4.1.1.2 Contemporary Aboriginal community participation in coastal fishing

The number of Aboriginal people fishing along the NSW coast today is not well documented. Few Aboriginal people now hold commercial licences that provide access to the ocean hauling sector of the industry (Hector Saunders pers comm, Karuah Local Aboriginal Land Council).

However, a project funded by the Natural Heritage Trust and undertaken by the Centre for Indigenous Environmental Research at the Southern Cross University is seeking to shed some light on Indigenous fishing in NSW (Schnierer pers.com.).

Under current licensing arrangements, most Aboriginal fishers are included in the recreational sector of the fishery.

As part of the recreational fishery, Aboriginal people are required to give priority to commercially licensed fishers in areas that are 'recognised fishing grounds'. Aboriginal people who are <u>not</u> licensed fishers may assist a fisher who holds an ocean hauling endorsement to remove fish from a net, but must not participate in the shot or hauling of the net. All persons involved in the shot and hauling activities must be endorsed.

This means that Aboriginal community members who are present on the beach with an Aboriginal person who holds a relevant commercial licence may assist in removing fish from the net, but no other activities, unless they are also licensed.

NSW Fisheries is currently coordinating a national survey of recreational fishing activity. The project is a joint initiative of Commonwealth, State and Territory governments. A sample of 45000 Australian households was selected from Australian Bureau of Statistics subdivisions. These households were contacted by telephone and information collected about participation in fishing, household structure, demographic profile (including ethnicity), and fishing intentions in the coming year.

Fishing households were encouraged to participate in a diary program where monthly information was collected about fish catches, fishing effort and fishing expenditure. Although data processing

is continuing, NSW Fisheries has provided preliminary information for the first ten months of the survey.

Preliminary results are noted below (Gary Henry pers comm):

10300 households were selected in NSW.
About 8300 households provided a full response to fishing participation questions.
These households contained about 19600 people.
1.4% of the sample were Indigenous people.

1836 fishing households in NSW agreed to participate in the diary survey.
23 (1.3%) of these households were Indigenous.
3590 fishing people in NSW took part in the survey.
63 (1.7%) of these were Indigenous people.

Clearly, the sample of 63 Indigenous fishers is only small and also includes both inland and coastal fishers. Nevertheless, the sample provides a preliminary indication of some of the characteristics of Aboriginal fishing activity, which perhaps distinguish it from fishing by other groups.

The sample of 63 Aboriginal fishers has gone fishing on 266 separate occasions over the ten month period and the number and species diversity of their catch is shown in **Table 4.1**. Estuarine and marine species are shown in italics. The fishing effort by these fishers over the period of the survey is greater than the average across the state, hinting at the broader Aboriginal community consumption of the catches of Aboriginal fishers. The currently available data does not provide an indication of other types of fishing activity, or of other estuarine and coastal resources that are of importance to Aboriginal people.

A more detailed survey and analysis of Aboriginal fishing practices would be needed to draw firm conclusions about the nature of participation of Aboriginal fishers in the coastal fishery.

Table 4.1 - Results of Recreational fishing survey, Indigenous households

Species Common name	Kept	Released	Total
Bream – unspecified	*32*	*66*	*98*
Carp	37	1	38
Catfish – freshwater	1	2	3
Catfish – unspecified		6	6
Cod - Murray/ Murray perch	4	20	24
Cod - red rock/ red scorpion/ coral perch		2	2
Cod – unspecified		1	1
Fish – other		12	12
Flathead – unspecified	43	79	122

Table 4.1 - Results of Recreational fishing survey, Indigenous households (cont)

Species Common name	Kept	Released	Total
Flounder/ sole/ flatfish – unspecified		6	6
Garfish – unspecified	30		30
Gurnard	3		3
Leatherjacket	6		6
Lobster – unspecified	12	11	23
Morwong – blue	0		0
Mullet – unspecified	4	7	11
Mulloway/ jewfish/ kingfish	3		3
Non-Fish – other	1		1
Perch - golden/ yellowbelly/ callop	42		42
Perch – pearl	1		1
Perch - redfin/ English		1	1
Pike – unspecified		1	1
Salmon - Australian east/ west/ kahawai		1	1
Shark – unspecified	1		1
Snapper - pink/ southern/ squire	2	13	15
Tailor/ chopper/ jumbo	9	7	15
Trout – brown		1	1
Trout – rainbow	10		10
Whiting -unspecified	10	39	49
Yabbies	7		7
Yabbies/ nippers/ bass yabbies	40		40
Grand Total	**298**	**276**	**574**

Over the period of this survey, the most commonly caught ocean fish by Indigenous fishers were flathead, bream, whiting, garfish, lobster, snapper and tailor.

4.1.1.3 Fishing method on the north coast

Faulkner (2000) provides general information about Indigenous fishing in northern NSW today. He notes that target species include both freshwater and saltwater species, with fish, crayfish, freshwater mussels, marine/estuarine shellfish, aquatic woodworms and freshwater turtle being mentioned.

Fishing technology includes hand lines (82%), rods and reels (57%), nets and spears, together with specialised traditional environmental knowledge. Faulkner (2000) notes particularly the concentrated effort of Aboriginal fishing practice, where a group of fishers is fishing not only for themselves, but to provide food, medicines and other resources for others in their community. The scale of fishing effort by these Aboriginal fishers is greater than if they were occupied with recreational fishing activity as individuals, but the catch is generally not intended for sale. Notwithstanding this, the catch has significant value to the Aboriginal community, as a supply of food, to meet social obligations within the community, and to provide materials for barter. More detailed analysis of north coast fishing participation, practices and cultural values is provided in Faulkner (2001, in prep).

4.1.2 The economic and social value of fishing in coastal Aboriginal communities

Most Aboriginal people who fish in estuaries and collect shellfish from beaches are currently classified as recreational fishers. Many recreational fishers of all ethnic backgrounds fish for both lifestyle and dietary supplementation reasons. However, the way fishing is reported to be practised by the Aboriginal community reflects strong cultural, lifestyle and economic factors.

Aboriginal people persistently describe fishing activity as something that is done at the community scale, rather than the individual scale. Many members of the community join together to fish and collect shellfish and to share other information about the environment. Sharing and barter of fish catches is part of the way people within a community meet their social and cultural obligations to others. The fishing outing also provides opportunities for the passing of traditional ecological knowledge and cultural knowledge from one generation to the next.

The economic value of this type of fishing activity to individuals and to whole Aboriginal communities is difficult to quantify. There are a number of constraints that need to be taken into consideration when assessing the economic value of beach fishing in Aboriginal community economies, and therefore the impact that regulation of the fishery has had and will have on the economy of Aboriginal communities. These matters are noted below, on the basis of anecdotal information from the State Aboriginal Land Council and some Local Aboriginal Land Councils. Although it would be possible to document and verify these general statements, a detailed social and anthropological study would be necessary. Such a study is beyond the scope of the present EIS process. The time frame necessary to achieve the level of trust between the Aboriginal community and researchers, and for transfer of effective information about the economic value of various activities, is also outside the scope of this EIS process. Some of these matters are currently being addressed through the consultation for the preparation of an Indigenous Fishery Strategy for NSW (see **Section 4.5.3**).

Key points that have emerged from the consultation during the preparation of this EIS include:

- In general, many people who live in coastal Aboriginal communities are relatively disadvantaged in terms of education, and access to the broader job market. This affects the relative economic importance of non-market food sources to individuals and to the community.

- On the south coast, employment based around a series of seasonal jobs is described. These include work in sawmills, bean and potato picking and fishing (particularly during the summer). Fishing is described as a community subsistence activity, with most of the catch consumed within the community, and a portion traditionally traded for other commodities, or sold locally (not through the Commercial Cooperative). This type of fishing and trading is described as being of great importance to community welfare, although the overall cash exchange may be very small, and very poorly documented.

- On the north coast, small-scale marketing of fish or shellfish at the local level provides an important economic supplement to the incomes of individuals and is also considered to provide important social benefits to communities with a high level of unemployment amongst young people.

- Community based fishing and use of other estuary resources is described as having indirect economic value to Aboriginal communities; for instance, because fishing parties also collect traditional medicines from the estuary, because the fish resources provide a healthy component of the diet (reducing the risk of certain illnesses), and because the fishing activity may provide outlets for other social issues that have economic implications. None of these aspects are documented quantitatively.

- Aboriginal people state that they have a strong interest in the sustainable use and management of beach fishery resources, so that the full range of resources of value to the community is available for future generations.

