ESTUARY GENERAL
EIA REPORT

Prepared for:
NSW Fisheries

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Prepared by:

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PREPARATION, REVIEW AND AUTHORISATION

Project Name:	*Estuary General EIA Report*	Project No.:	*31229.001*
Prepared by:	*Ros Taplin*	Signature:	
Position:	*Senior Consultant*	Date:	*13th September 2001*
Reviewed by:	*Jan Parsons*	Signature:	
Position	*Environment Manager (Australia)*	Date:	*13th September 2001*

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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 Haul and Estuary Prawn Trawl. This report presents the assessment for the Estuary General Fishery.

1.2 METHODOLOGY

Estuary General Fishing:

- involves over 20 different fishing methods;
- is undertaken by about 940 fishing businesses;
- occurs in approximately 80 estuaries; and
- involves over 100 species.

This complexity has made it impossible to assess each activity and estuary 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 within the estuaries;
- 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 Estuary General Fishery and relevant environmental issues consultation was undertaken with members of the Estuary General Management Advisory Committee (EGMAC), Local Councils and the staff of NSW Fisheries.

i Consultation With EGMAC Members

Three members of EGMAC, Mr. Karl Tesar, Mr. Graeme Byrnes and Mr. Brian Clifford, were contacted regarding issues in the Estuary General Fishery. These members of EGMAC serve as industry representatives for commercial fishing operators in the Estuary General fishery, and have first-hand experience of the fisheries' issues.

Responses from the three members indicate that commercial fishermen are generally engaged in a broad range of activities within the Estuary General Fishery, and utilise a wide variety of different equipment to conduct their activities. The peak fishing season extends throughout spring, summer and autumn, with winter being the least active period. On a daily basis, there was a general balance between daytime and nocturnal fishing activities, with neither period dominating.

The Estuary General 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 estuaries that are bounded by National Parks. Local Councils play a limited role in controlling commercial fishing activities, with their input generally limited to location and access controls.

In relation to noise, light, air quality/energy and greenhouse issues, there was an appreciation that commercial fishing activities do have some impact on these areas as follows.

- Noise Issues

  Estuary General Fishing activities can have associated noise problems. Fishermen generally take precautions to avoid excessive noise, and attempt to avoid any audible noise in the vicinity of residential dwellings.

- Light Issues

  The use of equipment, in particular spotlights, can result in issues concerning light. There are attempts to minimise the impacts of such equipment, and use of this equipment is avoided where possible, particularly during night operations.

- Air Quality/Energy and Greenhouse Issues

  There is an appreciation that the use of boats do have associated air quality and energy and greenhouse issues. While it would be possible to make improvements in these areas, like switching from 2-stroke engines to 4-stroke engines, there is an associated economic cost.

It was felt that the impact of commercial fishing on these issues was less than the cumulative impact of recreational fishing. The rationale behind this was that the total number of recreational fishermen is much greater than the number of commercial fishing operators, and recreational fishermen are generally less concerned about taking necessary precautions to minimise the impacts they have. Commercial operators have a greater awareness of the implications of their activities and the need to minimise their impact.

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 they contain some of the major commercial fishing estuaries within New South Wales, and because they offer a diversity of estuary types within their local government area.

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 available to deal effectively with fishery issues.

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 numbers and types of complaints received concerning commercial fishing activities.

Very few complaints are received concerning commercial fishing operations and for the most part, the complaints that are received related to noise issues. In particular, the complaints have identified issues such as the banging the sides of boats with oars or other objects to scare fish into meshing nets, the use of outboard motors in residential areas at night, noise from winches, and from prawn cookers (gas blowers) used on estuary banks in residential areas.

2 ESTUARY AND FISHERY DESCRIPTION

2.1 ESTUARIES

2.1.1 Description

Estuaries are partially enclosed bodies of waters that are connected to the ocean. The *Fisheries Management Act 1994* defines estuarine waters as "waters other than ocean waters that are ordinarily subject to tidal influence". Estuaries are found along the entire NSW coastline, with a total of 690 water bodies being identified, many of which are small and unnamed. Of these water bodies, 135 are considered to be major estuaries (NSW Fisheries, 2001). Major estuaries include rivers, such as the Clarence, Richmond and Manning Rivers, bays, such as Jervis Bay and Botany Bay, large coastal lagoons or lakes, such as Myall Lakes, Lake Macquarie and Lake Illawarra, and smaller lakes, such as Smiths Lake and Coila Lake.

Approximately 80 estuaries in NSW are used for commercial fishing. Twenty four of these estuaries produce almost 95% of the total catch in the Estuary General Fishery (NSW Fisheries 2001). A majority of the catch comes from large coastal lagoons in the central region of the NSW coast, with the exception to this being the Clarence River on the north coast, which is the highest producing estuary in NSW.

Estuaries are characterised by brackish water caused by the mixing of ocean and fresh waters. They generally comprise complex ecosystems and sustain high levels of biodiversity, supporting a wide variety of fish and invertebrates and providing a diverse range of habitats, including mangroves, seagrasses, mud flats and sheltered rocky reef. Estuaries and their associated habitats also provide a significant contribution to terrestrial biodiversity, supporting insects, reptiles, mammals and, especially, birds.

2.1.2 Land Uses Surrounding Estuaries

Many of the estuaries throughout NSW have become a focus for anthropogenic activities and land use. In particular, urban development has become more concentrated around estuaries due to the attractive environment they offer. This has placed increasing pressures on estuaries and their surrounding environment.

To illustrate the type of land use adjoining estuaries, four commercial fishing estuaries were selected. These were the Clarence and Richmond Rivers (examples of larger river estuaries), Myall Lakes (example of smaller coastal lakes) and Lake Macquarie (a larger coastal lake surrounding by urban and industrial development). Brief descriptions of these estuaries follow.

- Clarence River

  There are a diverse range of land uses close to the Clarence River. Significant areas of State Forest (Fortis Creek State Forest) exist in the region, while there are also areas used for agriculture particularly sugar cane growing and cattle grazing. Large urban areas, most notably Grafton, are found on the shores of the river, while a number of smaller urban villages, such as Copmanhurst, Moleville and Eatonsville can also be found along the river.

- Richmond River

The land uses surrounding the Richmond River are similar to those found on the Clarence River. Nature Reserves, including mangroves, dominate the area; although while there are areas used for agricultural purposes. A major urban centre, Ballina, is located on the river, and has some associated river developments including marinas. Small urban villages, such as Timbali, can be found along the river.

- Myall Lakes

  The land surrounding Myall Lakes is dominated by National Parks, specifically, the Myall Lakes National Park. There are a number of small urban villages, such as Bungwahl, that fringe the lake. Scattered dwellings are found at various locations, such as at Mayers Point and Nerani.

- Lake Macquarie

  Many small urban areas, including Swansea, Blacksmiths, Belmont, Warners Bay and Boolaroo dominate the shores of Lake Macquarie. Linked to these urban uses are tourism facilities such as caravan parks and camping areas. Small parks and reserves are also abundant around the lake. A number of major industrial uses are also located close to the lake, including the Eraring Power Station, an aluminium smelter and several coal mines.

2.2 FISHERY DESCRIPTION

Over 15 different types of fishing gear are used in the Estuary General Fishery ranging from hand collecting to motorised hauling nets. Most gear catches a wide number of species but some, such as eel traps, target specific species. Table 2.1 describes the main fishing methods and identifies where the activity may interact with the noise, light and air environments. Energy and greenhouse issues are also identified in the table. Fishing methods described are:

- traps;
- hoop or lift nets;
- mesh nets; and
- hauling nets. The table describes general purpose hauling nets. There are specific methods and types of hauling used for some species and these are not separately described. The species these methods target include pilchards anchovies and bait trumpeter, whiting and garfish.

This assessment is limited to the effects of fishing on activities associated with the management of the fishery. It does not extend to shore-based activities such as processing plants, cooperatives and boat ramps.

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Consulting in fisheries management, economics and training.

An Assessment of Economic and Social Issues in the NSW Estuary General Fisheries Management Strategy

A report to NSW Fisheries

by Dominion Consulting Pty Ltd

September, 2001

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This report has been compiled on the basis of existing literature, information, and targeted surveys some of which was supplied by the client, New South Wales (Fisheries) and compiled under limited time and financial resources. Neither Dominion Consulting Pty. Ltd, its employees or sub-contracting parties undertake responsibility arising in any way to any persons in respect of the data, errors, or omissions arising, through mis-interpretation of information, negligence or otherwise, however caused. This report should not be used as the basis for commercial decisions; those so doing, do so at their own risk.

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Contact for author

Dominion Consulting Pty Ltd,
Suite 7/8, 822 Old Princes Highway,
Sutherland,
NSW 2232.

Tel. (02) 9545 4317 and Fax (02) 9545 4316
E mail: mcilgorm@tradesrv.com.au

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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 study is potentially short of a state-wide all fisheries perspective of economic and social information. The DUAP process enables such 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 to estimate a value at point of first sale. This may give a minimum estimated value and probably underestimates the industry catch value.

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 Estuary General 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 side 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 the first 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, 2001b). 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 first of 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 from the Australian Bureau of Statistics (ABS) was accessed via the Bureau of Rural Science, Social Science unit for the social assessment. Aggregate ABS data is of limited use to a specific EG 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 licensing records show endorsements holdings and fisher file and business numbers. They also have some fisher details such as date of birth and home postcode. Catch and effort information from the NSW Fisheries database can be added to existing licensing information to determine catches in each administered fishery.

   An imputed Sydney value at time of first sale can be obtained by combining fishers' catch return data and the Sydney Fish Market (SFM) monthly average species prices. The "Sydney index" value infers that the price for all seafood landed in NSW is the monthly average price at first sale in Sydney. This may under or over report the revenue associated with individual fishers. The revenue estimate at point of first sale does not include market deductions, and it does not account for export sales outside the Sydney Fish Market which "exceeds Sydney prices" (pers. comm., EG MAC). Premium seafood is often sold by fishers near point of landing to obtain higher prices, with minimal freight or marketing costs. Data sourced from Department's records will be referred to as **"Source: NSWF"** or when combined with SFM data the **"Sydney index"**.

   Comparisons of the Sydney Index revenue estimates and revenues, as stated by the respondents to the economic survey, indicate that the Sydney index probably understates fisher revenue at point of first sale by between 12% and 21%;

b) A specially devised social survey was executed by telephone by Roy Morgan Research 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 Estuary General 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 provisionally analysed in the current study for the fishing businesses in the Estuary General 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 as headings 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 Estuary General (EG) fishery has commercially licensed fishers operating in 80 estuaries in coastal NSW. The list of estuaries and administrative zones are reported in the Estuary General Fisheries Management Strategy (EGFMS, 2001).

In May 2001, there were 944 EG businesses. Of these, 40% were north of the Manning river, 42% were in the Wallis Lake to South Sydney area and 18% in the area South of Sydney. The total catch and value of the EG fishery in the 1984-2000 period is reported in Figure G1.

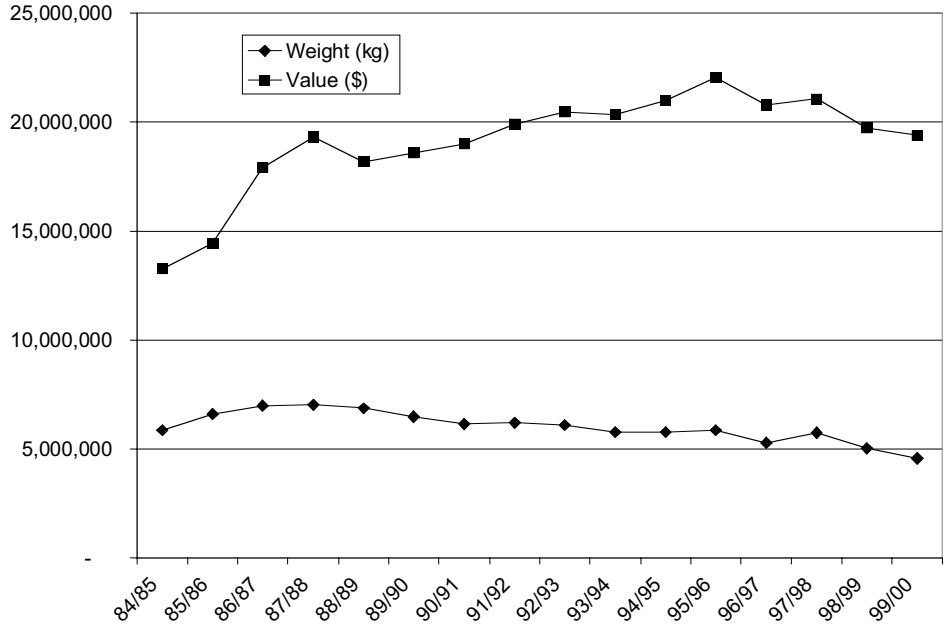


Figure G1: Total catch (Kg) and total value ($) of catch (nominal), in the NSW Estuary fisheries in the 1984-2000 period (Source: NSWF; Sydney index). (Estuary data 1984-2000 includes Estuary Prawn Trawl data as well as EG).

The total production in the 1997-2000 period, when Estuary General (EG) was a distinct fishery, was approximately 5,000 tonnes of seafood which had an estimated value at first sale of $18.1m in 1999-2000 as reported in Table G1.

Relationship between EG and other endorsed fisheries

The EG fishery has an annual revenue of $17.3 to $19.4m and is approximately 27% by revenue of the total annual fishery production in NSW as reported in Table G1. Calibration of the Sydney index data suggests the value may be 12%-21% underestimated.

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	OPT	OFT	OTL	RL	Total
1997/98	19.4	2.6	7.2	20.9	5.2	11.2	4.2	70.7
1998/99	17.6	3.2	4.1	23.4	4.1	9.6	3.8	65.8
1999/00	17.3	3.8	4.4	22.4	3.9	9.8	4.5	66.1
Average	**18.1**	**3.2**	**5.2**	**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; OPT Ocean Prawn Trawl; OFT Ocean Fish Trawl; OTL Ocean Trap and Line and RL Rock Lobster) Dollar ($) values are nominal.

Due to the mixed endorsement holdings of EG fishers across several fisheries, the revenue associated with catches across several fisheries made by fishers and fishing businesses holding EG endorsements is greater than 18.1m per annum and is reported in Table G2.

Table G2: Fishery revenue for EG endorsement holders in the EG and other fishers in the years 1997-2000 (millions $, nominal. Source: NSWF; Sydney index).

Year	EG	EPT	OH	OPT	OFT	OTL	RL	Total
1997/98	19.4	1.8	4.2	2.0	0.3	2.4	2.1	32.2
1998/99	17.6	2.5	2.5	1.0	0.1	2.3	1.7	27.7
1999/00	17.3	3.0	2.9	2.3	0.0	3.4	2.7	31.6
Ave.	**18.1**	**2.4**	**3.2**	**1.8**	**0.1**	**2.7**	**2.2**	**30.5**
%	**59%**	**8%**	**10%**	**6%**	**0%**	**9%**	**7%**	**100%**

Table G2 reports that EG endorsed fishers had an average catch value of $18.1m from the EG fishery over the 1997-2000 period, but an additional $12.4m from these fishers' activities in other NSW commercial fisheries. The extent of the relative revenue of EG endorsed fishers across all fishing activities is reported in the percentages at the bottom of Table 2. Estuary General fishers' catch revenue is 59% of their total fishing revenue across all fisheries.

Significant operator links exist between the EG fishery with both Estuary and Ocean Prawn trawl fisheries, Ocean haul, Trap and line and Rock lobster fisheries.

The NSW fishery revenue for different districts along the NSW coast is reported in Table G3. The EG fishers operate regionally within this state-wide picture of fishery interactions.

Table G3: 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 regional fishery revenue associated with endorsed EG fishers is reported in Table G4.

The state-wide fishery relationships reported in Table G3 reveal that the Clarence district has 23% of state-wide fishing revenue, reflecting the OPT, EPT and EG fisheries in that region. The Clarence EG fishery revenue is the highest EG district fishery revenue and with Wallis Lake and the Richmond River second and third. The zones 1-4 north of Sydney/Hawkesbury have approximately 80% of the revenue from state-wide fish production.

Table G4 reports the revenue associated with EG endorsed fishers in 1999/2000 across all fisheries, giving the total catch in each district as a percentage of the total of $31.7m. In Table G4 the EG revenues are as the state-wide picture, the EG endorsed fishers having approximately 75% of revenue in EG fishing in the Zones 1-4 north of Sydney/ Hawkesbury. Table G4 indicates the EG catch as a percentage of total catch in a district for the year 1999-2000.

Table G4: Fisher revenue for EG fishers in the EG and other fisheries, in different estuary districts of NSW in 1999-2000 ($ '000. Source: NSWF; Sydney Index).

Zone	District	END	ACTIVE	EG	EPT	OH	OPT	OFT	OTL	RL	TOTAL	EG % of district
1	TWEED	41	30	655	-	206	-	-	191	-	970	59%
1	RICHMOND	35	29	1,856	14	-	407	-	196	-	2,473	75%
2	CLARENCE	156	134	2,740	2,538	116	1,372	-	198	217	7,137	38%
3	COFFS HARBOUR	52	34	245	-	157	-	-	253	187	842	29%
3	HASTINGS	57	48	912	13	341	35	-	118	50	1,468	62%
4	MANNING	48	38	1,193	-	162	7	-	31	138	1,447	77%
4	WALLIS LAKE	88	72	2,272	1	190	198	8	265	447	3,382	67%
4	PORT STEPHENS	65	41	860	-	163	17	-	176	571	1,787	48%
4	HUNTER	77	50	1,555	213	57	168	9	211	126	2,338	67%
4	CENTRAL COAST	81	54	1,061	107	106	1	-	421	133	1,830	58%
5	HAWKESBURY	30	18	251	102	-	-	-	1	-	341	70%
5	SYDNEY NORTH	39	19	290	54	69	1	-	123	51	587	49%
5	SYDNEY SOUTH	41	23	467	6	22	-	-	379	262	1,129	41%
6	ILLAWARRA	56	35	876	-	983	54	-	26	188	2,128	41%
6	SHOALHAVEN	56	30	1,042	-	57	-	-	457	132	1,688	62%
7	BATEMANS BAY	43	29	442	1	77	33	13	76	189	832	53%
7	MONTAGUE	22	18	451	-	57	-	8	142	0	658	69%
7	FAR SOUTH COAST	16	11	128	-	114	-	-	134	15	388	32%
	TOTAL	**1,003**	**713**	**17,299**	**3,049**	**2,877**	**2,293**	**38**	**3,396**	**2,707**	**31,659**	**54%**

Key – END, Endorsements; Active, submitted one or more catch returns in 1999-2000.

Table G4 also reports that in May 2001, there were 1,003 endorsement holders in EG (944 fishing businesses). In the 1999-2000 year, 713 endorsement holders had fished in the EG fishery, compared with 750 in the previous year illustrating annual variation. The EG fishery reflects the diversity in fisher activity state-wide and also regional patterns of operation. The EG fishery is primarily based in the central and northern regions of the state where fishers are also endorsed in other fisheries. The final column of Table G4 illustrates the regional dependence on the EG fishery in the different fishery districts and also shows the dependence on the fishery in the southern area.

The diversity of fishery operations between multiple fisheries and multiple regions is compounded by multiple methods used in taking the NSW estuary fish catch. The estimated value of catch by different methods is reported for all estuary fishing in 1997-98 in Table G5 below. There are approximately 27 fishing methods used in NSW estuaries with different impacts on the fisheries and environment. Mesh netting and haul netting are seen to take 43% of estuary product value.

Vessel data from licence records

Vessels in the EG fishery are diverse as businesses and fishers can have several licensed vessels. These vary from open vessels with no wheel house or decking, to small powered and unpowered vessels about 5 metres in length (Newcastle Marine Brokers, 2000).

The NSWF licence data confirms the length of vessels, but the nature of EG fishing means that several small vessels can be held by one fisher or fishing business. Estuary boats are not as central a capital item as in the offshore fisheries. Figure G3 reports available details on the vessels used only in the EG fishery (n=624, mean length = 5.1m and sd= 0.91m) and EG and other fishing activity vessels (n=1416, mean length = 6.7m and sd= 3.3m). EG endorsed fishers who fish in other fisheries such as the OPT, account for the vessels over 9 metres. EG fishers have 2,040 boats from a state-wide total of 2,950.

Table G5: Revenue associated with different fishing methods in all NSW estuaries 1998-99 (in $, Source: NSWF; Sydney index).

	Method	1998-99	%
1	Mesh net, top set bottom set or splashing	5,435,908	28%
2	Estuarine prawn trawl	3,166,949	16%
3	Hauling net, beach haul	2,957,741	15%
4	Crab pot (Trap)	1,497,123	8%
5	Prawn haul net	1,087,431	6%
6	Prawn set pocket net	964,424	5%
7	Prawn running net	953,032	5%
8	Bait net	923,204	5%
9	Prawn seine (Snigger)	565,849	3%
10	Eel trap	361,786	2%
11	Mesh net, flathead	335,662	2%
12	Other or ambiguous	297,599	2%
13	Hand gathering	289,880	1%
14	Fish trap,bottom/demersal	275,253	1%
15	Handline	169,414	1%
16	General purpose, trumpeter whiting or garfish net	98,920	1%
17	Pound net	56,881	0.3%
18	Hoop or lift netting	39,112	0.2%
19	Pilchard,anchovy,bait net	35,177	0.2%
20	Garfish net (hauling)	14,278	0.1%
21	Setlining	9,715	0.0%
22	Lobster/Crayfish pot	7,472	0.0%
23	Skindiving	4,596	0.0%
24	Jigging	2,439	0.0%
25	Trolling	1,429	0.0%
26	Mesh net, bottom set	19	0.0%
	Grand Total	**19,551,290**	**100%**

(nb. This is for all NSW estuary fishing an includes EPT fishery. See Table G3 for EG and EPT values).

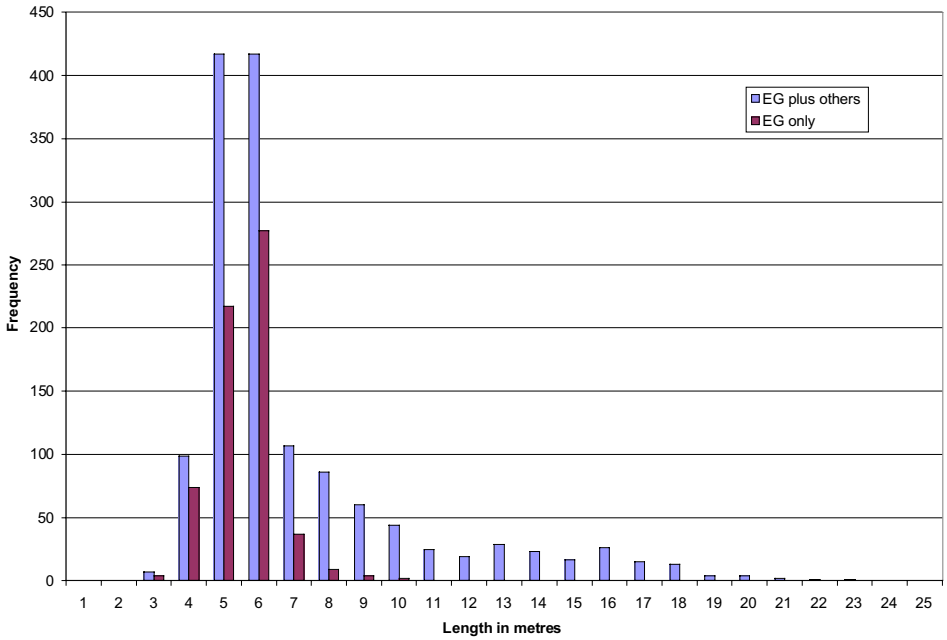


Figure G2: The distribution of vessel lengths in the EG fishery (Source: NSWF, licence data).

Method endorsements within the EG fishery are numerous and include:

Meshing, prawning (all prawning except trawling), trapping (fish and blue swimmer crabs), mud crab trapping, eel trapping, category one hauling (general purpose (mullet, blackfish and bream), whiting, garfish, pilchard, anchovy and bait fish nets), hand gathering, diving, beach worming only, handline and hauling crew.

Capital investment in the EG fishery

Capital investment ranges from low cost for beach worming only, to $100,000+ for an extensive fishing business. 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 and these have likely been restricted by limits on transferability imposed by management. Many packages would be in the $20,000 to $40,000 range and would differ from this due to the diversity of businesses activities and assets (Newcastle Marine Brokers, 2000). The distribution of business values is likely to be large and skewed to the left of the mean, as per revenue estimates reported in Figure G3, later in report. More accurate information is needed on fishery licence values and investments. This need will increase as share values will have to 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.

EG Ports in NSW with berthing facilities

The operators in the EG use a variety of sites and facilities for boat storage and operation. Some of these are in conjunction with established wharf and fishing cooperatives. A list of all public port assets for NSW was obtained from the Department of Land and Water Conservation which was then compared with areas of operation of the EG fishers, Fishing Co-operatives and towns in coastal NSW. The locations of port infrastructure are reported in Table G6.

Table G6 reports the major port facilities available to EG fishers. The use of port assets by EG fishers was sourced from Department Fishery Officers and EG MAC members. Interview comments are attached to the right hand side of Table G6 and indicate that the estuarine nature of the EG fishery means that coastal port facilities are not central to the operations of EG fishers, especially compared to some of the ocean fisheries which involve larger vessels and established harbour facilities.

Distribution – licensed 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 role than before.

NSW Fisheries has a system of Registered Fish Receivers (RFR) and Restricted RFRs (RRFR) 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 fishers or small businesses holding permission to sell catch locally and which number 83 state-wide.

Table G6: The EG fishery and public port assets in NSW. Comments on EG use (Source: DLWC).

Town	Port Assets	HBR	JET	WHV	ACC	Comment
Tweed Heads	Tweed Heads	1	2		1	Estuary fishers use trailer boats and ramps
Brunswick Head	Brunswick Heads	1	3	2	1	Only open to crab trapping trailer boats
Ballina	Ballina	1	1	2	1	Moor along river or trailer
Evans Head	Evans Head	1	1	1	1	
Maclean	Yamba & Iluka	2	4	3	2	Estuary fishers use trailer boats and ramps unless set pocket and truck catch to cooperative
Wolli	Wooli	1		1	1	
Coffs Harbour	Coffs Harbour	1		5	1	Trailer boats
South West Rocks	South West Rocks	1	2	1	1	Trailer or moor in creek
Jerseyville						Trailer
Port Macquarie	Port Macquarie	1		2	1	Trailer or moor along river
Laurieton	Camden Haven	1	1	2	1	Trailer or moor along river
Crowdy Head	Crowdy Head	1	2	1	1	Ocean access harbour only. Fishers in lower end of Manning trailer
Taree						Trailer or moor along river
Tuncurry	Tuncurry	1	1	3		Moor around lake
Nelson Bay	Nelson Bay	1	1	5	1	
Tea Gardens	Tea Gardens	1		1		Trailer or moor along Myal
Wickham	Raymond Terrace	1	1		1	Harbour at Wickham with Co-op
Newcastle	Swansea	1	1			Trailer boats or moor around lake Jty x2, Whv x 1
Mannering Park						Trailer boats or moor around lake
Tacoma						Pat of Newcastle District
Brooklyn	Brooklyn	1	1			Trailer boats or moor along river and Pitt Water
Pyrmont						Trailer or moor at Pyrmont and Leichhardt
Mascot	Cooks River					Moorings only with ramp access
Wollongong	Wollongong	3	2	1	1	Ocean access only
Berkley	Berkeley	1	1	2	1	Trailer boats or moor at Berkeley Harbour or around lake
Port Kembla	Port Kembla	1	1			Ocean access only
Shellharbour	Shellharbour	1		1	1	Ocean access only
Kiama	Kiama	1	1	1	1	Ocean access only
Nowra	Greenwell Point	2	3	0	1	Used mainly as ocean access Port. Trailer boats
Huskisson						Trailer boats or moor in creek
Ulladulla	Ulladulla	1	1	2	1	Ocean access only
Ulladulla	Ulladulla					
	Batemans Bay	1	2	2	1	Trailer boats or moor along river
	Narooma	1	1	3	2	Woogonga Inlet closed to fishing comercially
Bermagui South	Bermagui	1	3		1	Ocean access port. River closed to fishing
Eden	Eden	1	2	3	1	Trailer boats or moor in harbour
	Throsby Creek	1	2	2	1	

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

Tables G7a and b were compiled from these regulatory forms and can give some indication as to the number of licensed processing facilities associated with EG and the location of the RFR and RRFR holders in the EG fishery- (there is insufficient data in this area and it should be treated with caution).

Table G7a: The RFRs associated with the EG fishery (Source: NSWF Fish receiver records).

Areas		No. RFR's	With Cold Store	No. Cold Vehicles	EG	EG - Cold Store	No. Cold Veh. - EG
North	Tweed-Manning	38	34	39	17	15	10
Central	Wallis-Sydney	29	21	30	7	7	8
South	Illawarra - Far South Coast	25	22	33	5	5	7
Total		**92**	**77**	**102**	**29**	**27**	**25**

Table G7b: The RRFRs associated with the EG fishery (Source: NSWF Fish receiver records).

		No. RRFR's	EG	EG - Cold Store	No. Ice Boxes - EG
North	Tweed-Manning	22	5	3	2
Central	Wallis-Sydney	26	6	5	1
South	Illawarra - Far South Coast	35	18	13	5
Total		**83**	**29**	**21**	**8**

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 (see data deficiencies section 3). It is estimated that 29 of the 92 RFRs establishments in the state (30%) deal with EG species, but the proportion and volume of business is unknown. There are 17 of 29 RFRs associated with EG species in the northern area, and less in the central and south of the state. Approximately 83% of processors by number are north of Sydney which is similar to fisher numbers and the value of fishery revenue. Cold storage and retail sales also follow this pattern.

The RRFR data indicates that of 83 RRFRs state-wide, 29 (35%) may have involvement with EG species. Of these 21 have access to a cold store below 5 degrees C, and 8 have ice box arrangements in place to maintain quality (Table G7b). 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 estuary general fishery is required to take the catch from the landing point to market via processors or cooperatives. From state-wide records, there are 28 fish

transport vehicles (capable of holding fish below 5degrees C) associated with establishments which handle EG species amongst other seafood. Again, an unknown proportion of this capacity would be directly attributable to the EG fishery. Approximately 27 of 29 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 employment only with the social survey giving new employment estimates. Table G4 has presented the regional employment of EG fishers along the NSW coast.

Direct employment

Fishers are employed in businesses, though each business may have several fishers, and fishers can work in several businesses. 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, or to work for other businesses as well as their own. 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 the EG fishery level for consideration.

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

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

* a file number is a unique number given to a fisher, partnership or company by NSWF.

The following facts for Estuary General were obtained from available data sets:

- In the EG fishery 944 businesses are associated with 1,003 fisher file numbers (NSW F database);
- In May 2001 there were 919 Owner operators and 58 nominated fishers associated with the EG fishery (NSW F database);
- A further breakdown of "entities" reports 14 companies, 44 partnerships and 922 male and 11 female fishers.

The social survey investigated employment in the EG fishery. There were 502 respondents holding EG 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 G8.

Table G8: Estimation of number of employees in Estuary General fishing businesses, 2001(Source: RM- SS).

No of employees	Frequency	Total employees	Full-Time	Part –Time
0	393	0	0	0
1	47	47	23	24
2	22	44	0	44
3	13	39	10	29
4	7	28	16	12
5	1	5	1	4
6	4	24	12	12
7	1	7	7	0
8	2	16	8	8
10	2	20	12	8
>10	3	53	28	25
Total	**495**	**283**	**117**	**166**

The 502 fishers interviewed had a total of 283 employees of whom 117 were full-time and 166 part-time. Assuming the sample is representative, given there were 502 responses from 1,003 fishers, it is proposed to double the survey estimate. This may be an over estimate given that respondents tended to be more active fishers *ceteris paribus*. The EG whole fishing population infers 566 employees (234 full time and 332 part time). Many employees may be in processing, rather than assisting with EG catch. The fishers are also to be included in employment estimates and represent 1,003 fishers/ endorsement holders both full time and part time. Only 632 fishers (both part time and full time) chose to fish in the EG in 1999-2000.

There are between 1,198[1] and 1,569[2] persons employed full time and part time in EG fishing, or as employees associated with fishing businesses which hold an EG fishing permit. The survey estimate includes employees in fishing and processing, but is not a direct measure of the employment in the processing sector, which is unknown. The actual proportion of employees attributable to the EG fishery would be significantly less than the number employed in businesses with an EG endorsement.

There is no established measure of either full time or part time commercial fishers. All fishers were asked about 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 sources, in which EG fishers participated in the last 12 months (Source: RM- SS).

Frequencies	% EG Fishing	% Fisheries Representative	%General Investments	% Other industries Work
29	<10	4.5	15.3	46.9
1	10-19	-	85.0	-
55	20-29	6.3	6.3	60.0
2	30-39	5.0	-	55.0
19	40-49	10.9	7.3	30.5
7	50-59	3.8	13.9	18.3
14	60-69	0.3	9.6	16.4
21	70-79	5.3	5.3	5.4
73	80-89	0.6	1.9	2.2
319	**90-100**	-	-	-

Table G9 reports 319 fishers with 100% income from fishing and 94 with 80-90% of income from fishing. Part time fishing involvement is revealed in 85 persons with less than 30% of income from fishing and up to 60% of income from another industries. Of this paid representative committee and Directors ships is less than returns from general investments and other industries. Fishers working in other industries are described in the social issues section H.

The social survey employment estimates also include the employment of fishers' partners. In the survey sample, 135 of 502 fishers had their marital partners "in the business" of which 45 were full time and 90 part time.

[1] (632 active EG fishers+566 employees)

[2] (1,003 endorsed EG fishers + 566 employees)

Dependence measures

There are several measures of dependence. The revenue from the EG fishery as a share of total fishing catch revenue is reported in Table G2. The regional dependence for the different zones and districts in the EG is reported in Table G4. Table G4 reports that endorsed fishers in areas such as the Richmond River, the Hastings River, Manning River, Wallis Lake, Hunter River, Hawkesbury River, Shoalhaven River and Montague Island are relatively most dependent on the EG fishery having over 60% of estimated district revenue derived from the EG fishery. The method dependence in the EG is reported in Table G5. Income dependence patterns are described below.

A measure of dependence of each fisher category is given by the estimates revenue of different catch combinations in the EG fishery as reported in Table G10a. Approximately 32% of fishers fish EG only, having 21% of the value of all EG endorsed catch and are 100% dependent on the EG fishery. The decreasing level of dependence is seen in the right hand side column of Table G10a in relation to active endorsement numbers fished:- EG only, 2, 3 and 4 and 5 endorsement holders. Major catch inter-dependencies are with the Ocean haul, Ocean trap and line and Estuarine prawn trawl as reported in Table G10b. Comparison of percentages enable inferences about the relative earning capacity in each fishery as represented by the Sydney index.

Table G10a: The dependence on the EG fishery, by EG endorsed fishers with other fishery endorsements, in 1999-2000 (Source: NSWF; Sydney index).

No. Active Fisheries	No. Fishers	%	Total Catch	%	EG Catch	%		%EG
1	324	32%	9,329,210	30%	9,329,210	55%		100%
2	211	21%	11,355,512	36%	5,873,035	34%		52%
3	72	7%	4,101,146	13%	1,614,029	9%		39%
4 & 5	16	2%	1,284,393	4%	249,355	1%		19%
Endorsed - No Catch	290	29%		0%		0%		
Endorsed - Other Catch	90	9%	5,355,588	17%		0%		
Total	1,003	100%	31,425,849	100%	17,065,629	100%		

Nb. “Endorsed no catch” are latent endorsements and “Endorsed –other catch” are fishers endorsed in EG who chose to fish in other fisheries

Table G10b: The dependence on the EG fishery, by EG endorsed fishers with other fishery endorsements, in 1999-2000 (Source: NSWF; Sydney index).

Catch Combinations	No. Fishers	%	Total Catch	%	EG Catch	%		%EG
EG Only	324	32%	9,329,210	30%	9,329,210	55%		100%
EG & OH	47	5%	3,426,642	11%	2,459,705	14%		72%
EG & OTL	70	7%	3,018,078	10%	1,681,309	10%		56%
EG, OTL & OH	26	3%	1,673,585	5%	880,233	5%		53%
EG & RL	12	1%	624,154	2%	287,625	2%		46%
EG & EPT	75	7%	3,730,884	12%	1,315,303	8%		35%
EG, OTL & RL	20	2%	1,275,442	4%	400,110	2%		31%
EG, OTL, OH, RL	10	1%	780,490	2%	200,144	1%		26%
Other Combinations	27	3%	1,499,758	5%	367,522	2%		25%
EG & OPT	6	1%	532,168	2%	118,987	1%		22%
EG, EPT & OPT	6	1%	179,850	1%	25,481	0%		14%
Endorsed - No Catch	290	29%		0%		0%		
Endorsed - Other Catch	90	9%	5,355,588	17%		0%		0%
Total	1003	100%	31,425,849	100%	17,065,629	100%		54%

Nb. "Endorsed no catch" are latent endorsements and "Endorsed –other catch" are fishers endorsed in EG who chose to fish in other fisheries

Distribution of income among fishers – categories of annual income etc.

The distribution of income is available through several measures. Firstly, revenues associated with each EG only endorsed catch combination are reported in Table G11 from the Sydney index. The EG fishers have the lowest average revenue in comparison to other fishing combinations as seen in the average revenue and index of average revenue. The distribution of annual revenue varies by fishing category and as reported by the coefficient of variation (se/mean), the variation in annual fisher's return is substantial. Frequencies of gross revenue are plotted for single and multiple EG endorsed fishers in Figure G3.

Table G11: The distribution of average annual revenue for all EG fishers, fishing within the EG fishery in 1999-2000 (Source: NSWF; Sydney index).

No. Active Fisheries	No. Fishers	Average Revenue ($) per annum	Index of AR	sd	Coeff. Of Var.
4 & 5	16	80,275	2.79	41,757	0.52
Endorsed - Other Catch	90	59,507	2.07	79,488	1.33
3	72	56,960	1.98	41,165	0.73
2	211	53,818	1.87	49,210	0.91
1	324	28,794	1	36,896	1.28

Nb. "Endorsed –other catch" are fishers endorsed in EG who chose to fish in other fisheries

Figure G3: A frequency distribution of annual fishing revenue for EG fishers in 1998-99, fishing EG Only, 2, 3 or 4 fisheries (Source: NSWF; Sydney index).