4.2 CURRENT ACCESS OF ABORIGINAL COMMUNITIES TO COASTAL FISHERY RESOURCES

Commercial fishing has existed along the NSW coast since the mid nineteenth century, and by historical accounts dating to the late nineteenth century, it existed initially as a locally based activity because of the lack of effective refrigerated transport to bring catches to the Sydney or export markets. Commercial fishing operations moved to more remote parts of the coast early in the twentieth century. Thus, the interaction of traditional Aboriginal fishing activity on beaches with the commercial sector spans approximately 150 years in the Sydney area and 100 years elsewhere on the NSW coast. In many Aboriginal communities, at least some members held general commercial fishing licences, and participated in the commercial sector, as well as fishing to support family and friends (see **Section 4.1**).

From the late nineteenth century, a number of estuaries (or parts of estuaries) were closed to commercial fishing, generally to conserve or to allow the regeneration of fish stocks. Traditional Aboriginal fishers would have continued to have access to the aquatic resources of these waterways during periods of commercial closure. Many beaches are also closed to commercial fishers for at least part of the year. These closures have been initiated, in part, to reduce conflicts between commercial fishers and other groups on beaches.

Since the mid 1980s, a number of new regulations have been introduced by NSW Fisheries (see **Table 4.2**). The broad objective of these regulations was to enhance the efficiency of the commercial fishery, and introduce greater control over fishing effort and impact. Until this time, many nominal participants in the industry had held licences that were used only rarely in terms of the historical importance of the commercial fishing activity to the licence holder's income. However, with many "sleeper" licences issued, there was a potential for major impacts on the fishery resource, if for instance, all licence holders decided to increase their effort and use the full extent of the licence. The new provisions forced amalgamation of many smaller businesses and low-activity licences.

The number of Aboriginal people who are licensed as commercial fishers in the ocean hauling sector and the relative scale of their fishing effort, is not known.

The introduction of greater regulation in the ocean hauling fishery from the mid 1980s had several unintended consequences in relation to the access of Aboriginal communities to the coastal fishery. The impacts of the regulations continue to be of concern to Aboriginal fishers, and are discussed further in **Section 4.2.1**.

Table 4.2 summarises the changes to the regulations, and the ways in which these changes are seen by the Aboriginal community to have disadvantaged their access to the fishery. The information presented here about the views of the Aboriginal community is based on discussions with the NSW Aboriginal Land Council, NPWS Aboriginal sites officers/liaison officers along the NSW coast and a small number of individual Aboriginal fishers.

Table 4.2 - Increasing Regulation of Commercial Fisheries

Date	Regulation	Effects on Aboriginal fishers (advice from Aboriginal community representatives)
1980	Access to the abalone fishery limited	Commercial access to abalone is available only to those holding commercial licences. Two licences are held by the Cruise family at Eden, but no other Aboriginal fishers now participate legally in commercial abalone fishing. Aboriginal communities feel that the scale of their past involvement in abalone fishing was greater than the individual recreational fisher, and was not recognised in the allocation of abalone licences, in what is now a very lucrative industry. Aboriginal people feel that they were not consulted adequately about their interests in this industry at the time. Note that abalone is not part of the ocean hauling fishery.
1984	Freeze on the issue of new boat licences	This was the first time that access to the general fishery had been limited. Although existing boats were not affected, limits were introduced on new commercial boat licences, and additional boats had to be justified.
1986	Access limited to offshore prawn trawling	No specific information available.
1987	Freeze on the issue of new commercial fishing licences	The aim of this regulation was to ensure that new participants in the fishing industry replaced existing fishing effort rather than adding to it. Aboriginal communities note that they tend to fish in community groups, so that more than one generation would be represented in a fishing group. During fishing activities, not only fishing skills but other cultural information might be shared with younger members of the community, so that sale or transfer of the licence from one generation to another is not as straightforward as in some other parts of the general community. Coastal Aboriginal communities feel that they were disadvantaged by this change to the legislation
1993	Access to the lobster industry limited	No specific information available.
1994	Licensing policy introduced, catch validation required	The 1994 legislation was the first part of the changes that continued until 1997 when the restricted fishery concept was introduced. Although NSW Fisheries required only small commercial returns to be documented, some Aboriginal families who had held general commercial licences were not able to meet this requirement. In this period, requirements that all participating fishers hold a licence were introduced. Aboriginal fishers feel that the small scale, group fishing strategy of Indigenous people is disadvantaged by this requirement.
1997	Restricted fisheries introduced for major marine fisheries	This legislation ended the period that licensed fishers could automatically access multiple fisheries. Aboriginal people feel that NSW Fisheries did not consult adequately with them about the implications of this legislation. Entry to the restricted fishery required demonstration of a minimum level of catch history. Aboriginal people feel that basing licence renewals on returns lodged with NSW Fisheries was not consistent with the "circular seasonal" fishing practised by Aboriginal communities, and the family support/barter economy of Aboriginal communities. The restricted fishery licences also meant that separate licences now needed to be held to access the estuary general, beach hauling and prawn hauling components of the fishery (with separate endorsements for different parts of the beach hauling), which were all part of the seasonal round of small scale Indigenous fishers. Aboriginal fishers also report that the zoning of the coast for licensing purposes is not consistent with their seasonal activities, which would once have involved considerable movement along the coast (eg from Nowra to Lakes Entrance).

Table 4.2 - Increasing Regulation of Commercial Fisheries (cont)

Date	Regulation	Effects on Aboriginal fishers (advice from Aboriginal community representatives)
	Closure of certain beaches and estuaries to commercial activity during holiday periods	Many NSW beaches are closed to commercial fishing over weekends and during holiday periods when recreational demand is greatest, or to protect habitat/resources. Aboriginal people do not generally regard themselves as recreational fishers. These closures further restricted community scale fishing activities (eg pipi gathering).

4.3 IMPACT OF CHANGING REGULATIONS - SPECIES AND LOCATIONS

The impact of changing regulations for commercial beach hauling fishers adds to the impacts of regulations for pipis and beach worms and estuary general fishers. This discussion includes fishing that is licensed in the estuary general and ocean hauling fisheries. **Table 4.2** indicates that restrictions in both these commercial sectors have affected Aboriginal fishers who would traditionally have accessed the resources of all sectors during their annual activities.

4.3.1 Pipis and beach worms

Pipis are a bivalve mollusc that is common on sandy beaches, particularly along the central and north coasts of NSW. The past importance of pipis in the diet of Aboriginal people is attested to by the presence of large numbers of extensive middens comprising almost exclusively pipi shell, in the dune fields behind central and north coast beaches. These middens mostly appear to date to the last 3000 years (see **Section 3.2.2**). There is no doubt that pipi continues to be an important part of the diet of coastal Aboriginal communities today, and pipi gathering is an important social as well as dietary activity.

Pipis are also now a growing commercial resource, with pipis sold as bait and for consumption in soups and chowders. The pipi market grew rapidly from a low base to a peak of approximately 70000 tonnes (value $125000) in 1996-97, but dropped dramatically following concerns about contamination by biotoxins from algae. NSW Fisheries predict that this sector of the commercial market will recover and grow. Commercial pipi gathering is almost exclusively by hand.

There are few, if any, Aboriginal people involved in the commercial harvesting of pipis (ie. holding estuary general licences with endorsements for pipis). Aboriginal people therefore currently harvest pipis as part of the recreational sector where strict bag limits now apply. Recreational licences are also now required to be held by each individual participating in pipi gathering, unless they are party to a registered Native Title claim.

On the north coast, changing regulations about access to pipi resources has lead to some conflicts about small scale marketing of pipi (generally for bait) by Aboriginal communities, such as the Bundjalung community at Yamba. In this community, Aboriginal people report that they have had long standing arrangements with local fishing tackle and bait suppliers to provide pipis for bait during the peak tourist season. Aboriginal people note that the money earned from this activity supplements income from other part time jobs and social security payments, particularly for young Aboriginal people (verbal paper presented by the community at the NSW Coastal Conference, Yamba 2000).

4.3.2 Fish species

Table 4.3 shows the species that are commonly reported to be caught by Indigenous fishers, or have been reported as a significant component of bone from Aboriginal sites along the NSW coast. It also shows the most commonly caught commercial species in the estuary general and ocean

hauling fisheries, and the extent to which some of these species are currently exploited by the commercial fishery (based on NSW Fisheries, May 2001, Draft Ocean Hauling Fishery Strategy and Draft Estuary General Fishery Strategy).