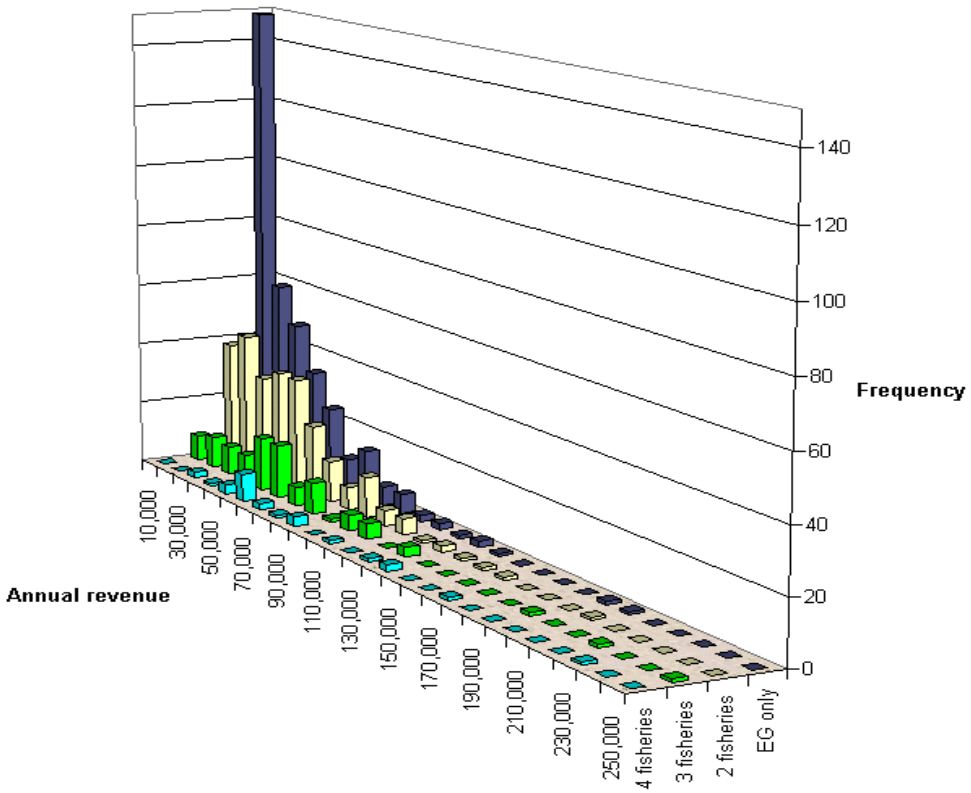
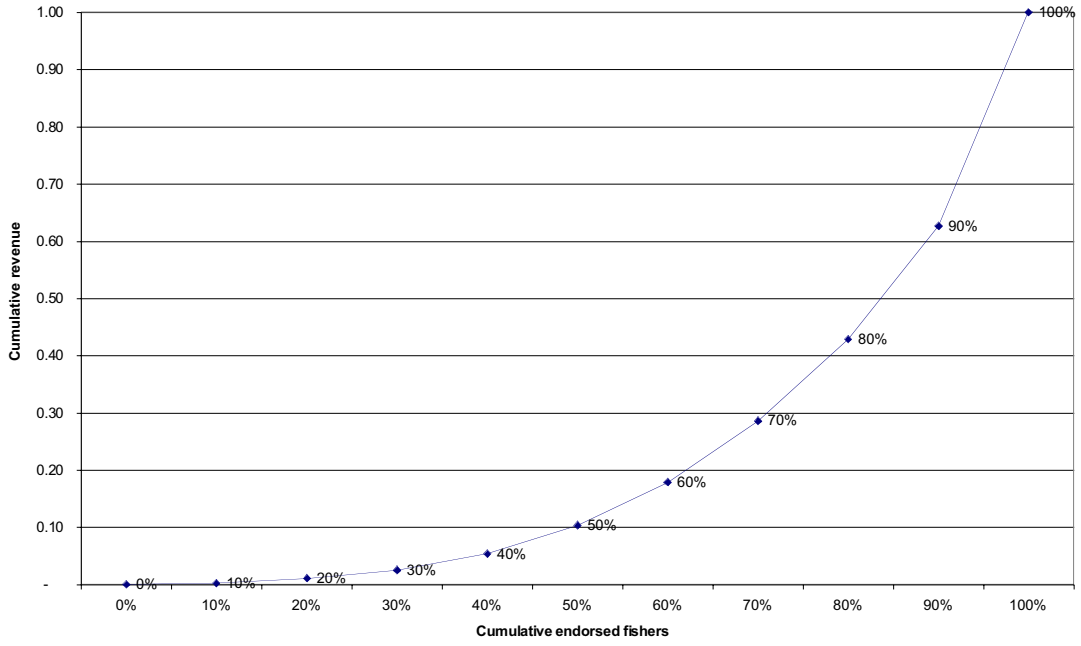


Figure G3 confirms the diversity in revenue among fishers (file numbers) where a total of 148 EG only fishers have revenue below $10,000 per annum probably being part time fishers. Both Table G11 and Figure G3 indicate the variation in fisher income.

Figure G4 displays this information to relate cumulative revenue and numbers of fishers in the fishery. This shows that by fisher number, the distribution of annual catch among EG fishers is evident. It should be noted that:

- 50% of fishers take 90% of the fishery revenue
- the top 10% of fishers take 38% of fishery revenue
- the top 20% of fishers take 57% of fishery revenue
- the top 30% of fishers take 72% of fishery revenue
- the bottom 50% of fishers take 10% of fishery revenue indicating part time fishers.

Figure G4: A plot of cumulative revenue versus cumulative number of endorsed fishers in the EG fishery in 1998-99 (Source: NSWF; Sydney index).



Other fisher income data is available from the social survey. Table G12 reports the frequency of gross income from all sources for 370 EG fishers who responded.

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

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

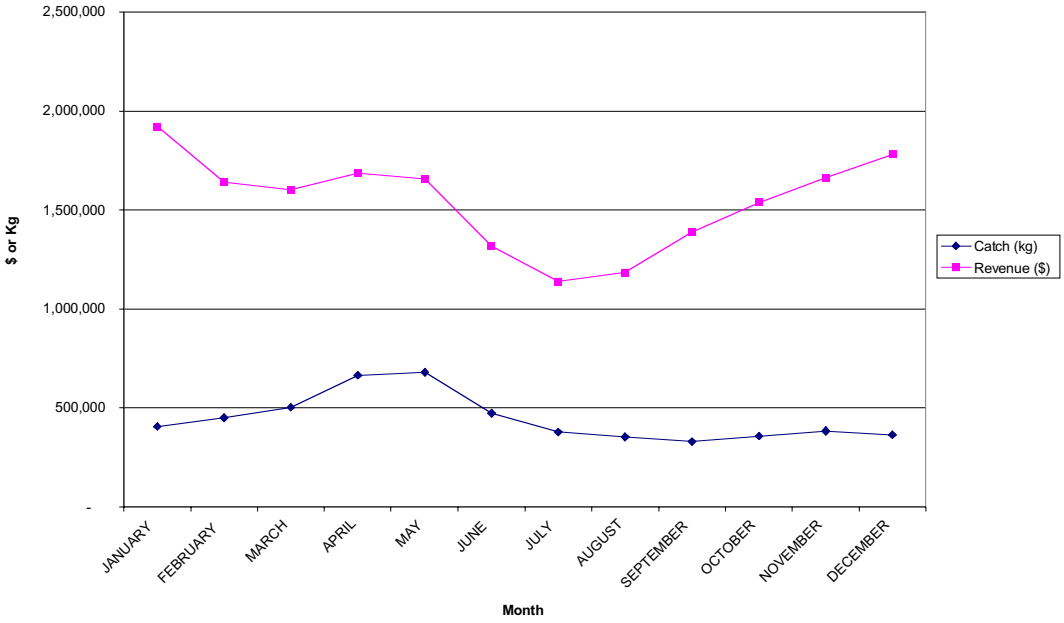
The distribution of income question revealed a mean income of circa $40,000, but there were 26% of fishers interviewed who did not to reply. A significant number of incomes of $100,000 or over were recorded (7%). The accuracy of this cannot be verified, but as it represents income from all industries, it may indicate financial diversification and business interests outside the EG fishery.

Seasonal employment

There was no previous data on seasonal employment prior to this study. The seasonal occurrence of the fish species 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.

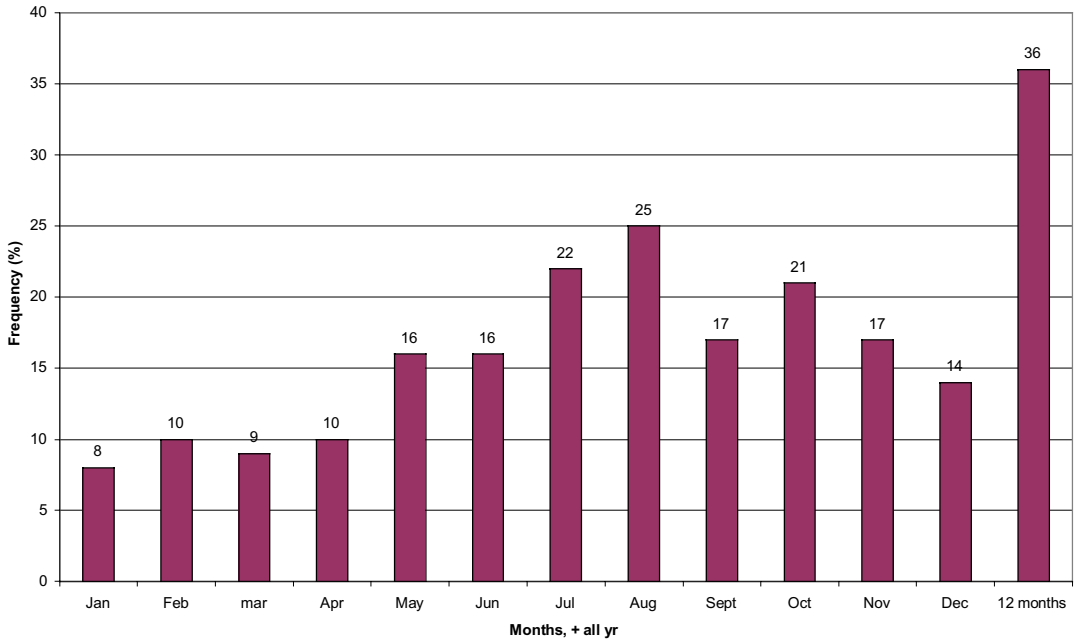
The monthly variation in EG catches is reported in Figure G5 and indicates a reduced catch and revenue in the third quarter of the year (July- October). Employment attributable to the EG fishery is likely reduced in these months, as effort and labour is rested or may move to other fisheries.

Figure G5: The monthly variation in catch and revenue in the EG fishery for years 1997/98 and 1998/99 averaged (Source: NSWF; Sydney Index).



The actual seasonality of part time work in other industries was investigated in the social survey. Figure G6 reports the timing of this non-fishing employment 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.

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



The correlation between the survey responses (Figure G6) and the Fishery Department EG catch data (Figure G5) indicates fishers work in other industries in the EG low season and all year round (see social section for further non-fishery employment analysis).

(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 EG fishery

Effort in a fishery can be appraised at different levels of aggregation. In the Estuary General fishery, each business produces effort in the EG fishery and in other fisheries for which it holds 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 944 businesses holding 1,003 endorsements to fish in EG in 2001. For the 1,003 licence holders holding EG endorsements, 623 were actively fishing in a range of commercial fisheries in 1999-2000 and 380 were not.

Of the 623 active fishers, 90 could have fished in EG, but chose to catch fish in other fisheries for which they were endorsed. This left 533 with a catch record in EG in 1999-2000. Of these, 360 fished EG only and 173 fished EG and other fisheries.

In the discussion 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 EG.

Firstly, some businesses may not be fishing any of their endorsements in EG or other fisheries. There are 380 endorsements with no fishing activity associated with them in 1999-2000. These are considered latent and are unfished for a variety of reasons (for example, multiple endorsement holdings, in another industry for a period, ill health and old age. The social section of this report provides further details). These business operators could activate their endorsements by fishing or transferring them to other operators hence raising active effort in the fishery. Holding the licence as a fishing right for its option value is also permissible and owners incur management and licence fees.

Secondly, EG endorsement holders that fished in other fisheries can be considered latent when considering the EG, but not to the degree of the previous case. They have chosen to fish other fisheries for a variety of reasons, but to hold the EG endorsement for its option value. They may choose to use 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 EG 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 1a.

Fishing Effort in the EG 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. Thus it is possible for a fisher to have

more than 365 days a year of effort. Past endorsement numbers by region, an aggregate effort measure are reported in Table G13a and effort in days in Table G13b.

Table G13a: Current EG endorsement numbers by region, May 2001 (Source: NSWF-licensing records).

	Zones							
Method	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**
Crab trap	22	59	68	119	20	4	4	296
Eel trap	8	46	36	66	20	28	22	226
Fish trap	5	23	48	120	49	6	9	260
Hand gathering	29	4	29	40	2	15	5	124
Handlining & HC	58	152	96	300	116	96	62	880
Hauling Cat. 1	12	25	11	77	36	28	14	203
Hauling Cat. 2	11	32	26	77	17	32	15	210
Meshing	54	119	81	264	95	89	53	755
Prawning	31	109	47	241	12	77	49	566
Total	**230**	**569**	**442**	**1304**	**367**	**375**	**233**	**3520**

The days effort associated with those endorsements in the years 1997-2000 are reported in Table G13b. It can be seen that shareholdings are being used under the FMS as an aggregate measure for the control of effort. Effort varies significantly between areas and endorsements.

Table G13b: Historical average effort levels in the zones of the Estuary General fishery, 1997-2000 (Source: NSW F – catch effort records).

Sum of Days Fished		Zones								
Endorsement Category	Financial Year	1	2	3	4	5	6	7	*	Grand Total
Crab Trap	1997/98	1,887	3,503	6,863	8,714	300		29	205	21,501
	1998/99	2,155	3,248	6,997	7,825	272	2	12	41	20,552
	1999/00	1,782	3,420	6,033	7,651	452	21	74	30	19,463
Eel Trap	1997/98	684	1,299	717	907	834	1,010	798	105	6,354
	1998/99	774	1,142	926	1,315	965	1,006	674	123	6,925
	1999/00	969	1,218	1,628	1,307	853	1,058	336	65	7,434
Fish Trap	1997/98	5	932	2,495	1,470	790	11	2	7	5,712
	1998/99	91	709	2,416	1,349	591	6		57	5,219
	1999/00	24	474	2,084	1,363	581	26	77	-	4,629
Hand gathering	1997/98	82	11	67	39	120	207	96	200	822
	1998/99	64	8	78	175	193	166	299	6	989
	1999/00	89		60	214	81	123	67	25	659
Handlining	1997/98	43	822	145	534	317	94	1	49	2,005
	1998/99	233	663	106	656	318	50	6	3	2,035
	1999/00	112	635	120	695	260	197	29	3	2,051
Hauling 1	1997/98	386	4,119	312	3,361	1,534	1,160	198	374	11,444
	1998/99	405	2,950	258	4,378	1,062	1,456	130	16	10,655
	1999/00	327	3,227	411	3,606	886	1,263	107	2	9,829
Meshing	1997/98	2,006	5,603	5,838	18,650	3,582	3,533	2,406	473	42,091
	1998/99	2,284	6,101	6,151	16,851	3,437	4,194	2,582	188	41,788
	1999/00	2,464	6,201	5,963	17,192	3,276	3,397	2,211	93	40,797
Prawning	1997/98	1,458	3,640	1,382	6,727	115	1,606	739	205	15,872
	1998/99	1,182	2,437	1,205	7,362	62	880	1,344	88	14,560
	1999/00	1,552	2,424	1,245	6,732	16	1,429	884	26	14,308
Grand Total		21,058	54,786	53,500	119,073	20,897	22,895	13,101	2,384	307,694

Key *Other records- not in zones.

Under the FMS, effort measured in endorsement numbers, would be the prime control for management. The regional catch will be monitored and a review of effort levels will occur if the catch triggers are reached.

(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 gives base line minimum values of fish prices in the EG fishery. The Sydney prices do not incorporate the prices of exported product and refer to unweighted monthly average prices. The Sydney price may not adequately reflect a significant portion of the EG catch marketed outside Sydney, as it includes product from many fisheries outside the EG Fishery. Market prices are a major data shortfall (see section 3).

For example, the fish produced in the EG fishery has a significant export from NSW to Queensland for some species such as mullet. These often receive a much higher price for females in roe, than for male fish which tend to be closer to Sydney price. Using an average price for a species does not reflect quality and grading issues.

The economic survey revealed EG Only fishers exported 2% of their product, by value, to outside Australia. This was higher for fishers fishing EG and other fishers at 12% (RM-ES). Marketing expenses as a percentage of gross revenue were 13.5% across all EG businesses (RM-ES).

In the economic survey, 170 EG fishers were asked to state their main marketing options. EG fishers with other fisheries have more diversified marketing arrangements as reported in Table G14 in number of fishers (percentage of fishers, not volume). EG only fishers tend to supply the Co-operatives and Sydney markets (78% by number), more than EG plus other fishing businesses (55% by number).

Table G14: The frequency of marketing alternatives for 170 sampled EG fishers (Source: RM- ES). (Note: it is by number of fishers in survey, not volume of product).

	EG Only	%	EG plus others	%
*Coops	40	47%	54	36%
*Sydney Fish Market	27	31%	29	19%
Shops	5	6%	18	12%
Restaurants	1	1%	3	2%
Bait	7	8%	8	5%
Agents NSW	6	7%	29	19%
Agents Qld	-	0%	7	5%
Agents Vic	-	0%	4	3%
Total	86	100%	152	100%

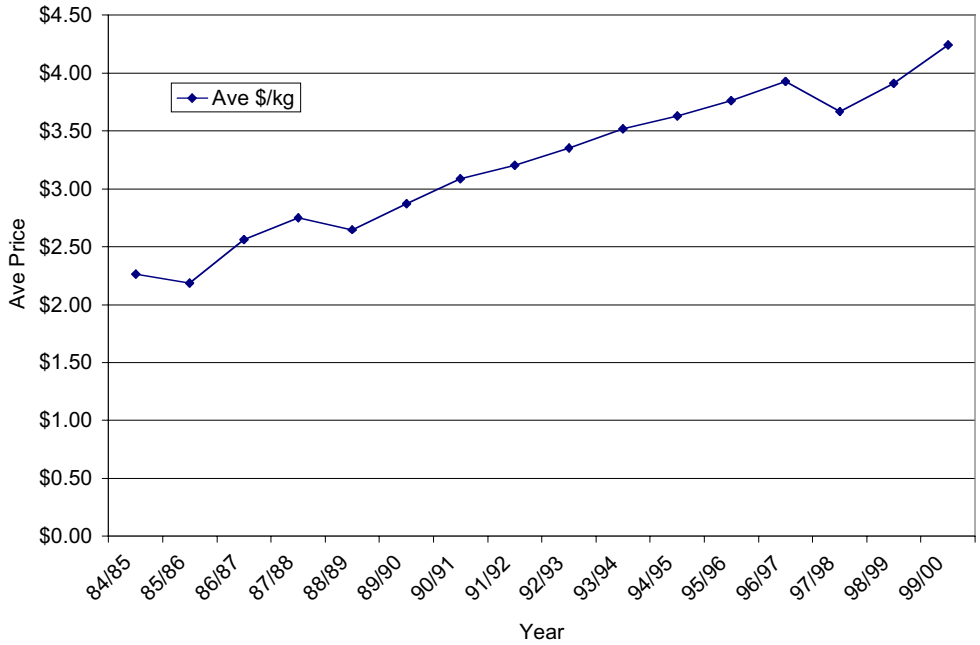
* Sydney Fish Markets would receive almost the entire Cooperative catch.

Some recent information on trends in national seafood marketing is presented in FRDC (2001), but has little estuarine fishery content. Ruello and Associates (2000) review retail and consumption of seafood in Sydney and emerging trends since a similar study of retail outlets in 1991. Some discussion of market impacts of estuarine fishery adjustment in NSW on supply of species is reported in Dominion, (2000a).

Price history

The price across all species of the EG product in nominal terms has increased from $2.25/kg towards $4.25/kg in the 1984-2000 period as reported in Figure G7 (Source: NSWF; Sydney Index, derived from Figure G1).

Figure G7: Average price ($/kg) of EG fish across all species in the 1984-2000 period imputed from Figure G1 (Source: NSWF; Sydney Index).



This represents a nominal price trend of 4.16% per annum in price across all species in the 1984-2000 period. However, considering the consumer price index rise for the period was 4.2% per annum, there has been no real increase in the price of fish across all species.

(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 or fishing businesses in the Estuary General fishery. A brief review of a cross section of fishing businesses in NSW was undertaken by IPART (1998), to establish the capacity of fishers to pay management charges.

The Department of Urban Affairs and Planning (DUAP) Director's Guidelines process requires a measure of the net returns of each fishery and an estimate of the fishery's contribution to national income and the value of licences.

Economic return

A fishing industry economic survey was developed and distributed to industry by Roy Morgan Research (Roy Morgan, 2001b). The survey methods and results are reported in Appendix 2.

The economic survey indicates that 20% of businesses 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 though the economic surplus. Approximately 80% of operators are under the long term viability measure and a significant proportion will not be adding contributing local, state and national income as discussed in Appendix 2.

The mean economic rate of return across businesses with EG fishing endorsements was -17% to capital and the median rate of return was -30%, indicating 50% of operators falling below this when examined on a single operational year. The results indicate significant long run economic viability issues for industry and the need to address the economic performance of up to 80% of operators in the fishery.

Economic rates of return within the social and socio-economic context of rural estuary fishers 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 the adjustment process and subsequent monitoring.

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) require 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 EG 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 Department 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 Estuary General fishery.

Gross revenue from catch* per annum	$20.9m
Less economic cost of operations**	$25.3m
Operational Economic surplus	$ -4.4m
less cost subsidies***	$ 1.43m
Total economic contribution	$ -5.83m
Plus rise or fall in fish stocks****	$ 0m
Total of Management cost account	$ -5.83m

* This is the revenue of catch from all EG businesses in the EG fishery and is the Sydney index estimate, adjusted by the economic survey results (see Table G3 ie $17.3m + 21% = $20.9m) to take account of prices higher than the Sydney index.

** This is the estimated cost of fishing inferred from the EG economic survey results for EG fishing businesses (ie. Appendix Table GA3 reports the average business as having $78,481 of economic costs for $65,350 of revenue ie. economic costs are 1.21 times revenue). The total economic costs includes 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 $1.883m, less fishers payments already in economic costs, $0.455m = $1.43m. 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 move towards greater economic viability and full cost recovery 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 EG 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-$40,000 business values of the mid 1990s and current period.

Detailed inference as to price structure of licence trades is not possible due to a lack of available licence purchase information. Available imputed fish market data indicates an increasing nominal fish price trend of 4.1% per annum which in eight years would give an expectation of a 33% in nominal fish prices in the 1993-2000 period and a potential rise in endorsement and business values. There has been no rise in nominal licence values which may reflect the limitations on licence transferability. 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, rather than an indicator of fishing prosperity.

(g) Existing economic multiplier effects – costs and benefits

Review of information on economic multiplier effects 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).

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. Table G15 presents multiplier estimates from the economic studies of fisheries in coastal regions of NSW.

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 3 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 Estuary General 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 EG fishery. The Northern NSW regional study covers the region in which the EG 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 fishers' business expenditures in the EG fishery was examined through questions on the larger scale purchases of EG endorsed businesses in the social survey. A total of 502 EG fishers were asked about the amount and location of their major purchase over $1,000. 285 had no major expenditures, but other expenditure locations and items purchased are reported in Table G16a and b.

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

ALL	TOTAL	%	TOTAL LESS THAN $50,000	$50,000 - $99,999	TOTAL $100,000 OR MORE	Can't Say	MOST EXPENSIVE ITEM	HAVE NOT MADE BUSINESS EXP.> $1,000
Towns \ n	**502**		**166**	**6**	**6**	**5**	**183**	**285**
Sydney	45	24%	42	1	0	2	45	0
Brisbane	22	12%	19	2	0	1	22	0
Newcastle	18	10%	17	1	0	0	18	0
Coffs Harbour	8	4%	8	0	0	0	8	0
Nowra	6	3%	6	0	0	0	6	0
Eden	5	3%	5	0	0	0	5	0
Yamba	5	3%	5	0	0	0	5	0
Other (Queensland)	5	3%	5	0	0	0	5	0
Grafton	4	2%	2	1	1	0	4	0
Lismore	4	2%	3	0	0	1	4	0
WA/ SA/ Tas	4	2%	2	0	2	0	4	0
Ballina	3	2%	3	0	0	0	3	0
Batemans Bay	3	2%	3	0	0	0	3	0
Gosford	3	2%	2	0	1	0	3	0
Melbourne	3	2%	3	0	0	0	3	0
Raymond Terrace	3	2%	2	0	1	0	3	0
Taree	3	2%	2	1	0	0	3	0
Wollongong	3	2%	3	0	0	0	3	0
Forster/ Tuncurry	3	2%	3	0	0	0	3	0
Other NSW (S of Sydney)	3	2%	3	0	0	0	3	0
Narooma	2	1%	2	0	0	0	2	0
Southport	2	1%	2	0	0	0	2	0
Tweedheads	2	1%	2	0	0	0	2	0
Kempsey	2	1%	1	1	0	0	2	0

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

Expense	Sum of EG	%	Expense	Sum of EG	%
Licence fees	680,600	19%	Inboard Engines	37,000	1%
Car/Ute	553,800	15%	Punts/ Dories	32,600	1%
Outboard engines	393,950	11%	Trailers	19,950	1%
Nets	372,050	10%	Gear Box	17,800	0%
Boat/new Boat	259,000	7%	Traps	17,080	0%
Fishing gear	241,500	7%	GPS	13,500	0%
No. of other items	207,850	6%	Ropes/Lines	12,550	0%
Bait/ Ice	179,000	5%	Hauler/Coilers	8,500	0%
Other	152,382	4%	Repairs	7,999	0%
Fuel/Oil	107,425	3%	Aluminium trays	6,530	0%
Can't say	82,830	2%	Freezers	4,500	0%
Wire	78,260	2%	Plotters	3,500	0%
Propellors	60,400	2%	Pump/ gen sets.	2,200	0%
Winches	56,000	2%	Hooks	2,000	0%
			Total	3,610,756	

Table 16a reports that 40% (85 out of 217) of expenditures over $1,000 were in the cities of Sydney, Brisbane and Newcastle. Expenditures in towns as displayed was for 35% of purchases (76/217) and 25% of expenditures over $1,000 were from small towns not reported in Table 16a. Table G16b reports the items purchased, with approximately $3.6m expended

on items over $1,000 outside the fisher's local area. Capital items, such as cars, nets, boats and fishing gear are approximately 60% of the expenditure in the survey sample. The expenditures by businesses on licence fees is for more than the EG fishery only.

Table 16c reports the pattern of expenditure on major purchases for 158 of 217 purchases. Generally fishers in the north and south purchase some major items in their respective areas, with Sydney, Melbourne and Queensland having trade with a range of areas. The major purchase link between the Clarence and Brisbane for EG businesses is significant.

Table G16c: Purchase location outside fisher's residence area, in which EG fishers made an expenditure of over $1,000 in last 12 months (Source: RM- SS).

	Town of major purchase over $1,000												
Town of residence	B'bane Qld	Lismore	Yamba	Grafton	Coffs Hbr	Forster/ Tuncurry	Newcastle	Sydney	Nowra	Batemans Bay	Eden	Melb. Vic	Total
Tweed Heads	1	-	-	-	-	-	-	1	-	-	-	-	2
Richmond River	3	2	1	-	-	-	-	2	-	-	-	2	10
Clarence River	17	3	1	5	6	-	-	4	-	-	-	1	37
Macleay River	2	1	-	1	-	-	2	1	-	-	-	-	7
Port Macquarie	1	-	1	-	-	-	-	2	-	1	-	1	6
Camden Haven	-	-	-	-	2	-	-	2	-	-	-	-	4
Manning River	1	-	-	-	-	2	-	-	-	-	-	-	3
Wallis Lake	1	-	-	-	1	1	1	4	-	-	-	1	9
Port Stephens	3	-	-	-	-	-	11	7	-	-	-	1	22
Hunter River	-	-	-	-	-	-	1	3	-	-	-	-	4
Newcastle	-	-	-	-	-	-	3	1	-	-	-	-	4
Lake Macquarie	-	-	1	-	-	-	1	-	-	-	-	-	2
Tuggerah Lakes	-	-	-	-	-	-	1	2	-	-	-	-	3
Hawkesbury River	-	-	1	-	-	-	3	6	-	-	-	-	10
Botany Bay	1	-	-	-	-	-	-	-	1	-	-	1	3
Lake Illawarra	1	-	-	-	-	-	-	3	1	-	-	-	5
Jervis Bay	-	-	-	-	-	1	-	4	2	-	-	-	7
Ulladulla	-	-	-	-	-	-	-	-	2	1	1	-	4
Batemans Bay	-	-	-	-	-	-	-	6	1	3	1	-	11
Narooma	-	-	-	-	-	-	-	3	1	-	1	-	5
	31	6	5	6	9	4	23	51	8	5	3	7	158

Regional expenditures, multipliers in the fishing and the seafood processing industries are an area for further research. Expenditures of fishers and businesses and interactions between fishing communities along the NSW coast could also be investigated on a state-wide basis.

(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 Impact 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 two levels – High 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 two levels of impacts – High 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 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 potential use of access arrangements, such as category 2 share management to reduce fisher effort by adjusting fisher numbers and hence capacity, has a high economic impact ranking. This is due to every business being affected and impacted financially with potential community costs and benefits. A low ranked issue is of more limited impact, some being smaller scale issues for sections of industry, such as altering specifications of a type of fishing gear regulation. This would impact only those using that gear and if the change per fisher is small, the total impact is estimated to be low. Ranking also considers the potential impacts of policies on the fish stocks.

From Table G17 four responses are ranked as highly impacting:
zoning of the fishery; changes to hauling; access right amendment through category II share management which impacts through minimum shareholding provisions for businesses and endorsement holders.

Low impact issues are discussed generically and an evaluation of the costs and benefits of the whole FMS are presented.

From Table G17 and investigation of each economic issue the main economic impacts come from altering access and effort in the fishery through effort and share entitlement Strategies (responses 2.2a,b, 2.3a,b and 5.2(a) and 5.3 a. which have implications for viability are as reported below).

Table G17: The EG Fisheries Management Strategy responses ranked by potential economic impact of the Fisheries Management Strategy.

RESPONSE	DESCRIPTION OF RESPONSE	GOALS	ISSUES	RANKING
1.1(e)	Reduce haul nets down to 500m & reduce shots per day	2,3,4	effort	HIGH
2.2(a)	Implementing zoning scheme in EG	4	effort	HIGH
2.2(b)	Active effort & endorsements, min. shareholding	1,3,4	effort	HIGH
2.3(b)	Min entry requirements at the fishing business level to prevent increases in effort	1,3,4,5	effort	HIGH
5.2	Promote long terms econonomic viability of EG		viability	HIGH
5.2(a)	Minimum shareholdings to adjust number of businesses		viability	HIGH
5.3 (a)	Provide secure fishing entitlement for EG		viability	HIGH
5.2(b)	Develop and indicator of individual economic viability		viability	LOW
5.2(c)	Develop a cost recovery framework		viability	LOW
1.1(a)	Increase mesh size of 70mm Flathead net	2,4, 5	size	LOW
1.1(d)	Phase out winter set mesh nets <95mm	2,4	size	LOW
2.1(a)	Limit size of gear	1,3,4,5	size	LOW
2.1(d)	Size limits to catch adult fish	5	size	LOW
2.1.1(a)	Introduce minimum legal length for primary finfish species		size	LOW
4.2(b)	Determine approriate size of first cature for king prawns and school prawn species	1,2,5	size	LOW
5.1	Optimise the biological yield of fish and max. economic return		size	LOW
1.2(a)- 7th pt	Equitable resource sharing - EG + other stakeholders	2,3,4,5	allocation	LOW
2.1.2(b)	Allocate max. quantity of glass eels	4,7	allocation	LOW
2.1.3(b)	Implement allocation of shares to fish and crab trapping	4,5,6	allocation	LOW
2.1.3(c)	Consider a tradeable crab trap regime based on shares	4,5	allocation	LOW
2.3(a)	Implement an owner-operator rule for EG fishing business	1,3,4	allocation	LOW
1.2 (a)-5th pt	Closures-Fish size, Max. Econ. Return	2,3,4,5	closures	LOW
2.1(e)	Prohibition on the taking of all female crabs carrying ova		closures	LOW
1.2(c) - 5th pt	Developing codes of conduct (Icing practices/adding value)	All	market	LOW
5.4(a)	Development of food safety programs		market	LOW

ii) Economic impacts

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

1) Economic assessment of zoning (FMS response 2.2(a))

The NSW coast will have seven fishery zones. Stage 1, commenced in June 2001 and involves allocating one of seven primary regions to each fisher and issuing a permit to operate in individual estuaries beyond that region for methods where historical use can be demonstrated. Stage 2 will involve applying tighter rules for zoning, but at the same time taking into account circumstances where fishers may be unduly impacted.

Fishers are required to operate within one zone, instead of traversing zones which often led to local disputes. This will "provide a framework for regional management" (FMS, 2000; 2.2(a)). Containing effort to regional zones will increase the likelihood of development of regional management arrangements with more secure access and less conflict caused through fishing by "outsiders".

Changes and measurable impacts

With the proposed zoning there are no envisaged market impacts, but several impacts on fishing rights. The right to access and traverse between different areas is being reduced and the right to fish in a given zone now becomes more exclusive. It is likely that access shares may increase in value if the resource in a region is perceived as productive, sustainable and well managed, provided that effort and fisher endorsement numbers are contained through the management strategy.

Conflict will be reduced from "external fishers" not entering another zone and the incentives for local fishers to steward the fish resources in their zone will increase.

Regional zoning would have differing impacts on the economic viability of fishing businesses. Businesses that fish in an area that outsiders previously accessed may experience an increase in commercial viability. Alternatively fishers who travelled between different regions would have segments of their business activity removed being forced to fish in one zone, or seek an exemption. Dedicated travelling fishers will have an alteration to their fishing practices and with impacts on their operational viability.

Information and analysis

Two sources of information exist on travelling fishers: the social survey and from the zoning appeals process.

In the social survey fishers were asked for to define the distance travelled one way from home, in either kilometers or boat hours of travel, to their main fishing activity. In the EG only 4% of fishers moved more than 100km one way by road or over 3 hrs by boat. Approximately 5% moved between 50 to 100km and 2 to 3 hrs by boat, representing approximately 46 fishers in the active fishing population (social survey data).

The implementation of stage 1 zoning had an appeals process where approximately 150 persons from 944 businesses indicated they had issues to be considered and were possibly being impacted in some way. Approximately 33% indicated economic impacts from the policy change, 41% indicated it was restricting their fishing operation and 26% of appeals had general disagreement with the policy.

Table G18 reports the number of total fishing businesses which want greater access to estuaries and the number of applications approved to fish in estuaries beyond their primary region. The extent of impact is indicated by Total Fishing Businesses (TFBs) rejected (17), and in the type 4 category of applicant who wished to change region and apply for additional estuary access (43 in total). For example, in region 6 under stage one of zoning there are numerous fishers who wish to traverse to lakes in region 7, 19 being approved to do so under stage 1. The second stage of zoning will lead to assessed criteria being applied, at which time the 67 business approved to fish in other zones may be reduced.

Table G18: Results of the stage 1 zoning appeals process by NSWF (Source: NSWF).

Zones	TFBs /region	TFBs wanting greater access	TFBs approved	TFBs rejected	Type 4's
1	72	7	4	3	2
2	158	7	7	0	0
3	106	7	7	0	2
4	302	19	13	6	8
5	123	13	13	0	3
6	126	26	19	7	28
7	59	5	4	1	0
	943	84	67	17	43

Key: TFB- Total Fishing Businesses

The FMS changes will restrict the movement and hence impact the fishing operations of between 17 and 43 fishing businesses. The economic impact will require adjustment of fishing practices if entry to a second region has not been approved. The most impacted regions will be fishers in regions 4, 5 and 6.

The impacts of zoning will be immediate and ongoing through stage 1 and stage 2. Mitigation has been made already through the appeals process for fishers to nominate for permission to fish in an adjacent zone. There may need to be specific area adjustments in zone 6 given the multiple region behaviour of numerous fishers in that area. Such concessions may be short lived as stage 2 of the zoning will be implemented in the future.

The costs of the policy change will be borne by fishers who travelled previously. There is insufficient information to estimate a monetary value, but the cost will be some portion of business revenue, presumed to be less than 50% of revenue, for between 17 and 41 fishers. The benefits are a likely reduction in local conflict, an increase in regional stewardship and in the ability to contain effort levels across the state through each zone. Costs and benefits cannot readily be evaluated in dollar terms, but the long term benefit to the whole EG fishery is presumed to outweigh the short term cost on impacted fishers under the FMS.

Zoning of commercial operators will have benefits for other sectors, such as recreationalists due to less conflict and more cohesion in commercial harvesting in each zone. This gives the potential for uniform weekend closures to be implemented among commercial fishers, with benefits to other interested groups in the community.

2) Economic assessment of hauling net regulations (FMS response 1.1e)

Hauling in certain major estuaries can use nets up to 1,000m in length. Six estuaries (St. George, Lake Illawarra, Botany Bay, Lake Macquarie, Tuggerah Lakes and Wallis Lakes) have 1,000m haul nets and 7 estuaries have 725m haul nets also. The reduction of hauling nets from 1,000m and 725m to 500m in estuaries under the FMS will alter fish hauling operations, with a restriction of one shot per hauling crew per day.

Discussions with industry suggest a reduction from a 1,000m net to a 725m net would lead to a greater than 25% reduction in catch revenue, and the reduction of 1,000m and 725m haul nets to 500m may reduce gross revenue by 33%-50%, though this depends on the fishing area.

The reduction to 500m would raise issues of economic viability for fishers using larger scale hauling nets. This is estimated to be between 20 and 30 fishers. The regulation may have indirect impacts with the downsized nets now having to compete with existing 450m haul net operators. This would alter the economic viability of operators who based business operations on the advantages given by use of a larger net.

The costs to an operators for a typical larger scale hauling operation which grosses revenue of $120,000 per year (source: NSWF/Sydney index - sample of 5 potentially impacted haul net fishers) would be a reduction of between $30,000 and $60,000 per fishing operation (25%-50% of average gross revenue). This impact would require significant adjustment in the operations of fishers.

The policy benefits would be to reduce the catch and hence potentially increase the fish stocks, which is difficult to value in monetary terms. There is insufficient information to appraise these benefits and there are doubts in industry that they are tangible (pers. comm., EGMAC).

Other smaller haul netters may increase catches in the wake of the policy changes. If this is the case, concerns about hauling causing of environmental damage and taking excessive numbers of fish may not be allayed among recreational and community members. These benefits are impossible to quantify and are presumed by the FMS to exceed the financial loss to the impacted fishers. Potentially impacted fishers believe they will be financially disadvantaged by the policy (pers. comm., EG MAC). Reduction in the size of large hauling nets is perceived as benefiting both the commercial fishery and recreational fishery, as more of the larger fish targeted by the 1,000m net may end up remaining in the fish population.

The change in hauling nets from 1,000m and 725m to 500m could be mitigated by the reduction being to 725m and then appraising the outcome of such a change. Some industry members consider the reduction to 500m to be more than required to address management or community concerns (pers. comm., EG MAC).

3) Minimum shareholdings and effort adjustment (FMS response 2.3b)

The FMS response 2.3b 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, 2.3(b)). FMS response 5.2(a) is to "use minimum shareholding provisions, either as a trigger point response or in accordance with the share management plan, to adjust the number of estuary general fishing businesses to a level which improves the economic viability of the fishery and its participants" (FMS, 5.2(a)). As indicated in the FMS "it is the governments intention to create a full time professional fishing industry" (2.3(b)). These responses have implications for economic viability and the access of EG fishers.

Active effort can be measured on the broad level when a fisher submits catch returns in one month of the year to the fisheries department. In contrast latent effort is when no catch returns are submitted to the Department as no fishing has taken place.

Addressing active and latent effort through endorsements will involve the use of category 2 share management under the FMS. There is no evidence in the FMS of economic evaluation of alternatives to this proposed policy, such as cancellation of latent endorsements or other alternatives. The economic effects of category 2 share management have not been previously been analysed.

The category II share management scheme allocates shares in access, (on a basis 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 and duration 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.

The use of the minimum shareholding provision at the business and endorsement level is to contain effort by operators having to hold a minimum number of shares, buying shares from other fishers.

The trading process is envisaged as adding value to the shares through time, though this has not been tested. Unlike an effort or catch quota, the shares may not be sufficiently binding on individual producer behaviour to produce rises in share value.

Minimum shareholding limits for business endorsements and regions that increase over time, means that some businesses will decide to sell and exit the industry, and the share holdings will aggregate in each fishery. A minimum shareholding would impact on part time fishers forcing them trade up, or to exit parts of the fishery, or the industry with a payment from sale of shares. A total minimum share holding provision is proposed for new entrants to prevent small or part time businesses from being purchased and worked at higher than historic levels of effort.

Impacts

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.