Table 4.3 - Species valued by commercial and Indigenous fishers

Species	Commercial fishery	Indigenous fishing
Sea mullet	Important resource, fully fished (EGFMS) Fully fished (OHFMS)	Frequent ethnographic references right along the coast; reported in recreational survey of Indigenous fishers; reported from south coast Indigenous fishers in 1950s
Luderick	Moderately fished (EGFMS) Moderately fished - sustainable (OHFMS)	Widely fished, anecdotal information
Yellowfin bream	Fully fished (EGFMS) Fully fished (OHFMS)	Black bream (not yellow fin bream) reported ethnographically and in midden sites; reported from the Wreck Bay community in 1950s. Bream commonly caught accordingly to data in recreational fishing survey
School prawns	Fully fished	Widely fished, anecdotal information
Dusky flathead	Fully fished	Reported ethnographically and in midden sites; reported in recreational survey of Indigenous fishers
Blue swimmer crab	Unknown	Widely fished, anecdotal information
Sand whiting	Moderately fished (EGFMS) Moderately fished (OHFMS)	Reported ethnographically and in midden sites; reported in recreational survey of Indigenous fishers; reported from the Wreck Bay community in the 1950s
Longfinned eels	Underfished to fully fished depending on catchment (EGFMS)	Ethnographic reports of eel trapping in upper estuaries and wetlands
Pipi	Unknown (EGFMS)	Most common species in ocean beach middens; pipi gathering a strong contemporary Indigenous fishing activity, both recreational and small scale commercial
Fantail mullet	Under fished	No information available
Silver trevally	Fully fished to overfished (EGFMS) Fully to over fished (OHFMS)	Reported ethnographically and in midden sites
Mulloway	Unknown (EGFMS)	Reported from archaeological sites; reported from the Wreck Bay community in 1950s
Tarwhine	Unknown (EGFMS)	Present in some midden sites (north coast)
Leatherjacket	Moderately to fully fished	Reported from archaeological sites
River garfish	Unknown (EGFMS)	Reported in recreational survey of Indigenous fishers
Sand mullet	Unknown (EGFMS)	

Table 4.3 - Species valued by commercial and Indigenous fishers (cont)

Species	Commercial fishery	Indigenous fishing
Silver biddy	Unknown (EGFMS)	
Mud crab	Unknown (EGFMS)	
Eastern king prawn	Fully fished (EGFMS)	
Tailor	Unknown (EGFMS)	Reported ethnographically; reported in recreational survey of Indigenous fishers. Moderately common in midden sites.
Snapper	Fully fished to overfished (EGFMS)	Reported from archaeological sites; reported in recreational survey of Indigenous fishers
Yellowtail	Fully fished (OHFMS) Fully fished (EGFMS)	
Whiting	Unknown (EGFMS)	Frequently caught by Aboriginal fishers
Rock oyster		Abundant in estuarine middens (especially north coast)
Mud/sand oyster		Common in estuarine middens along entire coast
Hairy and edible mussel		Abundant in upper levels of south coast middens (last 1000 years)
Blood cockles (Anadara cockles)		Contemporary Indigenous fishing, very common in estuarine middens right along the coast
Rock platform shellfish		Common in coastal middens, particularly on the south coast, where headlands more frequent
Mud whelk		Common in archaeological sites
Blue Mackeral	Moderately fished (OHFMS)	
Sandy Sprat	Unknown (OHFMS)	
Sweep	Unknown (OHFMS)	
Anchovy	Unknown (OHFMS)	
Australian salmon	Unknown, fluctuating (OHFMS)	Multiple ethnographic references to this fish being targeted in schools, on both north and south coast.
Sea garfish	Probably over fished (OHFMS)	Commonly reported in Indigenous component of recreational fishing survey.
Pilchards	Unknown (OHFMS)	
Dart	Unknown (OHFMS)	
Bonito	Unknown	
Leatherjacket	Unknown (EGFMS)	
Greasy back prawn	Unknown (EGFMS)	
Squid	Unknown (EGFMS)	
Beach worms	Unknown	Collected by Indigenous fishers for their own use and for sale in small quantities

This very preliminary level of analysis indicates, as might be expected, that there has been and continues to be a strong overlap between the fish species targeted by commercial fishers and those that have been targeted by Aboriginal people in past and contemporary fishing activities. There is much less overlap between commercial and Indigenous shellfish harvesting, although a number of the shellfish species preferred by Aboriginal people are also now collected by other ethnic groups in NSW.

Of particular note is the reported extent to which some species, of long standing importance to Indigenous fishers, are considered to be fully fished to overfished in the commercial sector, although NSW Fisheries also note that the status of some species requires further analysis.

The OHFMS lists species that are protected under the Fisheries Management (General) Regulations 1995, either from the commercial sector, or all sectors. Marine fish protected from all sectors includes:

- Ballina angelfish;
- Estuary cod;
- Great Queensland groper;
- Grey nurse shark;
- Herbst nurse shark;
- Black rock cod; and
- Weedy sea dragon.

Marine fish protected from commercial fishing include:

- Estuary perch; and
- Blue groper.

There are also restrictions on the amounts of tailor and Australian salmon taken commercially in some areas.

From the limited information that is currently available about Indigenous fishing species preferences, the restriction of access to species listed for general protection would not constitute a significant impact on the economic aspects of Indigenous fishing.

4.4 NATIVE TITLE AND LAND CLAIMS

Local Aboriginal Land Councils in NSW may make claims with respect to Crown Land under the NSW Aboriginal Land Rights Act. In general, land claims to date have included parcels of land along the banks of estuaries, and on beaches. For instance, the government announced in March 2001 the granting of a Land Claim by the Worimi Local Aboriginal Land Council over substantial sections of Stockton Beach. Although part of the claim is proposed to be leased back to NPWS to become part of a new national park in the vegetated dunes of Stockton Bight, the granting of the Land Claim will provide the Land Council with opportunities to exercise a high level of control over the use and management of the beach and dunes, including the management of a large number of midden sites.

The Commonwealth Native Title legislation was introduced in 1993. Up until the end of June 2001, a total of 335 Native Title claims had been made by Aboriginal people in NSW. Very few of these have yet been determined, and only 52 have reached the acceptance or registration stage. Of the 335 claims, 147 have subsequently been withdrawn.

Where it is demonstrated to exist, Native Title provides the Aboriginal community with opportunities to negotiate in relation to allocations of the resources of the land (or water) (future acts) in question, and also to negotiate compensation for loss of access to traditional sites and practices.

Of the Native Title claims that have been lodged to date in NSW (and the Jervis Bay territory), 50 relate to land around estuaries and along the coast. Two claims on the south coast (by the Walbunja people and the Djiringanj people) extend both along the coastline and out to the 200 nautical mile limit. Other examples of claims that cover estuarine and coastal waters include those by the Bherri Werri people (Jervis Bay), Eloura people (south of Wollongong), Gundungurra people (Moruya) and Banjalang people (north of Yamba and at Byron Bay).

In some cases, Native Title claims have been made and subsequently withdrawn, although this is not necessarily an indication that local Aboriginal people consider that the claim has a weak case. In all cases, the effort required to demonstrate the necessary connections to the land, and to achieve successful outcomes from Court cases, is high. It can be expected that resolution of Native Title issues will take many years.

The issue of Native Title is noted in the draft Ocean Hauling Fishery Management Strategy as a reason that Aboriginal people are stakeholders in the development and implementation of the strategy. The draft strategy also alludes to the potential for Native Title to lead to the exclusion of other groups of estuary fishers from some waterways. As no Native Title claim that would provide for exclusive use or partial curtailment of other users has yet been granted in coastal NSW, the draft strategy does not specifically address the process for dealing with future interactions between Indigenous fishers and commercial fishers in this context.

The draft Strategy does discuss contingency plans "in the case of emergencies or unpredictable events" and also has a trigger point for review that relates to significant shifts in the balance between catches taken by various sectors (commercial, Indigenous and recreational) in any estuary.

These broad strategies will allow the Ocean Hauling Management Strategy to be reviewed and amended over time, as the issues related to tenure of waterways and the seabed are further resolved.

4.5 MANAGEMENT OF INDIGENOUS FISHING AND OCEAN HAULING FISHING INTERACTIONS

4.5.1 Outstanding issues of concern to coastal Aboriginal communities

The level of Aboriginal participation in the commercial fishery sector appears to have declined substantially over the last twenty years. There are now perhaps less than fifteen active fishing licences (estuary general and beach hauling) held by Aboriginal families along the coast. However, the lack of commercial participation is not an indication of declining Indigenous participation in fishing generally. There are four main categories of outstanding issues of concern to the Aboriginal community in relation to their participation in the management of fisheries in NSW (NSW Fisheries 2000) and each of these is also relevant to the impact of ocean hauling commercial fishery strategy on Aboriginal communities:

- lack of recognition and accommodation of traditional Indigenous fishing practices;
- declining participation of Aboriginal people in commercial, recreational and aquaculture fisheries;
- insufficient meaningful presence and participation of Aboriginal people in the process for managing and conserving fisheries resources; and

- need for better communication and consultation with Aboriginal people.