In the past few years an entrant must buy an RFO as opposed to a Fishing Operation (FO) to enter the NSW fishing industry. Consolidation through time has been achieved through the RFO policy (Murphy, 1999). The intention is to roll the RFO requirement into the share system with a minimum shareholding across fishery entitlements held by a business. Given industry restructuring, the proportion of RFOs to FOs has been increasing since the introduction of the policy. Murphy (1999), illustrates that the adjustment has been impacting small businesses grossing below $30,000 per annum, more than 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 to continue this rate of reduction of business numbers in the next 5 years, making a decline of 15% leading to 1,400 fishing businesses state-wide by 2006.

A 3% annual rate of reduction in business numbers will form the basis for assessing economic impacts. In Estuary General this would translate from 944 businesses in 2001, to 802 by 2006. If the reduction in business numbers were uniform across the EG the impact in each region is reported in Table G19.

Table G19: Envisaged impact of continued adjustment of business numbers in the EG fishery in the 2001-2006 period at 3% per annum –ie. 15% (Source: NSWF).

Zones	Total FBs per region	Estimated FB No.s (2006)	Reduction in FBs
1	72	61	11
2	158	134	24
3	106	90	16
4	302	257	45
5	123	105	18
6	126	107	19
7	59	50	9
	944	802	141

Key: FB= Fishing business

This would require a downward adjustment of 141 businesses from the EG fishery in the 2001-2006 period.

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 face having to gain 15% more shares in the 2001-2006 period to stay in the fishery. This would equate to the cost of 15% of the market value of 100 EG business shares, presumably the value of an existing EG fishing business.

Assessment scenario 1 –envisaging potential impacts of share management

A reduction of 15% of businesses in 5 years is estimated to equate to 15% of the value of an EG fishing business that exits. The value of small EG businesses most likely to exit may be between $15,000 to $30,000. Remaining businesses would have to buy 15% of shares in 5 years. This equates to $2,250 to $4,500 per fishing business left in the fishery, or $500-$1,000 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 number of fishers grossing less than $10,000 per year, the fixed costs of remaining in the fishery could lead to more than 15% of fishers being willing to sell shares. The cost of share purchase could be borne by more viable businesses,

but for the 80% of less economically viable businesses, there may be an incentive to increase effort to cover the new costs of share purchase and higher management charges. It is essential to monitor latent effort activation and rises in historic effort levels as recommended by the strategy. An appraisal of the latent effort and its potential impact on the FMS is presented in Appendix 1.

The move to category 2 share management and minimum business shareholdings would change allocations within the commercial sector substantially. It is difficult to predict share trading patterns, but the economic and social impact is likely to be higher on fishers with low levels of catch and businesses which constitute latent effort, or older fishers. The social impacts are evaluated in section H.

Cost and benefits

Estimated costs and benefits indicate that 944 businesses will reduce to 802 in five years with 142 businesses exiting. The total cost to those remaining is 142 businesses * the cost of an EG fishing business ($15-$30k), estimated at between $2.1m-$4.2m over 5 years of the FMS.

The benefits are increased share value reflecting improved management and stock conditions, and improved efficiency through businesses trading access shares and altering operations. There is insufficient information to estimate this reliably, though the FMS presumes these benefits to be higher.

Benefits to other sectors come from rationalisation of fishing capacity in the commercial sector, though there may be no direct increases in available catch for recreationalists. Community benefit is through more control of the effort levels in the commercial fishery.

4) Active effort and minimum shareholdings (FMS response 2.2a)

Active fishing effort is not to exceed "historic levels" and containment of "latent effort" is also a priority. The FMS aims to prevent the activation of latent effort by new entrants (objective 2.3), and latent effort is described in Appendix 1. For managing the minimum shareholdings at the endorsement and business level (responses 2.2b and 2.3b) the degree of impact on the fishing industry would depend on the allocation of shares, the level of the minimum shareholding, and the time available to meet the minimum shareholding criteria.

For example: If allocation of shares are 100 per endorsement and a minimum shareholding of 120 is envisaged after 4 years of the strategy, the impacts would be different than an allocation based on catch history which gives fishers up to 100 shares. This basis of share allocation needs to be modelled and discussed with industry. The allocation method is yet to be decided.

The minimum shareholding level is set in relation to the degree of endorsement adjustment required in the fishery. This is related to current fishing behaviour as described below.

- There were 1,003 endorsed file numbers in EG in May 2001;
- There were 623 active file numbers fishing in 1999-2000;
- Of these 90 had EG endorsements, but chose to fish elsewhere;
- Of the remaining 533, 360 fished in EG only and 173 fished in EG plus other fisheries.

EG endorsements and minimum shareholdings

Controlling effort, contains catch from a region at sustainable levels. Managing effort by endorsement numbers is one step removed from containing the number of days fished.

In managing effort at the aggregate endorsement level we assume that the relationship is straight line and thus a 10% rise (fall) in endorsement numbers implicitly assumes a 10% rise (fall) in effort. However, the top 10% of endorsements by number produce 27% of fishery wide effort measured by days fished and the bottom 40% per cent of endorsements produce 10% of effort measured in days. Given the relationship between fisher numbers and effort, a 10% fall in endorsement numbers could only represent a 2.5% fall in real effort. As reported in Figure G8.

Figure G8: Cumulative effort (days) and cumulative number of fishers in the EG fishery (1999-2000).

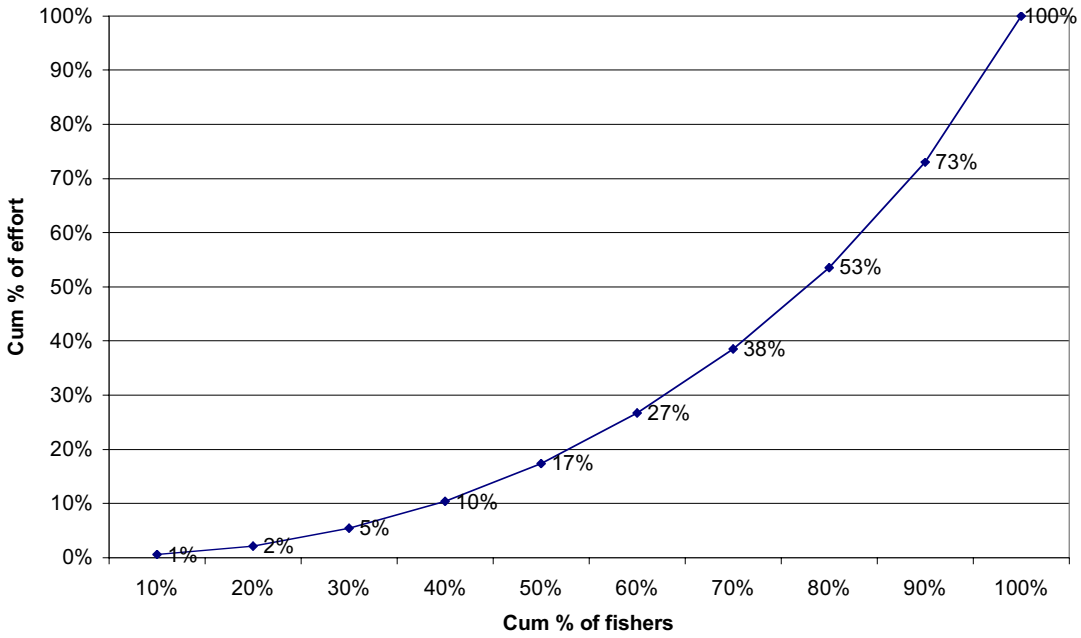


Table G20a reports the number of specific EG endorsements in each region averaged for the years 1997-2000. The impact of minimum shareholdings is predicted by examining a 15% reduction in endorsement numbers in each endorsement type in the next five years of the plan as reported in Table G20b.

Table G20a: EG endorsement numbers by zone as of 2001 (Source: NSWF).

	Zones							
Method	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**Total**
Crab trap	22	59	68	119	20	4	4	296
Eel trap	8	46	36	66	20	28	22	226
Fish trap	5	23	48	120	49	6	9	260
Hand gathering	29	4	29	40	2	15	5	124
Handlining & HC	58	152	96	300	116	96	62	880
Hauling Cat. 1	12	25	11	77	36	28	14	203
Hauling Cat. 2	11	32	26	77	17	32	15	210
Meshing	54	119	81	264	95	89	53	755
Prawning	31	109	47	241	12	77	49	566
Total	**230**	**569**	**442**	**1304**	**367**	**375**	**233**	**3520**

Table G20b: Reductions in endorsement numbers assuming a 15% reduction over the 2001-2006 period.

15% of endorsement numbers	Zones							
	1	**2**	**3**	**4**	**5**	**6**	**7**	**Total**
Crab trap	3	9	10	18	3	1	1	44
Eel trap	1	7	5	10	3	4	3	34
Fish trap	1	3	7	18	7	1	1	39
Hand gathering	4	1	4	6	0	2	1	19
Handlining & HC	9	23	14	45	17	14	9	132
Hauling Cat. 1	2	4	2	12	5	4	2	30
Hauling Cat. 2	2	5	4	12	3	5	2	32
Meshing	8	18	12	40	14	13	8	113
Prawning	5	16	7	36	2	12	7	85
Total	**35**	**85**	**66**	**196**	**55**	**56**	**35**	**528**

The impacts of trading in endorsements are reviewed in Assessment scenario 2 below.

Assessment scenario 2 – estimate only for envisaging potential impacts

A reduction of 15% of endorsement numbers in a region in 5 years is predicted to equate to 15% of the value of an EG method endorsement share. The value of a method specific endorsement is marginal usually being sold as part of a business. They also come as part of mixed packages complicating the estimation of a potential method endorsement share price (NMB, pers. comm.).

The value of a crab method share endorsement may be between $5,000 to $8,000 (estimate only). Those endorsement holders remaining in the fishery would have to buy 15% of shares in 5 years. This might equate to between $750 to $1,200 per fishing business left in the fishery, or about $150- $240 per year to remain in the crab fishery under new share arrangements. As each fisher may have several endorsements the annual cost would be in proportion to the number of endorsements operated by the fisher eg. Three endorsements $450-$720 per year.

The benefits will be an increase in share value through more defined ownership. Regional arrangements should ensure that historic effort levels among fishers are monitored.

The predicted adjustment of endorsements assumes that the adjustment is equal regionally which is unlikely to be the case. Minimum shareholdings on a regional basis would assist in reducing endorsement numbers, and effort, providing latent effort is not activated.

For adjustment at both business and endorsement level through share trading it is likely that several groups of endorsement holders will be more likely to sell shares.

Share purchase costs and management fees would make part time operations and businesses with low catches more likely to sell. Latent effort fishers with shares and perhaps elderly fishers, who do not see a future in the fishery, may be more likely to sell shares and exit the fishery.

Table G20a and b indicated 528 endorsements from a total of 3,520 would transfer in 5 years of the share system. This is estimated to translate to approximately 150 businesses leaving the industry. The regional impact is illustrated in Table G20b and is 15% in each area by assumption, but is unpredictable due to range of factors, the main being the response of fishers which will likely differ between zones and endorsement method types.

Costs and benefits

The costs of adjusting through minimum shareholdings are difficult estimate and require a separate adjustment modeling study. Each endorsement has a marginal value which has not previously been estimated.

The benefits will be an increase in endorsement share value, local stewardship, reduced capacity and increasing the likelihood of increased stocks in the longer term. There may well be cumulative impacts coming from application of minimum shareholdings at both business and endorsement levels and from interactions from FMS plans by other fisheries in which businesses have an interest. The cumulative impact may be significant.

Benefits to other community sectors are in having a more rationalised industry with local control, accountability and stewardship through increased access ownership. The introduction of shareholdings and minimum shareholding provisions will benefit recreational fishers and community as commercial fishery effort levels are contained and commercial fishing operation numbers are reduced through time.

Voluntary adjustment or buyback schemes can assist with fishing industry restructure. The developing Recreational Fishing Area (RFA) process will involve the adjustment of the commercial fishing businesses, but the extent of adjustment from this source is not yet apparent and will only be known after this EIS is finalised.

Managers are hoping to contain latent effort while applying the envisaged minimum shareholding provisions to cap active effort. The use of funds in the concurrent RFA process will assist in mitigation of financial impacts of commercial fishing adjustment. The basis of allocation of shares may also be mitigated, by using alternative allocation methods.

The response of fishers is difficult to predict. Business owners with latent endorsements, may be willing to sell, the supply of shares potentially exceeding demand, leading to both reductions in price and a lack of trading in the share market. This should be monitored. Part of mitigation, would be a closer examination of the share system allocation and associated economic valuation issues to make sure it achieves the desires of the FMS after implementation. This requires a state-wide modelling exercise across all administered fisheries.

5) Other low impacting measures

There are a series of less significant economic impacts from changes to net sizes/gear, small scale sectoral allocation issues, such as crab trapping. Optimising economic return is noted as an objective of prawn and finfish management and codes of conduct are recommended to improve added value through icing practices and safe food marketing.

Owner operators are to be preferred to nominated fishers. No new nominations will be accepted and the issue which led to entities having to nominate a “real person” would be altered with minimal economic impacts.

Impacts of changes to net mesh sizes and phasing out of 80 mm winter set mesh nets, restricts access at the gear level, with the intention of improving future fish stock levels with long term economic benefits. This may potentially increase endorsement share values, though there is insufficient available data and experimental evidence to empirically appraise the changes. A change to 95mm mesh will reduce catches of valuable legal size bream in the short term, thus reducing viability but the reduction in bycatch of undersize fish will lead to better yields once those fish grow to the selectivity size of the net. Fish market supplies may be reduced in the short term.

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 the case of prawns this would need to be modelled in a regional context.

Moving the crab trap fishery to a tradeable share management would alter access and increase crab share value due under a more accountable management regime.

The EG 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).

A code of conduct for improving icing practices is advocated under the FMS (1.2c). There are cost and incentive issues for some fishers in using more ice as the marketing system does not necessarily reward the additional expenditure (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 the 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.

There may also be a concern of a reduced fish supply to the community from the FMS. Technical gear restrictions may alter fish supply in the short terms through gear regulations. Adjustment through the share system should keep the level of fish supply within historical levels. The impact of the recreational fishing area process is unknown and is not part of the FMS assessment.

6) Costs and benefits of the 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 management cost accounting statement, as illustrated below in Box G2 for the EG FMS (NSW Government, 1997).

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

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

For the EG fishery per annum:	Year 2001-02	Year 2006-07	Year 2008-09
Gross revenue from catch (i)	20.9m	24.0m	25.5m
Less:			
economic cost (of effort)(ii)	24.84m	23.6m	23.1m
Costs of share purchase (iii)	0	0.9m	1.0m
Management charges to industry (iv)	0.46m	0.46m	1.9m
Additional cost of FMS (v)	0	0.76m	0.76m
Operational Economic surplus	-4.4m	-1.72m	-1.26m
less cost subsidies (vi)	1.43m	1.43m	0.0m
Plus rise or fall in fish stocks (vii)	0m	0m	0m
Total economic contribution	-5.83m	-3.15m	-1.26m

(i) This revenue of catch from fishing in the EG (see Box G1) rising at 3% per annum due to cpi.

(ii) Total costs of fishing less management charges currently paid by industry ($25.3m less $0.46m = $24.84m). Total cost of effort to rise by 3% pa, business numbers reduce by 3% per annum and there is a cost reduction of 1% per year due to efficiency gains from restructuring reducing the cost of effort to take the same catch.

(iii) Share purchase costs in 2002-03 are 944 businesses* estimates of ($500p.a. business share purchase + $450p.a. endorsement) = $0.9m per annum in share purchase costs to industry. Note these costs are minimal. Business numbers fall to 800 by 2006-07 with share expenditure per operator rising.

(iv) Costs of management not attributed to fishers under current cost policy are added.

(v) New FMS charges: based on 944 businesses *$800 each (could be less than this), becoming 800 businesses by 2006-7 ($944 each) = Total $0.76m

(vi) Subsidised costs of management (ie. management, research, compliance, consulting studies etc). The current commitment of government is to maintain this at $1.43m for existing service with the intention to industry paying full cost recovery by 2008-09. Generic subsidies to industry from fuel rebates are not included.
(vii) The change in the value of fish stocks are unknown and a methodology of incorporating these needs to be developed.

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

For the EG fishery per annum:	Year 2001-02	Year 2002-03	Year 2006-07
Management charges (i)	635	635	750
FRCAC/EIS (ii)	230	230	0
FRDC (iii)	115	115	115
New FMS charges (iii) &(iv)	0	800	944
Share rental (iii)	0	100	100
Share purchase (v)	0	950	1,250
Total costs per fisher	$970	$2,830	$3,159

(i) Costs per fisher are $0.6m/944 =$635. By 2006-07 $0.6m/800=$750. (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 944 business *$800 each becoming 800 businesses by 2006-07 * $944 each. (v) These costs are minimum estimates and may be double this, making the total to fishers $3,780 and $4,409 per annum.

The cost per fisher rises to $2,830 per fisher in year 2002-03 and is $3,159 by 2006-07. In the post 2006-07 period the intention is to change the basis of charges, relating management charges to business shareholdings. It is not yet possible to accurately model this.

The FMS response 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. The intention of the FMS is to move towards making the EG fishery more economically viable by the end of 5 years (2006-07). Full management cost recovery will be implemented by 2008-09.

The intention of the FMS would be to return the fishery to an economic surplus, though in Box G2a in year 2008-09 the fishery is in a net deficit position, which is preferable in comparison to the current situation. The account shows the need to accurately determine economic profitability from operations, which will vary from year to year as stock availability fluctuates.

The analysis here assumes the FMS 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 an investigation of 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, 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 EG. 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, small 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 944 to 802 businesses in the 2001-2006 period. Table G21 indicated 528 endorsements from a total of 3,520 would transfer in 5 years of the share system. This may translate to approximately 150 businesses leaving the industry. It is not clear to what extent these will have cumulative impacts (Thomas, 1998) 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, contribute least to output in the industry 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 adjustment assistance), 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 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. This is evident in the significant amount of latent effort among EG fishing

businesses. Reducing and controlling fishery effort is most readily achieved by controlling business numbers, endorsement numbers and fishing capacity, at a regional level.

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 the industry 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.

The use of shares and minimum shareholdings at the business level will link fishing business capacity to fishing effort in a given region. This would likely lead to aggregation of business numbers, in a way similar to the aggregation of fishing businesses seen in the years subsequent to the introduction of Registered Fishing Operations (RFOs). Fishers entering the fishery will be required to purchase RFOs and it is likely that those fishers with fishing operations (FOs) will sell in response to the minimum shareholding provision being introduced.

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 pathway to adjustment will depend on the envisaged rates of minimum shareholding, the perceived value of the shares and the amount of latent effort which is activated by the new right to sell.

The current regime enables fishers to move between zones leading to conflict between fishers and less incentive to manage their primary zone. Lack of alignment between fishers and the potential to manage their local resource can be overcome through zoning to get more co-ordination between commercial fishers and responsible fishing in their primary zone. This move to regional management of effort and fishers will enable communities to be constructively involved in local fishery management and more responsible fishing.

The adoption of further gear controls, fish size limits and moves towards determining optimal harvesting regimes for finfish and prawns, have more potential economic benefits than under current resource allocation rules.

(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 business operations through adjustment of active effort by category 2 share management. The strategy uses the zoning in the EG fishery, while realising that ultimately the total effort in the industry requires adjustment at the fishery business level. This suite of measures holds with the objectives of ESD, potentially improving the fishery for future generations (intergenerational equity) by making adjustments now, so as the future can be improved.

The move to share management also is an improvement of the valuation of the resource in the management measures and moves towards 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.

This also includes a more 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 is consistent with ESD in that the link between fishers and the resource is more defined potentially leading to improved stewardship among fishers. The current regime enables fishers to move between zones leading to conflict between fishers and giving less incentive to fishers to practice responsible fishing in their primary zone, than under the FMS. This move to regional management of effort and fishers will enable communities to be constructively involved in local fishery management and in more 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 pathway to adjustment will depend on

the envisaged rates of minimum shareholding, the perceived value of the shares and the amount of latent effort. 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 costs. In this element 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 developed and appraised with the principles of ESD in mind. The achievement of the goals can be monitored 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 logbooks joined with NSW Fisheries licensing data. Both districts and zones are used for spatial analysis and as districts are less aggregated, there may be occasions that fishery activity in an estuary traverses two or more zones. Effort data at the days fished level is complicated by the logbook system where fishing three methods in one day is recorded as one day of effort against each of three methods. This limits the potential for accurate production modelling or bio-economic analysis.

A significant issue for fishers is the use of the Sydney index for price imputation on declared catches. There are several cautionary notes in doing this. Some species such as squid may not have a representative monthly average price. The imputed price will likely be a minimum estimate of the price of species which are in demand.

For example, seafood such as larger fish and prawns, are unlikely to be sent to Sydney market as local demand is strong at higher prices, without commission and freight (pers. comm., EG MAC). In many cases, fishers in areas outside Sydney receive prices closer to Sydney retail

levels for valuable species. Similarly fish which can achieve better prices through sashimi grade handling and other techniques, may better the Sydney index. Prices for female mullet in roe in the north of the state, may be several times the Sydney price on occasions.

In contrast, the estimate of price at first sale does not deduct between 11%-23% of gross revenue for market, handling and freight expenses (source: RM-ES). A fisher adjacent to Sydney, landing to the fish market and receiving average price, would actually receive the Sydney index less 7%-9% 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 EG businesses by between 12% and 21% (Source: RM-ES).

There are also uncertainties in the value of EG businesses and 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 should extend to retailing also.

Economic multipliers could be estimated and contribute to future assessments. The regional importance of the seafood industry in each zone could be evaluated. The Registered Fish Receiver annual renewal forms could include more information on processing activity in relation to the fisheries under management.

Several of the assessment issues involving fishing gear selection require fish length and price relationships for micro evaluation of gear changes - costs and benefits. This requires investigation of the finer scale data potentially available.

Price information outside Sydney needs to be collected on a regional and fishery basis. This is required as several of the future assessment issues such as the optimal harvesting time of prawns will require bio-value models using biological and size and price information for different prawn species during their estuary to sea 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 this 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.

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:

a) 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 issues, such as maximising prawn or finfish bio-value through alteration of harvesting regimes.

b) 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.

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

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

e) 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.

f) 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.

g) Development of an environmental accounting approach to fishery management costs and benefits should be undertaken in the next 3-5 years.

Appendix 1a: 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 a natural 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 very large amount of latent effort and a substantial reason for it to be activated, enough effort could shift into fishery D to cause significant effects on stock. 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, such as fish price increases, 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 efficient 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 1b: Latent effort and the EG fishery

There is a large latent effort associated with the Estuary General fishery. 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. The removal of latent effort is not an explicit strategy and would have serious ramifications for industry.

The activation and removal of latent effort (Source: NSWF).

We assume each 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 under each scenario in Appendix Table G1. Scenario A envisages the removal of latent shareholdings over 5 years. Scenario B, the removal of latent shareholdings and those shares held by fishers fishing else where in 5 years. There are 380 fishers associated with latent endorsements and 90 fishing in other fisheries.

The Index indicates how the fisher's shareholding would increase relative to the base period shareholding under each scenario. Scenario A would require a 61% increase in share holdings and scenario B an 88% increase in shareholdings over five years. It is assumed that effort has to stay within historical levels (response 2.2b) and that the latent effort is not activated by new entrants (Obj. 2.3).

This shows the need to prevent latent effort activation under the strategy. Failure to control latent effort activation would impact on the adjustment of active effort under shareholding strategies under responses 2.2b and 2.3b.

Appendix Table GA1: Two scenarios estimating the reduction of latent effort in the next 5 years through shares being transferred to remaining fishers (see text for explanation).

Scenario A	Latent effort reduced to zero in five years					
	2002	2003	2004	2005	2006	2007
EG shares	100,300	100,300	100,300	100,300	100,300	100,300
made up of						
Latent	38,000	30,400	22,800	15,200	7,600	-
Fished other	9,000	10,098	11,196	12,294	13,392	14,490
Mixed fishing	17,300	19,410	21,521	23,631	25,742	27,852
EG only	36,000	40,392	44,783	49,175	53,567	57,958
Index	1	1.12	1.24	1.37	1.49	1.61

Scenario B	Latent effort and fished other reduced to zero in 5 years					
	2002	2003	2004	2005	2006	2007
EG shares	100,300	100,300	100,300	100,300	100,300	100,300
made up of						
Latent	38,000	30,400	22,800	15,200	7,600	-
Fished other	9,000	7,200	5,400	3,600	1,800	-
Mixed fishing	17,300	20,351	23,402	26,453	29,504	32,555
EG only	36,000	42,349	48,698	55,047	61,396	67,745
Index	1	1.18	1.35	1.53	1.71	1.88

The removal of latent effort is estimated as costing each remaining shareholder 61% or 88% of the value of 100 shares, approximately 61% to 88% of the value of an EG business. During this process 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. Fishing effort would tend to increase to enable remaining fishers to fund the additional share purchases in order to remain in the fishery.

In summary, Appendix Table G1 gives the dimensions of latent effort. Activation of latent will encroach on the potential of the fisheries management strategy to address active effort levels through strategies 2.2b and 2.3b.

Appendix 2: The NSW fishery economic survey and the EG fishery

This appendix summarises the methods and results of an economic survey of operators in the EG fishery. A state-wide economic survey was distributed by Roy Morgan Research Ltd (Roy Morgan, 2001a) and analysed for the EG 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 EG 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.

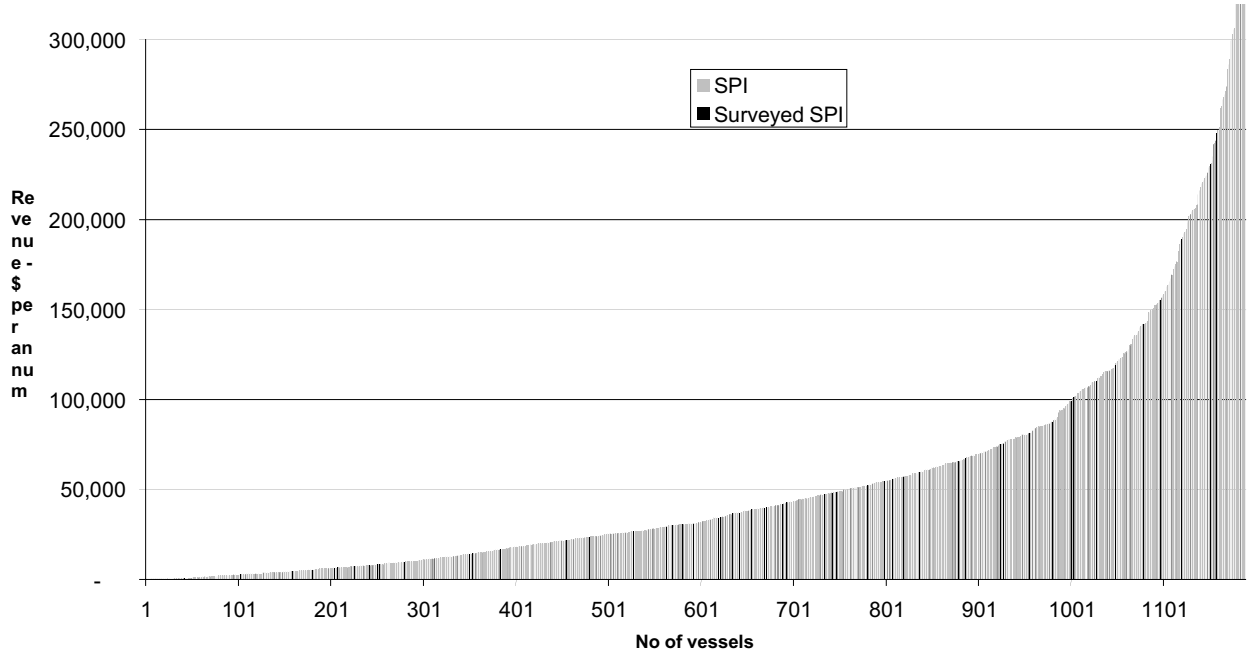
Fishing operator survey

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 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 estuary general 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. In the EG fishery 147 of 674 active fishers responded (21.8%). The representativeness of the state-wide survey response is reported is in Figure GA1 below. The sample of fishing businesses with EG

fishing had a higher response rate and is proposed as being reasonably representative of operators in the EG 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 EG fishery. This then leaves "latent effort" which is primarily an administrative construct (see Appendix 1), 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. 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 EG 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 apparent capital value.

Estuary General profitability results

(Note: this material is in draft form and is supplied under the normal caveat in respect of information supplied by fishers).

There were a total of 170 economic surveys from EG endorsement holders. Of this a significant number had not earned revenue in the period and several were duplicate surveys. The surveys were divided into three groups for analysis: EG fishing only; EG plus other fisheries where gross revenue was > than $60,000 per year; and EG plus other fisheries where gross revenue was < than $60,000 per year.

This division was made on the basis of recognising the diversity in business structures, gross earnings and not wishing to put high and low revenue businesses within one category.

The sample of businesses and range of gross revenues are reported in Appendix Table GA2.

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

Vessel category	Observations	Mean Revenue	Minimum Revenue	Maximum Revenue
EG Only	57	$ 42,098	$ 15,000	$ 165,000
EG and other (>$60,000 pa)	44	$ 116,779	$ 60,000	$ 297,000
EG and other (<$60,000 pa)	45	$ 36,692	$ 15,000	$ 60,000
Mean business	146	$ 65,350	$ 15,000	$ 297,000

The variety in business categories and activity levels among fishers are evident. These are now explored further through accounting and economic measures.

Accounting measures

The survey results are reported in Appendix Table GA3.

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

$	EG Only	EG Other >60K	EG Other <60K	Average Vessel	EG Only	EG Other >60K	EG Other <60K	Average Vessel
Gross revenue	42,098	116,779	36,692	60,581	100%	100%	100%	100%
Direct costs*	16,559	42,630	14,943	24,759	39%	37%	41%	41%
Indirect costs**	10,328	24,705	14,269	16,317	25%	21%	39%	27%
Total costs	26,887	67,336	29,212	41,076	64%	58%	80%	68%
Gross operating profit	**15,211**	**49,444**	**7,480**	**24,274**	**36%**	**42%**	**20%**	**40%**
these costs include:								
* wages	1,889	11,488	1,299	4,910				
** Interest	744	1,857	2,660	1,695				

The results report that direct operating expenses, such as bait, fuel, boat repairs, fishing gear repairs, freight costs and wages to employees, are 37%-41% of revenue in the three activity groups, the 37% being attributable to high revenue EG plus other fisheries group. Indirect costs, such as boat and vehicle registrations, insurances, fishery management charges, rates, bank and business administration expenses, were 25%, 21% and 39% of revenue, making total operational costs 64%, 58% and 80% of total revenue. The wages recorded for were for employees as opposed to payments to owner operators, and were between 3% and 10% revenue, meaning the survey data for wages did not record payments by the business to the owner as wages. About two-thirds of EG fishers sampled had no interest payments to meet and less than 20% had annual interest payments of more than $2,660 per annum.

Operating profit is apparently 36%, 42% and 20% of revenue respectively. 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 require an economic approach.

Economic survey 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 57 EG only vessels had positive returns, in excess of all economic costs;

3 of the 45 EG plus other fisheries < $60,000;

20 of the 45 EG plus other fisheries > $60,000 pa fishers had positive economic returns

In total this indicates that 30 from 147 (20%) of 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. In the survey period 30 vessels from 147 would be earning returns in excess of opportunity costs and represent businesses in economic surplus.

Discussion of economic viability and the EG fishery

The viability of fishing businesses in the EG 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 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 surplus available varies between the three types of operation examined and is potentially highest for the EG plus other fisheries grossing > $60,000.

The economic profit enables long term viability to be appraised with 20% of businesses having economic profit and are thus viable in the long run covering economic depreciation setting aside enough now to renew capital at a future date. This infers that 80% 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.

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

$	EG Only	EG Other >60K	EG Other <60K	Average Vessel
Gross revenue	**42,098**	**116,779**	**36,692**	**65,350**
less costs				
Cooperative expenses	3,700	2,606	1,660	2,715
Bait	327	1,789	907	990
Boat fuel	2,629	9,428	3,452	5,145
Fishing gear	2,506	5,063	2,925	3,486
Vehicle fuel	1,887	4,005	2,005	2,629
Freight	569	1,583	234	805
Other costs	1,704	363	760	970
Imputed Labour	37,622	42,561	39,824	39,937
Total Direct costs	**50,944**	**67,397**	**51,767**	**56,678**
Boat registration/fees	286	1,599	736	861
Vehicle registration	678	1,595	728	995
Insurance	714	1,843	687	1,082
Fishery Man. Charges	204	1,094	585	617
Com Fish Licence	782	1,426	845	1,016
Accounts	544	1,273	717	839
Phone	552	1,850	490	966
Power	403	945	443	596
Rates	1,699	1,177	901	1,283
Bank expenses	209	760	146	374
Economic depreciation	1,292	2,550	1,186	1,679
Repairs	1,348	6,054	1,700	3,024
Repairs vehicle	1,052	2,152	1,077	1,426
Travel	108	763	128	334
Other costs	54	1,398	2,251	1,169
Opp. Cost of Capital	3,215	8,870	4,034	5,349
Total Indirect costs	**13,140**	**35,349**	**16,655**	**21,608**
Total Economic costs	**64,084**	**102,746**	**68,423**	**78,286**
Economic gross profit	**- 21,986**	**14,033**	**- 31,731**	**- 12,936**
Capital asset value	45,925	126,720	57,634	76,413
Ec. Rate of Ret.to Capital	**-48%**	**11%**	**-55%**	**-17%**

It is likely that fishers forgo payment for all the time involved with the fishing business. The high labour commitment to fishing in the EG is reported in Appendix Table GA4 where the average EG fisher spends 48% 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 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 EG (RM-ES).

Days	EG Only	EG + Other >60K	EG + Other <60K	Total
Fisher days (unpaid)	98	121	107	108
Fishing days (paid)	213	241	213	222
Fisher unpaid days as % of paid	**46%**	**50%**	**50%**	**48%**
Family/other unpaid	25	51	40	38

For example if the fisher's partner or family member works for less than the imputed pay rate, and the operators earns a satisfactory return, then the imputed wage calculation is possibly unreasonable (Stanton, 1972; ABARE, 2000). Fishers may take less wages than the imputed

rate to keep the business operational. 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 the fishing improves. This substitution between fishing and other industries may be 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 EG fishery maybe identify with the following: “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).

Conclusions

For larger businesses fishing EG and other fisheries the economic rate of return to capital is approximately 11%. It should be noted that 51% of the activity of these vessels was in the EG fishery and the results here are for business activity as opposed to in the EG fishery alone. For all fishing businesses sampled with EG endorsements, an economic return to capital is approximately -17% (negative).

The long term viability of the lowest half of EG fishing businesses is questionable, but has to be interpreted within the context of small scale 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 return is –30% 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. This will be investigated in the EG assessment.

Appendix 3: 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 EG 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). After adjustment they indicate that "the ratio of all direct and indirect effects to the fishing direct effect" is 2.404 (Tamblyn and Powell, 1998; p 47).

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 Estuary General FMS is given in the introduction to the Economic Issues Chapter (G).

The DUAP guidelines for social issues will be followed below requiring 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. Two approaches were taken to this. The first was to use Australian Bureau of Statistics (ABS) data, 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 Estuary General 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);

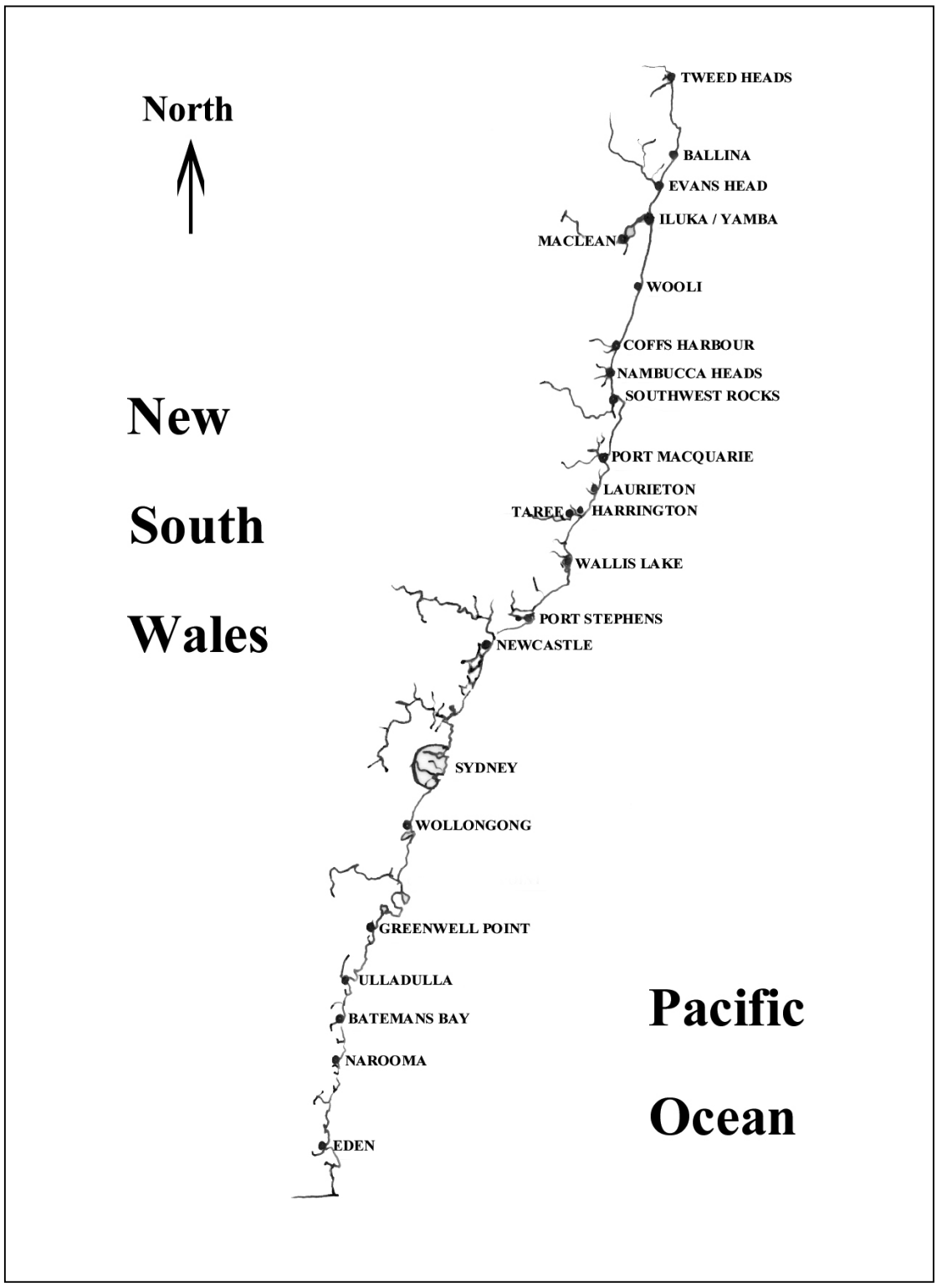
The Estuary General fishers are a diverse fishery group. The distribution of EG fishers North to South along the NSW coast is reported in Table G4 of the economic section. The profile of fisher communities in coastal NSW for all commercial fishers is reported in Appendix 1. The information on EG fishers and their communities has been extracted and are summarised in Table H1, which reports social indices at the zone and district level from ABS and licensing data. This can be used in appraising management impacts. Figure 1 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 EG fishers in zones and districts of NSW (Source: ABS/BRS and NSWF licence data).