4.5.2 Actions to address Aboriginal concerns in the draft OHFMS

The draft ocean hauling fishery management strategy identifies Indigenous people as stakeholders in the ocean hauling fishery, noting that these interests arise from:

- direct participation in the fishery as commercial fishers;
- traditional fishing practices, whereby people catch fish on behalf of themselves and their community; and
- lodgement of Native Title claims over estuarine areas that are used for commercial fishing. (see **Section 4.4**).

NSW Fisheries legislation does not currently recognise Indigenous fishers as a separate sector of the fisher population, and this is the main reason why none of the legislative reviews to date have given extensive consideration to Aboriginal community concerns.

The draft OHFMS does not specifically address the Aboriginal community's view that the evolution of the fisheries legislation in NSW has gradually but consistently undervalued the interests of Aboriginal people in the ocean hauling fishery. The draft strategy does, however, foreshadow future amendments to the strategy to better accommodate Aboriginal community interests.

For instance:

> *Objective 4.1*
> *To monitor and provide an appropriate allocation of the fisheries resource between fishing sector groups, acknowledging the need for seafood consumers to access fresh quality fish.*
>
> *Action: (a) assess, as far as is practicable, the size of the non commercial and illegal catch and the relative impact of such harvesting on the resource, taking into account the results of the National Recreational and Indigenous Fishing Survey.*
>
> *Object 4.5*
> *To promote harmony between the commercial fishery and other resource users, including recreational fishers, Indigenous fishers and local communities, through fair and equitable sharing of the fisheries resource.*

The draft Strategy recommends four actions in relation to this objective:

- continue to use fishing closures to control the area and time fished. These closures are determined in consultation with Regional Liaison Committees that include NPWS and Indigenous interests;
- review the established code of conduct on an annual basis, so that appropriate standards for interaction with other fishers and the environment are maintained;
- develop a code of conduct for the purse seine sector (not covered by existing code). This could cover interactions with other fisheries, and management of incidental catches of marine mammals or birds; and

- define recognised fishing grounds in consultation with Regional Liaison Committees to establish clear rules and priorities for access.

Part C6 of the Ocean Hauling Fishery Management Strategy relates to performance monitoring and review. The performance indicator listed for appropriate sharing of the ocean hauling fishery resource is the catch level (including estimates) of the commercial, recreational and Indigenous fishing sectors. A trigger point for review is noted as a shift of relative catch levels of 25% between sectors over the term of the strategy.

It is important to note that such a shift in relative catch is unlikely to occur without significant changes to policies affecting access to the resource.

4.5.3 Towards a NSW Indigenous Fishery Strategy

NSW Fisheries has recognised that coastal Aboriginal communities have long standing and legitimate interests in the fishery resources of the coastline. The NSW Government now also acknowledges that Indigenous community interests in the coastal fishery are contemporary and do not only relate to past history. The traditional access of Aboriginal communities to natural resources has been restricted by existing fisheries management policies and legislation.

A recent working paper prepared by NSW Fisheries (2000) indicates that consultation is progressing about how best to recognise and accommodate the rights and interests of Aboriginal people in the estuary fishery and other commercial fisheries. The working paper is part of the process for the development of an Indigenous Fishery Strategy for NSW.

The working paper does not provide a specific definition of Indigenous fishing activities, but several important characteristics can be deduced.

A number of actions have already been implemented to recognise the interests of Indigenous stakeholders. These include:

- NSW Fisheries accessed funds from the Federal Government as a result of the Coastal Zone Inquiry to employ an officer to begin the development of an Aboriginal fisheries strategy (1996/7);

- A series of workshops with Indigenous communities across NSW in 1998. These workshops identified hundreds of issues of concern to Aboriginal people, falling into approximately 15 main categories of issues, that should be addressed by the Indigenous Fishery Strategy;

- In October 2000, the NSW recreational fishing fees policy was released. The policy exempts Aboriginal people fishing in saltwater from the recreational fishing fee, provided that they are party to a registered native title claim and are involved traditional cultural fishing as described by the Indigenous Fishery Strategy. Until the Strategy is released an interim arrangement has been implemented. Local Aboriginal Land Council members and any Aboriginal person fishing with them are exempt from the fee if fishing in the Local Aboriginal Land Council area. A practical process for issuing certificates of fee exemption is now being considered; and

- Principles for the Indigenous Fishery Strategy have been proposed.

4.5.4 Interaction of the OHFMS and the Indigenous Fishery Strategy

The time frame for the finalisation of the Indigenous Fishery Strategy is not clear, and there are many complex issues to be resolved before a sustainable strategy is agreed to by the stakeholders. It is most probable that the Ocean Hauling Fishery Management Strategy will be assessed and will commence implementation before negotiations about the Indigenous Fishery Strategy are complete.

The preliminary indications are that the Indigenous Fishery Strategy will, subject to Government funding, address many of the issues that remain as outstanding concerns to the Aboriginal community in relation to the ocean hauling fishery. It is also possible that the strategy will include a staged series of actions to gradually improve Indigenous access to the natural resources of beaches and other fisheries, ensuring that any necessary changes to the OHFMS will also be gradual.

Ongoing review of the Ocean Hauling Fishery Management Strategy will be essential to ensure that any changes in the policy approach to Indigenous fishering are adopted within the OHFMS. It is proposed that the OHFMS will be reviewed in two years, with particular attention to ensuring consistency between any Indigenous Fishery Strategy that exists at that time, and the management protocols contained in the OHFMS.

4.5.5 Further strategic actions to mitigate impacts on Indigenous fishers

It is anticipated that the consultation leading to the adoption of a new NSW policy for fishing by Indigenous fishers will address many of the outstanding concerns of the Aboriginal community. The key actions, in relation to estuaries, that are being considered for inclusion in an Indigenous Fishery Strategy (NSW Fisheries Working Paper, 2000) are noted below. There is as yet no indication as to which of these options may be included in the strategy that is agreed between the NSW Government and Aboriginal people, but discussions are continuing. Options being discussed include:

- Issue permits or change regulations to allow exemptions for the use of certain low impact fishing gear (for instance small nets, spears and traps).

- Establish closures or management rules on sites that are recognised as significant to protect traditional Indigenous fishing.

- Establishing closures on particular species for harvest by Indigenous people only, such as bimbulas (blood cockles).

- Issuing permits to allow possession and bag limits to be exceeded for certain species, areas or periods, for individual and communities.

- Bimbulas are currently under utilised and are of low interest to commercial fishers. These could form the basis of sustainable Indigenous fishing.

- Some under utilised species such as Australian salmon could become a useful base for boutique-style, value-added processing in a small artisan style fishery and processing venture that used local community labour and resources.

- Expansion of the fishery for gathering beach worms and pipis from north coast beaches for bait for recreational fishing could be a viable and sustainable scheme.

- Extensive aquaculture (ranching) of black bream, snapper and prawns in intermittent south coast lagoons could be a viable scheme.

- Establish a program (like a Fishcare Volunteer Program) with Indigenous communities, to use and pass on Indigenous knowledge about fish habitat and conservation.

- Cross-cultural training for fisheries officers, and employment of Aboriginal Fisheries officers to enhance the accessibility of fisheries information to Aboriginal communities.

- Establish an Indigenous fisheries committee (to advise the current advisory council on Indigenous issues).

NSW Fisheries is advancing new policies in relation to marine conservation areas, recreational fishery areas and aquaculture at the same time as strategies for various commercial sectors are being developed and assessed. Within this far-reaching review of fishery management, innovative opportunities for responding to Aboriginal cultural values in relation to the ocean hauling fishery (and other fisheries) may emerge. The critical action in this regard is to provide meaningful opportunities for communication and discussion of all aspects of fisheries management with Aboriginal community representatives. A secondary action is that close co-ordination is maintained between all aspects of fishery management policy as it evolves.

5.0 SUMMARY OF ACTIONS TO MINIMISE THE RISK OF IMPACT OF OCEAN HAULING FISHERY ACTIVITIES ON ABORIGINAL SITES AND INDIGENOUS ISSUES

As noted above, the risk of impacts on Aboriginal sites from ocean hauling fishery activities is considered to be low at the whole of industry level, although specific local issues will need careful management.

Many of the concerns of Aboriginal communities about the impact of current commercial fishery regulations on their livelihoods and lifestyles are being addressed through the partnership with NSW Fisheries to develop an Indigenous Fishery Strategy. However, this process may take some time, both to finalise to the satisfaction of all stakeholders, and to implement through changes to other strategies and legislation.

In the shorter term, several actions are recommended to minimise the risks of adverse interactions between ocean hauling fishery activity, Aboriginal heritage and contemporary Indigenous community issues. These include:

- Focus on enhancing communication between NSW Fisheries and Aboriginal communities at all levels. This would include:
  - cultural awareness training for NSW Fisheries staff;
  - Aboriginal membership of local area fishery management committees;
  - Employ Aboriginal liaison officers to enhance transfer of information to Aboriginal communities, and to assist with the management of culturally sensitive information;
  - Consultation with Aboriginal community representatives about proposed new fishery infrastructure along beaches that could impact on sites of cultural heritage value; and
  - Consultation with NPWS about potential impacts on known Aboriginal sites for any new infrastructure development.
- Prepare cultural awareness material for commercial fishers in the ocean hauling sector (and other sectors such as beach pipi and worm collectors who access beaches in 4WD vehicles) highlighting risks to Aboriginal sites and how these can be minimised;
- Ensure close co-ordination of the preparation of new fishery management strategies for commercial, conservation, recreational and Indigenous sectors, to enhance opportunities for identifying innovative cross sectoral management options;

- Explore opportunities for further Indigenous fishing or recreational fishing development in estuaries that are currently subject to a low level of commercial fishing activity; and

- The OHFMS should be reviewed after two years, so that changes to Indigenous fishing policies can be accommodated.

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VESSEL (TYPE-DISP'T)	DATE	VOYAGE		LOCATION OF SHIPWRECK		DATABASE REFERENCE
		FROM	TO	GENERAL	SPECIFIC (Lat/Long), [COMMENTS]	
Ability (Steamer-140t)	1960#/1965*			Newcastle#/Sydney*, scuttled	Newcastle#/Sydney*, off	ASDB 126#*/FWI#
Active (Ketch-40t)	18/02/1852			Newcastle, wrecked	Hunter River entrance	ASDB 11
Active (Ketch-49t)	19/01/1898		Morpeth	Newcastle, wrecked, aground	near *Colonist*	ASDB 12
Ada (Ketch-50t)	29/04/1897			Stockton, wrecked, aground	Oyster Bank	ASDB 14
Adolphe (Barquentine-3204t)	30/09/1904	Antwerp	Newcastle	Stockton, wrecked, hawser parted	Oyster Bank (32.91/152.80)	ASDB 24
Age (Steamer Screw-2284t)	05/06/1899	Sydney	Newcastle	Newcastle, aground, refloated	Shepherds Hill	ASDB 601
Alexander and John (Schooner-117t)	28/08/1861	Newcastle	Sydney	Newcastle, wrecked, ashore	rudder broke, Nobbys Head	ASDB 30/FWI
Alhambra (Steamer screw-766t)	30/06/1888	Newcastle	Newcastle	Newcastle, wrecked, collision	near Nobbys [	ASDB 445
Alice (Schooner-80t)	02/04/1861	Newcastle	Sydney	Newcastle, wrecked, ashore, squall	Nobbys Head	ASDB 48
Alice (Schooner-nk)	02/04/1901			Stockton, wrecked, ashore	Stockton Beach	ASDB 603
Ann (Schooner-103t)	26/01/1856			Stockton, wrecked, aground	Oyster Bank	ASDB 57
Ann (Ketch-28t)	13/03/1886	Sydney	Port Stephens	Newcastle, wrecked, ashore	3 nm N	ASDB 436
Arcollun (nk)	00/00/1862			Stockton, wrecked	Oyster Bank	FWI
Atlantic (Schooner-nk)	20/09/1876			Newcastle, abandoned	Newcastle, off	FWI
Ben (Ketch-12t)	18/10/1888			Newcastle, foundered	Newcastle, off	ASDB 551
Bengal (Barquentine-428t)	06/05/1872			Newcastle, wrecked	Newcastle, off	ASDB 1720
Berbice (Ship-760t)	05/06/1888	Melbourne	Newcastle	Newcastle, ashore, SE gale	0.5nm N of breakwater	ASDB 562
Boats (2) _(nk)	20/05/1893	Newcastle		Newcastle, capsized	Big Ben Reef	FWI
Boyd (Schooner-18t)	16/07/1812			Stockton, wrecked, ashore	Stockton Beach (32.92-.75/152.20-151.78)	ASDB 102
Brothers (Cutter-nk)	23/12/1837			Newcastle, ashore, recovered	Nobbys	FWI
Brothers (Cutter-nk)	21/02/1849			Newcastle, piracy	Newcastle	FWI
Bungaree (Steamer Paddle -552t)	05/10/1865	Newcastle		Newcastle, sank, refloated	Nobbys, off	ASDB 115/FWI
Bungaree (Steamer Paddle -552t)	19/06/1866	Newcastle		Newcastle, stranded, recovered	Nobbys	ASDB 115/FWI
Butcher boat (nk)	07/03/1894	Newcastle		Stockton, wrecked	Stockton Beach	FWI
Canmore (Schooner-131t)	21/10/1854	Melbourne	Newcastle	Stockton, wrecked, aground	Oyster Bank [7/9 lost]	ASDB 1118
Cawarra (Steamer Paddle -552t)	12/07/1866	Sydney	Rockhampton	Stockton, wrecked, aground	Oyster Bank [60/61 lost]	ASDB1132
Ceylon (nk-10t)	00/02/1834	Coal River		Newcastle, wrecked, ashore, gale	near [2/5 lost]	ASDB1138
Champion (Lighter-42t)	10/05/1877	Hunter River	Hunter River	Newcastle, wrecked, coll *Maitland*	Hunter River entrance [1/3 lost]	ASDB 537
Chance (Ketch-39t)	28/07/1857	Richmond R.	Morpeth	Stockton, wrecked, gale, aground	Oyster Bank	ASDB 1141
Charlotte (Sloop-10t)	19?/09/1827	Sydney		Stockton, wrecked, ashore	(32.92-.83/151.88-.78) [4/4 lost]	ASDB 1146
Charlotte (nk)	~00/03/1833			Newcastle, wrecked	off [2/3 lost]	ASDB 1147
City of Newcastle (Steamer Pad-393t)	12/09/1878	Sydney	Morpeth	Newcastle, wrecked, ashore, fog	2 nm S at Shepherds Hill	ASDB 1155
Clara (Brigantine-132t)	26/07/1874	Sydney	Newcastle	Newcastle, wrecked, aground	reef S of Nobbys	ASDB 774
Colonist (Steamer Screw-819t)	09/09/1894	Newcastle	Adelaide	Newcastle, wrecked, navigation error	under N breakwater	ASDB 1165
Commodore (Steamer Paddle-187t)	03/09/1931	Newcastle		Newcastle, scuttled	3 nm E of Nobbys (124.07/151.87)	ASDB 1847
Cumberland (Schooner-59t)	08/04/1862	Newcastle	Newcastle	Newcastle, wrecked, swamped, gale	~2 nm off [5/5 lost]	ASDB 1185
Delight (Cutter-35t)	12/04/1838		Newcastle	Newcastle, wrecked, swamped	at anchor, Hunter River entrance	ASDB 1201
Doorabang (Steamer Screw-nk)	31/07/1873			Newcastle, wrecked	Nobbys	FWI
Dover (Brig-nk)	00/00/1852			Stockton, wrecked	Stockton Beach	FWI
Drover (Brig-nk)	10/11/1856			Stockton, wrecked	Stockton Beach	FWI

Abbreviations used:

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~ 'approximately' or 'about' **NSEW** and **combinations** compass points/directions **ASDB #** Fol no in the AIMA 'Australian Shipwreck Database' **FWI** Capt J Fletcher's Wreck Index