Zone	Home District	P'code Population	P'code Fishers	EG P'code Fishers	Unemployed (%)	SEIFA	Med. Ind. Income (wk)	Employed in C.F. as (%) of labour force	Employed in EG as (%) of labour force
1	TWEED	41,938	63	26	17	922	250	0.37	0.15
	RICHMOND	28,558	87	31	17	930	227	0.85	0.30
	Zone	**70,496**	**150**	**57**	**17**	**926**	**238**	**0.61**	**0.23**
2	CLARENCE	**43,353**	**259**	**139**	**19**	**919**	**222**	**3.12**	**1.68**
3	COFFS HARBOUR	55,625	110	30	19	940	215	0.67	0.18
	HASTINGS	61,291	90	45	18	936	227	0.68	0.34
	Zone	**116,916**	**200**	**75**	**18**	**938**	**220**	**0.68**	**0.25**
4	MANNING	37,878	80	48	18	914	203	0.67	0.40
	WALLIS LAKE	22,704	105	76	15	939	250	2.78	2.01
	PORT STEPHENS	52,562	101	43	13	967	250	1.33	0.57
	HUNTER	52,557	55	26	14	933	233	0.18	0.09
	CENTRAL COAST	206,143	102	76	11	977	267	-	-
	Zone	**371,844**	**443**	**269**	**13**	**951**	**244**	**0.68**	**0.41**
5	HAWKESBURY	2,380	30	12	7	1,004	300	-	-
	SYDNEY	3,276,207	189	72	7	1,047	350	-	-
	Zone	**3,278,587**	**219**	**84**	**7**	**1019**	**317**	-	**-**
6	ILLAWARRA	65,532	50	25	15	935	215	0.13	0.07
	SHOALHAVEN	53,871	75	46	15	945	215	0.81	0.50
	Zone	**119,403**	**125**	**71**	**15**	**938**	**215**	**0.36**	**0.20**
7	BATEMANS BAY	34,836	105	38	17	958	227	1.18	0.43
	MONTAGUE	8,135	53	13	16	955	180	1.54	0.38
	FAR SOUTH COAST	3,726	61	6	12	916	250	2.56	0.25
	Zone	**46,697**	**219**	**57**	**16**	**949**	**222**	**1.53**	**0.40**
Grand Total		**4,047,296**	**1,615**	**752**	**15**	**945**	**236**	**0.92**	**0.43**

Key: Postcode population as of 1996; postcode fishers-for all NSW and EG 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 EG) as percentage of labour force; see Appendix 1 for a fuller explanation of variables.

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



EG fishers inhabit some small towns and in terms of home ports, the social survey identifying there were 440 fishers, using 54 home estuaries or ports with other fishers, and 63 using home estuaries or ports by themselves. Table H2 enables EG fishers as part of fishing communities in NSW[1] to be identified by postcode area as available in ABS data. Maps of ABS survey data are reported in Appendix 4. This is an approximation to towns and fisher communities. The definition of fisher communities is an area for further work.

In Table H1, EG fishers are approximately 46% 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 EG fishers as a percentage of local working population. These are ABS data from the 1996 census. Fishers in the Clarence and Wallis Lakes area have the highest percentage of EG 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 within districts and illustrates the diversity in community structures and in the home locations of EG fishers. EG fishers form a substantial part of the NSW fishing community ranging from 4%-100% of local fisher numbers. A significant number of postcode areas with EG fishers fall below 900 on the SEIFA index of disadvantage and may well be more adversely impacted by changes under the FMS (For example: Tweedheads, 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 postcode have a high percentage of EG fishers in the work force (for example, Maclean, Yamba, Iluka, Empire Bay, Mannering Park and Berkeley Vale, and Moruya). Conversely some postcodes have relatively few EG fishers as a percentage of

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

the work force (for example, Evans Head, Coffs Harbour, Nelson Bay, Swansea, Mayfield, Kiama), though this should be interpreted with caution, given the weakness of this method in areas of high population.

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

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

Zone	Home District	P. code	Town/Suburb	P'code Pop'n	P'code Fishers all NSW	P'code Fishers (EG)	EG fishers as % of all NSW	Unemployed (%)	SEIFA	Med. Ind. Income (wk)	Employed in C.F. (%) of labour force	Employed in E.G. (%) of labour force
1	TWEED	2485	TWEED HEADS	8,978	22	5	23%	20.0	893	200-299	1.02	0.23
1	TWEED	2486	TWEED HEADS/BANORA POINT	24,984	22	8	36%	14.4	953	200-299	1.02	0.37
1	TWEED	2487	CHINDERAH/OTHERS	7,976	19	13	68%	16.2	921	200-299	0.52	0.36
1	RICHMOND	2472	BROADWATER/CORAKI	1,761	10	4	40%	19.5	919	200-299	0.3	0.12
1	RICHMOND	2473	EVANS HEAD	2,613	25	5	20%	16.8	900	160-199	0.41	0.08
1	RICHMOND	2478	BALLINA/OTHERS	24,184	52	22	42%	13.7	972	200-299	0.41	0.17
2	CLARENCE	2460	LAWRENCE/OTHERS	29,145	24	17	71%	14.8	951	200-299	1.212	0.86
2	CLARENCE	2463	MACLEAN/OTHERS	6,072	96	64	67%	16.2	946	200-299	4.46	2.97
2	CLARENCE	2464	YAMBA/OTHERS	5,340	64	28	44%	17.1	954	200-299	4.46	1.95
2	CLARENCE	2466	ILUKA	1,863	65	23	35%	18.6	891	160-199	4.46	1.58
2	CLARENCE	2469	WOOMBAH/OTHERS	933	10	7	70%	27.2	854	160-199	1.02	0.71
3	COFFS HARBOUR	2448	NAMBUCCA/OTHERS	8,690	18	16	89%	19.1	927	160-199	0.8	0.71
3	COFFS HARBOUR	2450	COFFS HARBOUR	32,488	52	10	19%	15.8	971	200-299	0.24	0.05
3	COFFS HARBOUR	2456	WOOLGOOLGA/URUNGA	11,848	20	2	10%	20.5	944	200-299	0.46	0.05
3	COFFS HARBOUR	2462	WOOLI/OTHERS	2,599	20	2	10%	20.0	917	160-199	1.19	0.12
3	HASTINGS	2431	SOUTH WEST ROCKS	3,965	33	11	33%	18.6	926	160-199	0.78	0.26
3	HASTINGS	2440	CRESCENT HEADS/OTHERS	23,164	20	13	65%	19.3	916	200-299	0.78	0.51
3	HASTINGS	2444	PORT MACQUARIE	34,162	37	21	57%	15.2	966	200-299	0.48	0.27
4	MANNING	2427	HARRINGTON/COOPERNOOK	1,473	24	5	21%	18.0	883	160-199	0	0.00
4	MANNING	2430	TAREE/OTHERS	28,312	35	20	57%	14.0	950	200-299	0	0.00
4	MANNING	2443	LAURIETON/OTHERS	8,093	21	23	110%	20.6	909	160-199	0	0.00
4	WALLIS LAKE	2423	BUNGWAHL/OTHERS	3,247	17	13	76%	14.5	939	200-299	0	0.00
4	WALLIS LAKE	2428	FORSTER/TUNCURRY/OTHERS	19,457	88	63	72%	15.1	939	200-299	0	0.00
4	PORT STEPHENS	2301	NELSON/SALAMANDER BAYS/OTH	25,046	27	1	4%	11.1	997	200-299	0	0.00
4	PORT STEPHENS	2315	NELSON BAY/OTHERS	8,393	54	18	33%	14.3	966	200-299	0.05	0.02
4	PORT STEPHENS	2324	TEA GARDENS/OTHERS	19,123	20	24	120%	13.6	937	200-299	0.05	0.06
4	HUNTER	2280	BELMONT/OTHERS	22,225	10	7	70%	10.5	989	200-299	0.555	0.39
4	HUNTER	2281	SWANSEA/OTHERS	11,349	15	8	53%	14.3	935	160-199	0.07	0.04
4	HUNTER	2295	STOCKTON/OTHERS	5,058	12	10	83%	12.8	918	200-299	0.71	0.59
4	HUNTER	2304	MAYFIELD/WARABROOK	13,925	18	1	6%	17.6	890	200-299	0.71	0.04
4	CENTRAL COAST	2250	ERINA/OTHERS	57,810	10	6	60%	7.7	1025	300-399	0.595	0.36
4	CENTRAL COAST	2251	AVOCA BEACH/OTHERS	29,370	11	8	73%	8.5	1032	200-299	1.04	0.76
4	CENTRAL COAST	2256	WOY WOY/OTHERS	14,168	12	10	83%	11.1	941	200-299	1.04	0.87
4	CENTRAL COAST	2257	EMPIRE BAY/OTHERS	25,326	10	6	60%	11.6	957	200-299	1.91	1.15
4	CENTRAL COAST	2259	MANNERING PARK/TACOMA/OTH	46,846	40	37	93%	10.6	972	200-299	2.78	2.57
4	CENTRAL COAST	2261	BERKELEY VALE/OTHERS	32,623	19	9	47%	14.1	935	200-299	2.78	1.32
5	HAWKESBURY	2083	MOONEY MOONEY	1,450	12	7	58%	5.7	1042	300-399	0	0.00
5	HAWKESBURY	2775	SPENCER	930	18	5	28%	9.2	967	200-299	0	0.00
5	SYDNEY		SYDNEY NORTH & SOUTH	3,276,207	189	72	38%	7.3	1047	300-399	1.54	0.59
6	ILLAWARRA	2500	WOLLONGONG	32,326	10	1	10%	12.6	998	200-299	0	0.00
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	13	72%	19.0	827	160-199	0.1	0.07
6	ILLAWARRA	2533	KIAMA	13,553	12	2	17%	7.6	1067	200-299	0.1	0.02
6	SHOALHAVEN	2540	GREENWELL POINT/OTHERS	24,208	59	33	56%	18.2	933	160-199	0.23	0.13
6	SHOALHAVEN	2541	NOWRA/OTHERS	29,663	16	13	81%	12.0	957	200-299	0.81	0.66
7	BATEMANS BAY	2536	BATEMANS BAY/OTHERS	14,335	32	15	47%	15.5	970	200-299	0.81	0.38
7	BATEMANS BAY	2537	MORUYA/OTHERS	9,002	10	9	90%	18.2	960	200-299	1.175	1.06
7	BATEMANS BAY	2539	ULLADULLA/OTHERS	11,499	63	14	22%	17.4	942	160-199	1.54	0.34
7	MONTAGUE	2546	NAROOMA/OTHERS	8,135	53	13	25%	15.9	955	160-199	0.81	0.20
7	FAR SOUTH COAST	2551	EDEN	3,726	61	6	10%	12.1	916	200-299	2.56	0.25
			Total		**1615**	**752**						

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

Table H3: The demographics of fishers in Estuary General (Source: RM –SS and NSWF licence data).

Statewide profile		All NSW	EG
Mean age of fisher (years)*		54.4	51.5
Age range		16-88	16-88
Percent males		99.2%	99.0%
Mean years resident in town		24.2	26.2
Mean years in Fishing Ind.		20.8	21.6
Generations in Fishing Ind.		1.9	2.1
Median Hours /week in fishing industry		54.1	53.1
Percent currently employed in other industries		19.1%	20.0%
Housing Tenure			
Own		49.9%	46.5%
Paying off		32.8%	34.6%
Renting		15.8%	17.3%
Other		1.4%	1.6%
Education			
Did not finish PS		2.0%	2.2%
Did finish PS		3.6%	3.2%
Year 7		4.1%	4.6%
Year 8		9.6%	10.9%
Year 9		17.4%	19.5%
Year 10		32.1%	33.0%
Year 11		3.8%	3.2%
Year 12		11.4%	10.1%
Trade cert.		10.1%	8.2%
Ind/ business		1.7%	1.6%
Uni		3.3%	2.4%
Other		0.9%	1.0%
Marital Status			
Married or relationship		81%	80%
Single		11%	11%
Other (Divorced, separated, widowed)		8%	9%
Partner employed in Fishing Business		40%	34%
Mean number of Children <16 years		1.2	1.1
(Other) Dependants			
None		63%	63%
Spouse		23%	24%
Children - over 16 and other		14%	13%
Employed Status			
Owner operator		88%	94%
Non fishing owner/other		4%	2%
Nominated fisher/skipper		8%	5%
Employees (%)	**0**	65%	79%
	1 or more	35%	21%
Mean Individual net taxable income (all industries)		$ 39,634	$ 36,412
Mean Household net taxable income		$ 42,483	$ 39,528
< 6,000		3%	2%
6,000-9,999		2%	2%
10,000-19,999		7%	6%
20,000-29,999		20%	24%
30,000-39,999		20%	22%
40,000-49,999		11%	10%
50,000-59,999		8%	7%
60,000-69,999		8%	9%
70,000-79,999		5%	5%
80,000-89,999		5%	5%
90,000-99,999		1%	0%
100,000+		11%	8%

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 survey age of EG fishers is 51.5, this sample estimate exceeding data from licence records which indicates 47.1 years. Participation of females in direct fishing is low (<1%), though 34% of fishers' partners are employed in EG fishing businesses. Approximately 94% of EG fishers are owner operators, average over 21 years of fishing experience, work a median of 53.1 hours per week, and 20% of fishers work in other industries. Fishers have high levels of residency, averaging 26 years and home ownership, with 81% owning or paying off a home.

The 502 EG fishers interviewed had low rates of formal education, with 70% achieving year 10 education or below. Only 10% 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 income from all industries is 92.1% of household income which averaged $39,528 after tax indicating the overall contribution of fishers to household income.

In examining dependants, it was found that 57% of fishers had no dependent children below 16 yrs of age as reported in Box H1.

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

No. of dep. Children	Freq.	Total dep. Children	%
0	287	-	[57% of 502]
1	70	70	16%
2	85	170	39%
3	41	123	28%
4+	16	69	16%
Total	**212**	**432**	**100%**

The balance of 212 fishers, had 432 dependent children under 16 representing families with an average of 1.1 per fisher (Table H3), or 2.05 children per fisher with dependent children. About 63% of fishers had no other financial dependants, 25% had dependent spouses (123 persons) and 13% had dependent grandparents, parents and children over 16 yrs (see Table H3).

Of 502 EG endorsement holders contacted, 449 had been fishing in EG 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. The reasons for not fishing in the past 12 months are reported in Box H2.

Box H2: Reasons for not fishing in the EG, or any other fishery in the last 12 months (Source: NSWF- SS).

Reason	Freq.	Reason	Freq.	
Sick/ in hospital	3	Not interested	1	
Changed occupation	2	Death in family	1	
Too old	1	Other	8	n=16

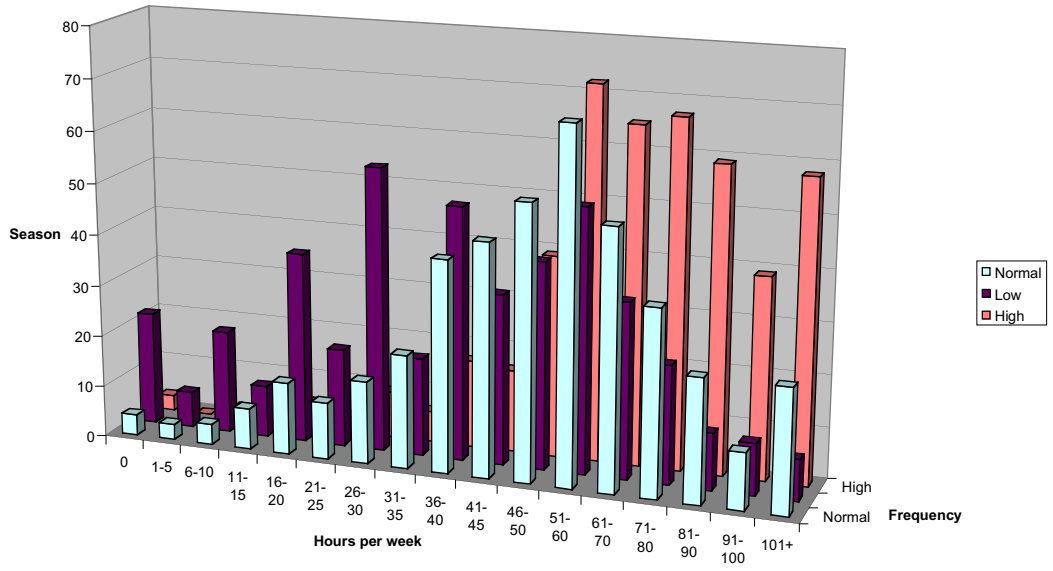
(b) Outline the community values associated with commercial fishing, in particular :

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

Industry working practices

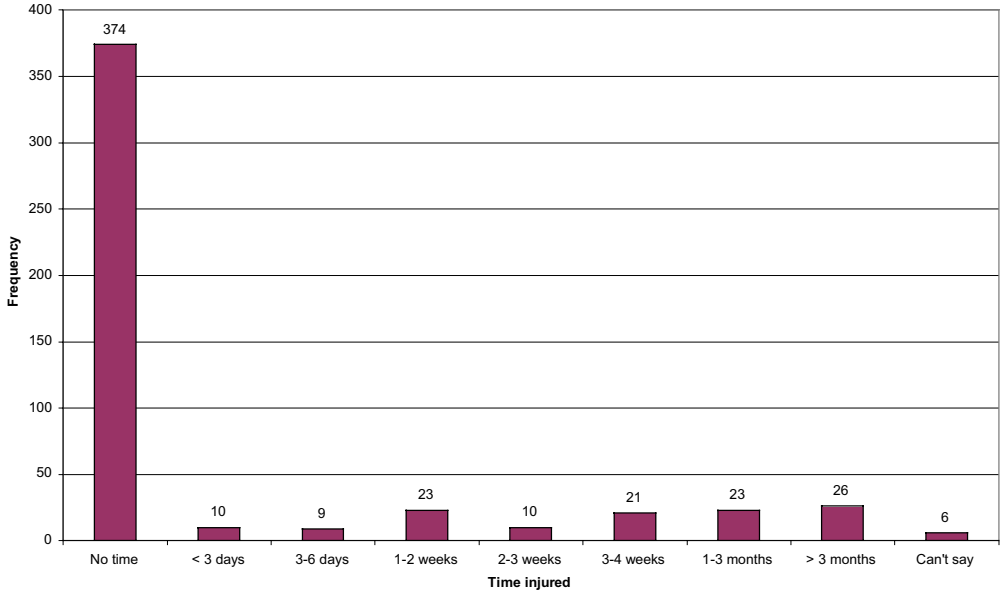
The social survey asked questions to provide information on the fishers way of life. The fishing life style takes more hours than the conventional 40 hour week, fishers being asked to estimate their average working week in normal, low and high seasons. The estimates from the telephone interview are reported in Figure H2. Normal working hours are estimated at 53.1 per week. This is significantly in excess of the 42 hours per week estimated by ABS for fishers nationally (ABS, 1996). High season estimates exceed 70 hours / week while low season hours are typically 26-30 hours /wk.

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



Fishing is a diverse activity, but can also lead to industrial injury. Box H2 indicates that 3% of the 502 fishers were inactive from the fishing industry in 1999-00 for a variety of reasons. Injuries from fishing also impacted fishing time as reported in Figure H3. The graph indicates that 75% of fishers had no fishing injuries in the previous 12 months, but that 16% of fishers were out of fishing for 2 weeks or more in the year 1999-00 through industrial injury (86 fishers in the sample of 502). This indicates the level of industry related injuries in the EG fishing industry.

Figure H3: Frequency of non-working time from industrial injury in commercial fishing in the EG fishery in the last 12 months (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).

Some part of regional fisher behaviour is captured in the travelling behaviour of EG fishers. About 42 from 502 fishers in Table H4 show significant travelling behaviour of over 50km per day (or 2-3 hours by boat) in their fishing operation.

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

	Frequency	**%**		
<25 km, 1hr by boat	334	69%		
25-50 km, 1-2hr by boat	96	20%		
50-100 km, 2-3hr by boat	23	5%		
>100 km, > 3hr by boat	19	4%		
Can't say	14	3%	n=	486

Other measures of time of residence are reported in Table H4b. This shows 65% of fishers remaining in the same postcode for the last 20 or more years and indicates that a substantial part of the community are long term residents with greater attachment to place and to local communities. There are likely to be strong social networks and ties, and higher levels of social capital within the EG fishing community.

Table H4b: Residency at current postcode (Source: RM-SS).

Years	Freq.	%	Years	Freq.	%
<1	10	2%	21-25	49	10%
1-5	37	7%	26-30	58	12%
6-10	43	9%	Over 30 yrs	217	43%
11-15	47	9%	Can't say	1	1%
16-20	40	8%	n=	502	100%

Table H4b reports 82% of fishers have been living in the same postcode area for 10 years or more. Less than 10% have moved their postcode in the last 5 years. Apart from some operational travelling behaviour, the EG fisher population is reasonably sessile and has a significant number of fishers who have been resident in a local area for a long time, implying significant community ties and social capital in the EG fishing community.