VESSEL (TYPE-DISP'T)	DATE	VOYAGE		LOCATION OF SHIPWRECK		DATABASE REFERENCE
		FROM	TO	GENERAL	SPECIFIC (Lat/Long), [COMMENTS]	
Dundee (Ship-nk)	15/08/1808	Sydney	Fiji	Stockton, wrecked, struck sand shoals	Oyster Bank (32.91-.88/151.8-.77) [2/4 lost]	ASDB 1214
Durisdeer (Barquentine-989t)	00/12?/1895	Simons Town	Newcastle	Stockton, wrecked, ashore	Stockton Beach	ASDB 589
Eclipse (Ketch-nk)	16/05/1850			Stockton, wrecked	Stockton Beach	FWI
Elamang (Steamer Screw-495t)	00/02/1905	Newcastle		Stockton, scuttled	Oyster Bank	ASDB 1225
Eleanor Lancaster (Ship-480t)	07/11/1856	Newcastle	Melbourne	Stockton, wrecked, aground, gale	Oyster Bank	ASDB 1226
Eliza Appleton (Brig-nk)	27/06/1853			Stockton, wrecked, aground	Oyster bank, seeking shelter from weather	ASDB 1233
Elizabeth & Mary (Schooner-nk)	14/01/1816			Newcastle, aground		FWI
Elizabeth Henrietta (Brig-nk)	19/12/1825			Newcastle, wrecked, struck reef	Nobbys Head, northern end (Big Ben?)	ASDB 940
Emily and Mary (Ketcvh-23t)	13/01/1892	Newcastle	Port Stephens	Newcastle, foundered, coll *Othelo*	off Nobbys Head	ASDB 581
Endeavour (Schooner-nk)	00/12/1817	Newcastle		Newcastle, wrecked, ashore	Nobbys Point	ASDB 723
Esperanza (Brig-117t)	16/02/1868	Newcastle	Melbourne	Newcastle, wrecked, aground	anchor parted near Bird Island [10/11 lost]	ASDB 1250
Estramina (Schooner-100t)	19/10/1816	Newcastle		Stockton, wrecked, aground	anchor parted, Oyster Bank (32.90-1/151.83)	ASDB 1251
Fanny (Brig-nk)	11/11/1853		Newcastle	Stockton, wrecked, aground	Oyster Bank	ASDB 1257
Ferryman (Ketch-41t)	24/06/1876			Newcastle, wrecked, ashore	north beach	ASDB 534
Fishing Boat (nk)	30/08/1885	Newcastle		Newcastle, foundered	Nobbys, off	FWI
Fox (Schooner-159t)	18/04/1864			Stockton, wrecked,	north shore, outside Scotts Point	ASDB 1273
Francis (Schooner-40t)	~21/03/1805	Sydney	Newcastle	Stockton, wrecked, anchor parted	N of 1805 river entrance (32.91-.88/151.80-.77)	ASDB 1274
Frederick (Schooner-73t)	26/06/1854	Newcastle	Sydney	Stockton, wrecked, coll *Waterwitch*	Oyster Bank	ASDB 1279
Gazelle (Schooner-108t)	00/07/1860	Newcastle		Newcastle, wrecked, ashore	near lighthouse (Nobbys Head).	ASDB 1286
Gem (Schooner-nk)	12/03/1880			Newcastle, wrecked, aground	Stockton breakwater	FWI
George H Peake (Brig-263)	11/07/1874	Newcastle	Melbourne	Newcastle, wrecked, coll *Sierra Nevada*	7 nm S of Port	ASDB 525
Gilbert Jamieson (Brigantine-106t)	00/00/1859			Newcastle, wrecked, aground,	N side of Nobbys	ASDB 1293
Goldseeker (Schooner-nk)	00/00/1856			Newcastle, wrecked	Newcastle	FWI
Governor Arthur (Cutter-nk)	24?/04/1829		Newcastle	Newcastle, wrecked, aground	Reef off Nobbys (Big Ben?)	ASDB 1298
Governor King (Schooner-38t)	22/04/1806	Norfolk Island	Sydney	Stockton, wrecked, dragged anchor	near wreck of *Francis* (32.91-.88/151.80-.77)	ASDB 1301
Helen S Page (Barque-217)	13/03/1868			Newcastle, wrecked, ashore, navigation	north beach	ASDB 1311
Herculean (Schooner-92t)	25/11/1863	Sydney	Newcastle	Newcastle, wrecked, ashore	Nobbys Head	ASDB 1316
Hunter (Schooner-58t)	02/10/1856		Newcastle	Newcastle, wrecked, blown ashore	North beach	ASDB 1328
Irresistible (Steamer Screw-136t)	27/08/1931	Newcastle		Newcastle, scuttled	6 nm NE	ASDB 1915
Islander (Slopp-106t)	17/03/1870			Newcastle, wrecked		ASDB 1337
Jessie (Schooner-119t)	09/05/1869	Newcastle		Stockton, wrecked, ,aground	chains parted, Oyster Bank [3/5 lost]	ASDB 1351
Jonathon (Ketch-43t)	04/10/1891	Tweed R.	Sydney	Stockton, wrecked, ashore	N of Oyster Bank	ASDB 577
Jones Brothers (TS Schooner-141t)	31/08/1905	Newcastle	Sydney	Stockton, wrecked, aground, gale	Oyster Bank near *Adolphe* [6/6 lost]	ASDB 614
Joseph Weller (Schooner-50t)	19/10/1837			Newcastle, wrecked, ashore	north beach near entrance	ASDB 1356
Joyran (Launch-nk)	70/07/1937			Newcastle, wrecked	Nobbys, south of	FWI
Katoomba (Steamer Screw-1006t)	00/02/1905	Newcastle	Newcastle	Newcastle, wrecked, aground	north breakwater, placed on Oyster Bank	ASDB 1364
King William IV (Steamer pad-81t)	02/07/1839	Newcastle		Newcastle, wrecked, ashore	Nobbys Island	ASDB 1671
Laura (Ketch-nk)	13/02/1869	Lk Macquarie	Newcastle	Stockton, wrecked, ashore, gale	Stockton Beach	ASDB 1778
LF71 (Launch-nk)	07/07/1937	Newport	Newcastle	Newcastle, wrecked, hit reef	~_ nm S of entrance (Big Ben?)	ASDB 1940
Lilian (Schooner-nk)	11/11/1872			Newcastle, wrecked	Newcastle entrance	FWI

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VESSEL (TYPE-DISP'T)	DATE	VOYAGE		LOCATION OF SHIPWRECK		DATABASE REFERENCE
		FROM	TO	GENERAL	SPECIFIC (Lat/Long), [COMMENTS]	
Lindus (Steamer Screw-1678t)	04/06/1899	Newcastle	Adelaide	Stockton, wrecked, heavy sea	swamped?, Oyster Bank (on Colonist)	ASDB 1387
Maianbar (Steamer Screw-487t)	05/05/1940			Newcastle, wrecked, ashore	towline snapped, Nobbys Beach	ASDB 1945
Margaret (Schooner-33t)	12/07/1860	Newcastle	Sydney	Stockton, wrecked, coll *Phantom*	Oyster Bank [1/? lost]	ASDB 1414
Margaret Chessel (Schooner-65t)	04/05/1879	Melbourne	Newcastle	Newcastle, wrecked, ashore, gale	north beach [1/6 lost]	ASDB 545
Mars (Sloop-30t)	12/04/1816			Newcastle, wrecked, driven ashore	5nm N of harbour (35.85-.78/152.067-151.85)	ASDB 1421
Mary Ann (Schooner-nk)	00/01/1834			Stockton, wrecked	off Stockton Beach	FWI
Mary Lloyd (Cutter-nk)	05/05/1874	Newcastle		Newcastle, wrecked, ashore, squall	Nobbys Head	ASDB 526
Merksworth (Steamer Screw-270t)	07/05/1989	Newcastle	Sydney	Stockton, wrecked, swamped	Stockton Beach, off [9/12 lost]	ASDB 599
Monitor (Cutter-20t)	00/01?/1834			Newcastle, wrecked, ashore	near Newcastle	ASDB 150
Mud Barge (Barquentine-nk)	00/00/0000			Newcastle, scuttled	off	ASDB 1449
Merry Days (Launch-14t)	00/00/1912?			Newcastle, wrecked	near	ASDB 1013
Messenger (Schooner-38y)	12/02/1869	Sydney	Port Stephens	Newcastle, wrecked, aground, gale	near Nobbys Head [7/7lost]	ASDB 1437
Monitor (Cutter-20t)	00/01?/1834			Newcastle, wrecked, ashore	near	ASDB 150
Nancy (Schooner-74t)	09/05/1869	Newcastle	Sydney	Newcastle, wrecked, ashore	north beach [1 lost]	ASDB 1454
Nautilus (Brig-70t)	24/11/1816	Sydney	Ncl, Batavia, Calcutta	Stockton, wrecked, aground	Oyster Bank, off Point Ross (33.02-32.8/151.86-.70)	ASDB 1456
Nautilus (Barquentine-166t)	20/12/1866	Sydney	Newcastle	Newcastle, wrecked, aground, gale	Big Ben Rocks off Nobbys Head	ASDB 1457
Norfolk (Sloop-25t)	00/10?/1800	Hawkesbury R.	Port Hunter	[Piracy] Newcastle, wrecked, ashore	Pirate Point (32.92/151.78) [15 lost]	ASDB 1464
Orient (Schooner-32t)	00/06/1866		Newcastle	Newcastle, wrecked, ashore	anchor stock broke, north beach	ASDB 1475
Osprey (Steamer Screw-208t)	30/11/1931	Newcastle		Newcastle, scuttled	Nobbys, 5nm off	ASDB 1991
Otago (Schooner-64t)	31/06/1867			Newcastle, wrecked	Newcastle, off	ASDB 1477
Paterson (Schooner-48t)	00/05/1845			Redhead or S, wrecked, ashore	off, ~5-10 nm from entrance	ASDB 1483
Packet (Cutter-41t)	00/07/1859			Newcastle, wrecked, ashore	Nobbys Head	ASDB 1093
Phantom (Brig-158t)	12/07/1860	Newcastle	Sydney	Stockton, wrecked, coll *Margaret*	Oyster Bank [1 lost]	ASDB 1490
Phoebe Dunbar (Ship-704)	07/03/1864			Newcastle, wrecked, fire, ashore	in surf 50 yds from north beach	ASDB 1491
Pluto (Steamer Screw, Dredge-nk)	05/06/1957	Newcastle		Newcastle, wrecked	Newcastle breakwater, inside	FWI
Ranger (Schooner-88t)	24/06/1891	Tweed R.	Sydney	Stockton, wrecked, ashore, squall	Stockton Beach	ASDB 578
Recovery (Schooner-nk)	26/5/1842			Stockton, wrecked	Stockton Beach	FWI
Redpole (nk)	00/04/1834			Newcastle, wrecked, swamped	off Hunter River entrance [>1 lost]	ASDB 17
Regent Murray (Barquentine-849t)	04/04/1899	Adelaide	Newcastle	Stockton, wrecked, ashore, gale	Oyster Bank	ASDB 1525
Resource (Schooner-19t)	00/09/1814	Newcastle	Sydney	Newcastle, wrecked	off (33.83-32.9/151.86-.26)	ASDB 1528
Rialto (Barquentine-303)	26/12/1870	Melbourne	Newcastle	Stockton, wrecked, aground, gale	Oyster Bank, 1000 yds N of breakwater	ASDB 1529
Richmond (Dredge-nk)	24/11/1934	Newcastle		Newcastle, scuttled	off (33.50/152.23)	ASDB 2014
Rob Roy (Schooner-47t)	00/07/1838			Newcastle, wrecked, ashore	Nobbys Head	ASDB 888
Roderick Dhu (Schooner-76t)	13/07/1866			Stockton, wrecked	'Newcastle' Bight, 14 nm S/Port Stephens	ASDB 1531
Rover (Schooner-66t)	09/11/1856	Newcastle	Sydney	Stockton, wrecked, aground, gale	dragged anchor, Oyster Bank	ASDB 1541
Runette (Launch-13t)	00/10/1947			Newcastle, wrecked, burnt		ASDB 2021
San Pan (Yacht-nk)	18/04/1936	Lk. Macquarie	Sydney	Newcastle, wrecked, hit reef	Big Ben Reef	ASDB 2023
Sarah Wilson (Brigantine-30t)	13/04/1848	Sydney	Newcastle	Newcastle, wrecked, hit reef	Nobbys Head (Big Ben?) Reef	ASDB 1554
Sea Gull (Schooner-64t)	13/07/1866	Richmond R.	Sydney	Newcastle, wrecked	off Newcastle Lighthouse	ASDB 1558
Sea Gull (Ketch-14t)	00/09/1876		Sydney	Newcastle, wrecked, supp. foundered	near Nobbys Head [3/3 lost]	ASDB 536

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		FROM	TO	GENERAL	SPECIFIC (Lat/Long), [COMMENTS]	
Shamrock (Schooner-160t)	13/11/1861	Sydney	Newcastle	Stockton, wrecked, aground/ashore	Oyster Bank/drifted ashore N	ASDB 1563
Sir David Ogilby (Schooner-99t)	19/09/1840	Newcastle	Sydney	Stockton, wrecked, ashore	missed stays, extreme end of north spit	ASDB 1564
Sophia (Schooner-nk)	26/07/1826	Newcastle		Stockton, wrecked, ashore	near Oyster Bank (32.91-.78/152.07-151.78)	ASDB 1570
Southland (Steamer Paddle-143t)	03/07/1876	Sydney	Newcastle	Newcastle, wrecked, coll *Waratah*	towing *Lady Belmore*, off	ASDB 1573
Star of Peace (Schooner-50t)	15/07/1864	Newcastle	Sydney	Stockton, wrecked, ashore	tow rope broke, north shore beach	ASDB 1582
Storm Cock (Steamer Screw-148t)	00/02?/1930	Newcastle		Newcastle, reported scuttled	off	ASDB 726
Storm King (Schooner-nk)	00/11/1856	Newcastle	Sydney	Newcastle, wrecked		ASDB 419
Surprise TS Schooner-90t)	01/02/1874	Newcastle	Sydney	Stockton, wrecked, aground	Oyster Bank	ASDB 432
Surprise (Sloop-24t)	00/04?/1805	Sydney	Newcastle	Stockton, wrecked, ashore	2 nm N of entrance (32.92-.8/151.83-.76)	ASDB 1587
Susan Gilmour (Ship-1141	03/07/1884	Sydney	Newcastle	Merewether, wrecked, ashore	tow parted, Susan Gilmore Beach	ASDB 1590
Transport (Brig-307t)	00/02/1888			Stockton, wrecked, broke up	Stockton Beach	ASDB 570
Trimmer (Sloop-20t)	00.07?/1805	Hawkesbury R.	Sydney	Newcastle, wrecked, foundered	near (33.02-32.8/151.88-.70)	ASDB 1614
Unidentified (nk-2030)	00/08/1835			Stockton, wrecked, ashore	Stockton Beach	ASDB 1767
Unidentified (Barge-nk)	09/09/1890	Newcastle		Newcastle, wrecked, capsized	~ nm off Nobbys Head [see Unnamed Silt Punt~]	ASDB 2127~
Unity (Steamer Screw-52t)	03/05/1907	Botany	Port Stephens	Stockton, wrecked, ashore	Stockton Beach	ASDB 620
Unity (Ketch-42t)	27/11/1862	Morpeth	Sydney	Newcastle, wrecked, ashore	missed stays, under Nobbys Head	ASDB 1631
Unnamed Silt Punt (Lighter-nk)	09/09/1890	Newcastle	Spoil ground	Newcastle, wrecked, capsized	~0.5 nm off Nobbys Head (see Unnamed Barge~)	ASDB 1753~
US Army-Unnamed (Motor Tug-nk)	27/07/1945			Newcastle, wrecked	Susan Gilmore Beach	FWI
Victor (Brig-227t)	17/03/1866	Newcastle	Melbourne	Newcastle, wrecked, ashore	wind failed, Nobbys Head under Harbourmaster	ASDB 1637
Vixen (Brigantine-46t)	02/09/1858	Newcastle	Sydney	Newcastle, wrecked, struck rocks	Nobbys Head (Big Ben?)	ASDB 1644
Vulcan (Sloop-28t)	24/12/1837	Sydney	Hunter River	Newcastle, wrecked, capsized, gale	entrance to Hunter River [6/6 lost]	ASDB 1645
Waratah (Schooner-109t)	00/06/1864	Newcastle	Sydney	Newcastle, wrecked	off [~7, all hands, lost]	ASDB 1653
Waterwitch (Brig-nk)	25/06/1854	Newcastle	Sydney	Stockton, wrecked, aground	wind failed, Oyster Bank	ASDB 1090
Wendouree (Steamer Screw- 1640t)	20/07/1898	Newcastle	Adelaide	Stockton, wrecked, aground	Oyster Bank	ASDB 1658
Western Star (Brig-124t)	15/07/1904	Cairns	Sydney	Newcastle, wrecked, coll *Tagliafero*	off [4/7 lost]	ASDB 613
William Watson (Barquentine-384t)	13/07/1866	Nelson, NZ	Newcastle	Stockton, wrecked, ashore	beached [2 lost]	ASDB 1668
Windhover (Brig-207t)	13/12/1874	Sydney	New Zealand	Newcastle, wrecked, foundered	off (33.16/153.16)	ASDB 529
WST1 (MV-325t)	27/07/1945			Merewether, wrecked, ashore	Susan Gilmour Beach	ASDB 2072
Yarra (Schooner-121t)	01/02/1874	Newcastle	Sydney	Newcastle, wrecked, ashore	cables parted, north beach	ASDB 530
Yarra Yarra (Steamer Paddle-555t)	15/07/1877	Newcastle	Sydney	Stockton, wrecked, swamped	off Stockton Bight (32.90/151.8) [17 lost]	ASDB 1680
Yua Wha (MV-230t)	05/01/1947	Sydney	China	Newcastle, wrecked, foundered	5 nm S (32.88/151.90)	ASDB 2091

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RESOURCE (Alphabetically Listed)	LOCATION	NATURE OF RESOURCE	PRIM'Y REF'CE	RESOURCE STATUS	SIGNIF'CE CLASS
Bogie Hole	3 Reserve Road, Newcastle	Ocean Baths hewn from rock shelf, convict-built 1819-22	NAMP: 0125	Site Surface	Arch/Hist/Scient/ Social
Macquarie Pier	Nobbys Road, between N side of Signal Hill and Nobbys Head	Breakwater over existing rock shelf, commenced 1818, renewed 1830, completed 1846 by convict labour; reconstructed 1860	NAMP: 0002	Site Surface	Arch/Hist/Scient/ Social
Merewether Ocean Baths	On rock shelf off Henderson Parade, Merewether	Hewn and finished rock shelf swimming pool with ocean access; constructed to provide safe swimming after the Gulf was taken over for sewerage outfall and earlier baths were contaminated by sewage	DLEP: E-13 DIX: C15	Site Surface	Arch/Hist/Social
Newcastle Beach	Shortland Esplanade	Easterly component of Newcastle's earliest recreation reserve, earliest beach recreation/hygiene sea-bathing, as well as earliest coal mining; subsequent site of segregrated male/female recreational bathing, formal Ladies Beach from ~1900, integrated 1920s	PIC: GPO1-10918 GPO1-10919	Surface	Hist/Social/Aes
Newcastle Ocean Baths	On rock shelf, N end of Newcastle Beach	Pool represents provision of safe saltwater bathing facilities by local government, replacing derelict Soldiers Baths	SPPM: 81	Site Surface	Arch/Hist/Social
Nobbys Beach	Nobbys Road	Effectively a human construct, Nobbys Beach resulted from the construction of Macquarie Pier and the modification of coastal current flow	PIC: BCP 05281	Surface	Hist/Social/Aes
Nobbys Head	NE end of Nobbys Road	1840s, Barney planned to blow up the island. Lighthouse and residences since 1858, beacon moved from Signal Hill; WWII OP, searchlight post and generator, gun emplacement.	NAMP: 1001	Site/Potential Site Surface/Subsurface	Arch/Hist/Scient
Nobbys Head Railway	Along Macquarie Pier from the former GNR goods/marshalling yards	Used c.1862-83 to bring in Waratah stone to rebuild/extend Macquarie Pier to Big Ben Reef; later to carry sand inland	NAMP: 1002	Site Subsurface	Arch/Hist/Scient
Pirate Point	Formerly the easternmost point of the northern bank of the Newcastle Harbour entrance	Site of Pirate Point sandspit, north head of harbour, on which colonial schooner *Norfolk* was wrecked after having been seized by convicts at Hawkesbury River, 1800; site of numerous groundings and other wrecks of shipping	Callen: 19, 36 *et seq*	Site	Hist
Shipwreck Walk	Northern Breakwater, Newcastle Harbour	Modern signage on the northern breakwater records the location of shipwrecks at harbour entrance and the southern aspect of the Oyster Bank [eg: *Cawarra, Colonist, Lindus, Adolphe, Wendouree, Mud Punts, Katoomba, Elamang, Regent Murray, Eleanor Lancaster*]	Callen 63-67	Site Surface-land Sub-surface-maritime	 Hist Arch/Hist/Scient
Soldiers Baths	Remains of a rock wall on the shelf to water's edge, N end of Newcastle Beach	Remains of the reputed first-constructed public ocean baths in NSW, constructed by Newcastle Borough Council 1882.	NAMP: 1215	Site Surface	Arch/Hist/Scient/ Social

Abbreviations used:

Significance Classes:
Arch Archaeological, **Hist** Historical, **Scient** Scientific, **Aes** Aesthetic
B,TP: # Barney, N, 1997. *Times Past*, page no.
Callen: # Callen, T, 1994. *Bar Safe*, page no.

DIX: refers to Dixon, J, 1935. *History of Merewether*
LEP: (*Draft) Local Environment Plan*
NLH: Newcastle Regional Library [Local History]
NAMP: # Newcastle Archaeological Management Plan, Inventory no.

PxB: Hunter Photobank, Newcastle Regional Library, catalogue no.
IC: Picman database, State Library of NSW
RNEDB: Register of the National Estate Database
SPPM: Newcastle CC *Heritage Places Strategic Plan/Plans of Management*

OCEAN HAULING CODE OF CONDUCT

OCEAN HAULING FISHERY OCEAN BEACH HAUL CODE OF CONDUCT FOR THE 2001/02 SEASON

1.0 GENERAL

1.1 Endorsed fishers will comply with local Council and NSW National Parks and wildlife Services (NPWS) by laws. Endorsed fishers must comply with the codes of conduct for fishers prepared by these organisations where these codes have been tabled before the Management Advisory Committee.

1.2 Endorsed fishers will not undertake any activity that brings the industry into disrepute or breaches any local arrangements agreed by the Management Advisory Committee.

1.3 Endorsed fishers will maintain public liability insurance policies to a minimum value of $5 million while endorsed to operate in this fishery.

2.0 ACCESS TO BEACHES

2.1 Endorsed fishers will only use local Council or NPWS approved access points. Endorsed fishers will not make their own access tracks and will comply with any periodic closures of access points by these authorities.

2.2 Endorsed fishers will work with local Councils to signpost entry and exit points used by licensed fishers as well as the traditional hauling grounds agreed by the Management Advisory Committee.

2.3 Endorsed fishers will co-operate with a system of locked gates where appropriate and will safeguard keys issued to them.

3.0 VEHICLE USE

3.1 Endorsed fishers will obtain 4WD vehicle permits from local Councils or NPWS if required by that authority.

3.2 Endorsed fishers will drive in a safe manner at all times. Endorsed fishers will abide by a general limit of 30 km/hr on beaches. Endorsement holders will not drive on a beach in excess of 5 km/hr in flagged areas or when passing within 10 metres of other beach users. Endorsed fishers may travel at 50 km/hr on particular beaches agreed with local Councils or NPWS.

3.3 Endorsed fishers will operate flashing lights or hazard lights on their vehicles while travelling along a beach.

3.4 Endorsed fishers, when travelling on beaches or engaging in fishing operations, will display clearly and legibly in letters and numerals at least 150mm in height on each side of their vehicles:

Soutce: Draft- For OH MAC and Advisory Councils August, 2001-10-03

- the number corresponding with their endorsed region in a circle followed by the letters LFB and the number of their boat (or the boat licence number of the skipper of the crew if they do not own a LFB)

- the information notice supplied by NSW Fisheries

This information will be affixed to the vehicle itself or boards displayed on the sides of the vehicle.

3.5 Endorsed fishers will minimise, as far as possible, the number of vehicles parked on beaches and will not exceed the number of vehicles agreed with the local Council for specific beaches.

3.6 Endorsed fishers will use only vehicles registered by the Road Traffic Authority in fishing operations or while travelling on beaches.

3.7 Endorsed fishers will not drive their vehicles on frontal sand dunes and will minimise, as far as possible, their impact on the landscape.

4.0 HANDLING OF FISH

4.1 Endorsed fishers will leave the beach clean at all times removing any litter as they leave the beach.

4.2 Endorsed fishers will deploy their gear in a way to minimise capture of prohibited size fish. The priority is to remove such fish first and release them in the water with the least possible harm. If a large number of prohibited size fish are killed the local Fisheries Office must be contacted within 3 hours of the incident.

4.3 Endorsed fishers will not target Tailor using gear prescribed for use within the ocean haul fishery.

4.4 Endorsed fishers will not bury fish in the dune system.

4.5 Endorsed fishers will comply with the instructions of local NSW Fisheries Officers about the handling of fish and, in particular, ice and storage requirements.

5.0 RELATIONS WITH OTHER BEACH USERS

5.1 Endorsed fishers will not allow any person to assist in any way in the operation of their nets unless they are a licensed commercial fisher holding an ocean haul endorsement in the same region where the hauling operations are taking place. Other persons may assist in the removal of the fish from the net provided that they are not the holder of a commercial fishing licence.

5.2 Endorsed fishers will not conduct a shot of a net within 100m of flagged bathing areas.

5.3 Endorsed fishers will co-operate with dune care and environment groups.

5.4 Endorsed fishers will not use lights, other than hand held torches, to locate or land fish except on the traditional hauling grounds agreed with the Management Advisory Committee and identified in the public notices published in the NSW Government Gazette.

5.5 Endorsed fishers will provide, on request, their photographic identification cards to any person who requests identification.

5.6 Endorsed fishers will keep a copy of the 2001/02 Code of Conduct in their vehicle and make this copy available to members of the public upon request.

6.0 PRIORITY RIGHTS

6.1 Endorsed fishers will recognise and abide by priority rights of all other fishers as specified in the Act and regulations.

6.2 Endorsed fishers will produce photographic identification cards to other fishers to ensure the required number of endorsed fishers for priority of shots are present.

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