(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

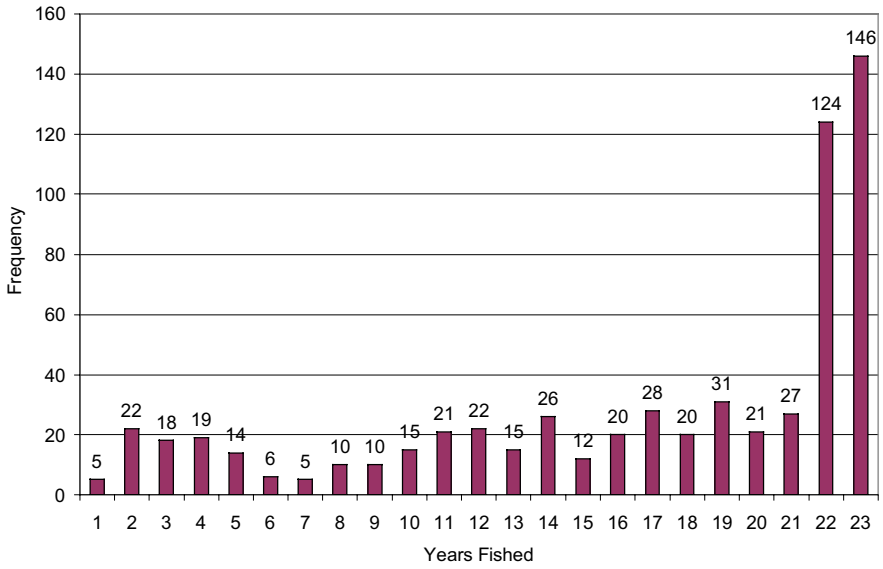
There is no one accepted measure of social capital (NSW government, 1997b). Fishers are often a significant part of the social infrastructure in small coastal communities. For example, an illustration of the potential contribution of fishers to local social capital is reported in Table H5 from McVerry (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 (After 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

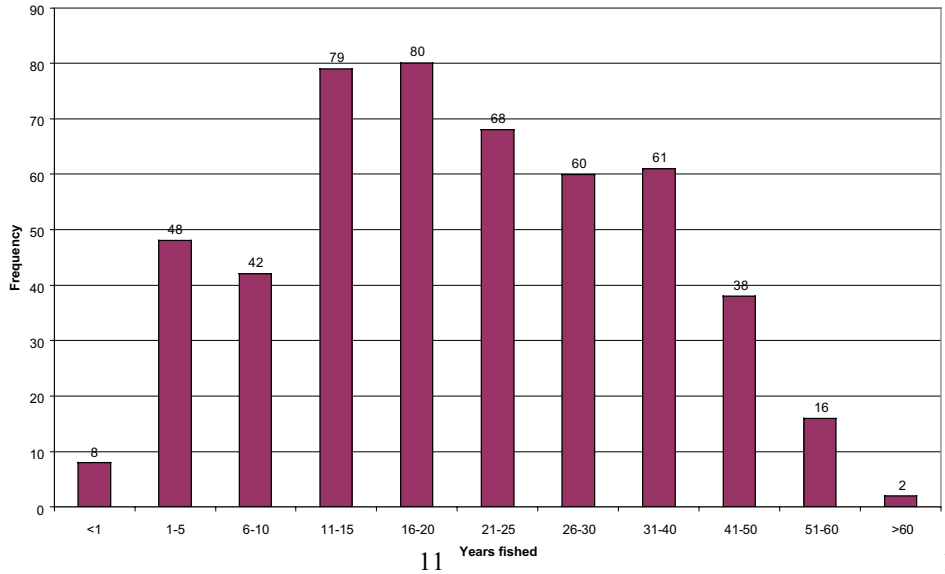
A measure which indicates a sense of fishing industry involvement, community and an element of social capital, is the years of fisher involvement with the industry. Licence record information goes back to 1977 for the EG fishers, have been summarised in Figure H4 and shows that 20% of fishers interviewed were fishing prior to 1977 when current electronic licence records began.

Figure H4: Number of years EG fishers have been licenced in NSW (NSWF licence data).



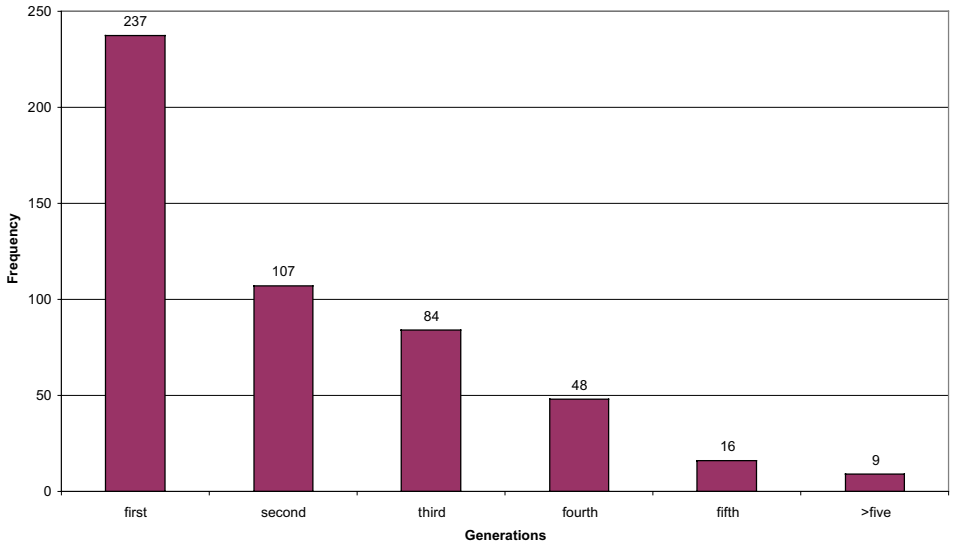
The mean licence duration is 16.8 years with a standard deviation of 6.7 years representing 12,600 person years fishing experience among 750 fishers. Of the 637 for whom records are available, 50% have over 20 years of experience. Figure H5 reports how many years fishers had been in the NSW fishing industry as recorded in the social survey (sample = 502 EG fishers).

Figure H5: Frequency plot of years fished by EG fishers in NSW fishing industry (Source: NSWF, 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 EG Fishery (Source: Roy Morgan - SS).

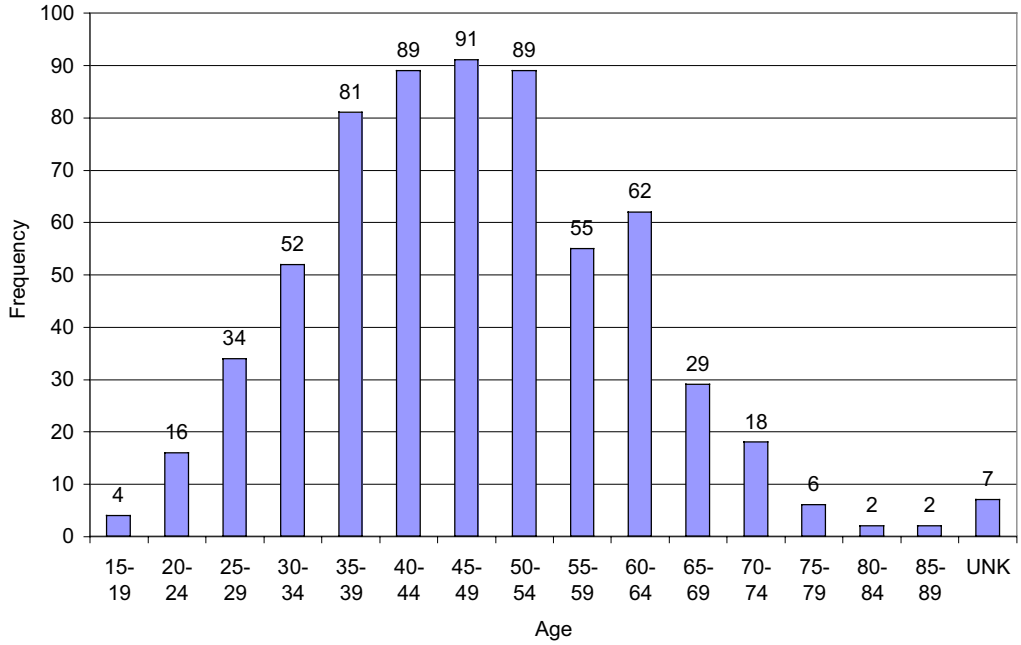


There are 47% of fishers who are first generation fishers, 21% who are second generation and that 32% of EG fishers were 3rd or more generation. The 47% of first generation fishers, reflect entrants who may be more capable of adjustment, than multi-generational fishing family members. There are 53% of fishers with a 2 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 licenced EG fishers

The ages obtained from licence records of fishers operating in the 1999-2000 period are reported in Figure H7. For 630 records the mean age is 47.1yrs, with a standard deviation of 12.7 years. Of these, 19% 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 EG fishers (Source: NSWF licence records).



Skill base 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 100 EG fishers (from 502 interviewed) who were undertaking paid work outside the industry:

- 32% would consider earning all their income from that other industry,
- 58% would not and
- 10% were undecided.

All 502 EG fishers were asked about their capacity to consider alternative employment:

- 14% (70) could get full-time employment outside fishing
- 12% (60) could get part-time employment outside fishing and
- 71% (354) could not get employed outside fishing – fishing is "all I know".
- 3% (18) Don't know/ can't say.

The 354 fishers from 502 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 21% (73) would consider retraining and 73% (258) would not. The 281 fishers who would not consider training were asked about their reasons and this information is given in Table H6. Participants generally gave more than one response.

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.

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

	EG	%
Fishing is only industry I know	103	23%
I'm too old	138	30%
I enjoy fishing	92	20%
I've invested in equipment	34	7%
It's a family business	33	7%
Bad health/injuries	14	3%
Risk of unemployment	9	2%
Illiterate/Low education	8	2%
Language barrier	2	0%
Other	22	5%
Can't say	2	0%
Total answers	457	100%
n=	281	

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 fisher would consider retraining into (Source: RM-SS).

	EG	%
Building	5	6%
Landscaping	1	1%
Electrical/Plumbing	1	1%
Farming	1	1%
Charter fishing	6	8%
Retailing	3	4%
Tourism	6	8%
Government	2	3%
Other	29	36%
Can't say	26	33%
Total answers	80	100%
n=	73	

Discussion

The social survey information show the EG fishers to be dependant on the fishing industry with approximately 70% of fishers indicating they have limited capacity or willingness to move from fishing to other employment. Approximately 26% would be able to consider retraining, but of the 70% who would not, experience, age, education and a high level of fishers self identification, inhibit fishers' capacity to move to other industries. This "physic income" from fishing is highly regarded by fishers, who do not feel they would be satisfied by other work in this 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 quote about the mobility of farmers from Bell and Nalson, (1974) is presented in Box H3 and may apply to fishers in the EG.

Box H3: 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 well be a hard core of 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.

Notes the intergenerational nature of occupational mobility with most farmers transferring 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 study 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 EG 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	-	-	6.0%
Illawarra SR	112.2	8.4	7.5%
South Eastern SR	152.9	12.2	8.0%
NSW Total			**7.2%**

Key: SR- Statistical Region (ABS,2001).

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 EG fishery is almost entirely male with approximately 11 female fishers (from 1,003). 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. As approximately 80% of EG fishers are living north of Sydney, the issue of unemployment is significant for any EG fishers displaced by the FMS, particularly in the Richmond and Mid north coast statistical region which includes the fishers in the Clarence community.

(ii) community views and perceptions

Views of community

The EG fishers are a part of the rural coastal NSW community. 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. Definitive public views 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 estuary 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 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 concerned over fish odours and wastes associated with commercial and recreational fish landing sites and the potential loss of local amenity. The community expect EG fishers to provide fresh seafood for the majority of the population who do not catch their own fish.

There is conflict on the perceptions of commercial fishing and the environmental damage it may cause. 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.

(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, but uses estuaries 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 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).

The high volume of traffic on Sydney Harbour and Botany Bay have led to the issue of section 37 permits to allow fishers to sink the head gear (floats) of their traps. This is both a safety and amenity issue.

(ii) the visual and amenity issues

The estuary fishers can both contribute and detract from visual amenity. Tourists expect to see a few small working boats pulled ashore on the edge of the estuary, but may object to fish odours, nets drying and fish offal/ frames disposed of in inappropriate ways, such as on shore. 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. This can be

related to fish sorting practices which can leave small numbers of dead fish washed up on shore. Many of these issues can be addressed at the local council level.

(2) Likely social implications of implementing the plan

Introduction

This section evaluates the social impacts of implementing the EG Fisheries Management Strategy according to the criteria set out in the DUAP Director's guidelines document. Social impact assessment (SIA) of fishery management plans has not previously been undertaken in NSW. This is not a social study of the NSW fishing industry, but an assessment of social issues under the DUAP Director's guidelines related to the implementation of the EG 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 – Higher and Lower. 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 Table H9. They were then ranked in order of estimated 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 of codes of conduct of gear, compliance and communication 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. New rules are proposed under the FMS changing the selection of net mesh size, optimum harvesting size, compliance and communication issues.

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

RESPONSE	DESCRIPTION OF RESPONSE	GOALS	CATEGORY	RANKING
1.1(e)	Reduce haul nets down to 500m & reduce shots per day	2,3,4	SE	HIGH
2.2(a)	Implementing zoning scheme in EG	4	SE	HIGH
2.2(b)	Active effort & endorsements, min. shareholding	1,3,4	SE	HIGH
2.3(b)	Min entry requirements at the fishing business level to prevent increases in effort	1,3,4,5	SE	HIGH
5.2	Promote long term economic viability of EG		SE	HIGH
5.2(a)	Minimum shareholdings to adjust number of businesses		SE	HIGH
5.3 (a)	Provide secure fishing entitlement for EG	4	SE	HIGH
6.3(a)	Use EG MAC as primary consultative body	7	COMM	LOW
6.3(b)	Independent Chair for MAC		COMM	LOW
6.3(c)	Joint industry/Departmental commitees	1	COMM	LOW
6.4(a)	Manage with other programs (MPAs etc)	1,2,3	COMM	LOW
7.1(a) 3 pts	Make FMS and EIS available to public	5,6	COMM	LOW
7.1(b)	Produce brochures and educational material	5,6	COMM	LOW
7.1(c)	Respond to FMS inquiries from public	5,6	COMM	LOW
7.2(a)	Publish eductional information on habitat	1,2	COMM	LOW
7.3	Scientific research and bycatch issues		COMM	LOW
7.4(a)	Periodic review of data collection from fishers		COMM	LOW
6.1(a)	Develop, implement & monitor EG fishery compliance plans	1,2,3,4,5,6	COMP	LOW
6.1(b)	Rationalise the penalties		COMP	LOW
6.1(c)	Implement an endorsement suspension scheme (points etc)		COMP	LOW
6.1(d)	Discourage illegal activity by publishing prosecutions	7	COMP	LOW
6.2	Develop Code of Conduct and Communication		COMP	LOW
1.2 (a)-5th pt	Closures-Fish size, Max. Econ. Return	2,3,4,5	EQ	LOW
1.2(a)- 7th pt	Equitable resource sharing - EG + other stakeholders	2,3,4,5	EQ	LOW
4.1 (a)	Assess non commercial & illegal catch and resource impact	2,7	EQ	LOW
1.1(b)	By catch devices and reduction of impact	2,3,4	IND	LOW
1.1(c)	Best practice techniques for incidental catch	2,3,4	IND	LOW
1.1(e)	Develop scientific observer program	2,3,7	IND	LOW
1.2(b)	Modify fishing methods	2,3	IND	LOW
1.2(c) - 5 pts	Developing codes of conduct	All	IND	LOW
1.4(a)	Implement Marine Pest Man. Plans	6	IND	LOW
3.1(b)	Implement any threatened species recovery plans	7	IND	LOW
4.4(a)	Participate in the development and reviews of fishing strategy	6	IND	LOW
4.5(a)	Identify and declare recognised fishing grounds over historical fish hauling, prawn hauling prawn running & set pocket	5,7	IND	LOW
1.1(a)	Phase out 70mm Flathead net	2,4, 5	SE	LOW
1.1(d)	Phase out winter set 80mm mesh nets	2,4	SE	LOW
2.3(a)	Implement an owner-operator rule for EG fishing business	1,3,4	SE	LOW
4.2(b)	Size of first cature for king prawns & school prawn species	1,2,5	SE	LOW
4.3(a)	Monitor the relative catch of major species taken by meshing, hauling, trapping, handlining and hand gathering methods	7	SE	LOW
5.1	Optimise the biological yield of fish and max. economic return		SE	LOW
5.4(a)	Development of food safety programs		SE	LOW
2.1(a)	Limit size of gear	1,3,4,5	SE	LOW
2.1(d)	Size limits to catch adult fish	5	SE	LOW
2.1(e)	Prohibition on the taking of al female crabs carrying ova		SE	LOW
2.1.1(a)	Introduce minimum legal length for primary finfish species		SE	LOW
2.1.2(b)	Allocate max. quantity of glass eels	4,7	SE	LOW
2.1.2(c)	Implement the outcomes of the 2001 review of eel harvesting	1,3,4	SE	LOW
2.1.3(b)	Implement allocation of shares to fish and crab trapping	4,5,6	SE	LOW
2.1.3(c)	Consider a tradeable crab trap regime based on shares	4,5	SE	LOW
2.1.4(b)	Monitor the catch level of all other species taken in the fishery	7	SE	LOW
5.2(b)	Develop and indicator of individual economic viability		VIAB	LOW
5.2(c)	Develop a cost recovery framework		VIAB	LOW

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

2.1 Health issues - NOT IN TOR

2.2 Social implications for fishers of any changes in resource allocations

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

The current rules in the EG fishery socially impact fishers in several ways.

The high number of entitlements and low catches among businesses, evidenced by 50% of the fishers taking 10% of the fishery value, reflects a diverse rural industry where many fishers are part-time and earn limited income from Estuary General fishing. Many fishers are dependant on fishing, as both a business, family occupation and as a way of life. This probably includes fishing to provide food for families, fishers selling most of the catch and retaining some for private or family consumption. Part-time fishers also access many seasonal opportunities in the EG fishery for specific species groups, such as prawns.

Maintaining the present rules means that over the next five years there will be many older, low or non catching commercial 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 and to enable another fisher to consolidate their business.

Conflict between fishers and between commercial fishers and with the recreational sector, is also a concern under current management arrangements. Much of the inter industry conflict stems from access to fishing areas and the unlimited access of fishers from other areas to local fishing areas. The plan proposes to address this by zoning fishers into regions, thus also creating more local involvement in management issues and harvesting.

Social conflict between industry and other sectors, such as recreationalists and the community would probably increase undercurrent management arrangements. The Recreational Fishing Area process is in response to this and is a process parallel to, but independent of the FMS. The FMS seeks to reduce commercial and recreational fishing conflict.

(c) 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.

Zoning of fishers

The implementation of the two stage zonation process (explained in section G) will reduce conflict, but will also alter fisher lifestyles and may have socio-economic impacts on up to 80-90 fishers. Under stage 1, 150 applicants wished their zoning to be reconsidered, of which 33% mentioned economic impacts, 40% alteration of their fishing operations and the balance, 23% indicated their general disapproval (source: NSWF zoning appeals). Under stage 1, 84 fishers have been able to keep access to estuaries beyond their primary region, though under stage 2 fishers may be limited to one zone, or smaller areas.

The fishers in the social survey who stated they travelled more than 50km per day, were examined to distinguish their social characteristics and to envisage potential social impacts as presented in case 1.

Social impact: the case of travelling fishers

The travelling fishers interviewed in the social survey operated in Tweed-Richmond, Clarence, Hunter, Wallis Lake, Tuggerah Lakes, Lake Illawarra, Bateman's Bay and Ulladulla and several other small areas. Of 42 fishers interviewed, queries on the social survey database revealed these travelling fishers have the following characteristics:

- more than 5 years fishing experience, 62% having fished up to 25 years;
- 60% had gross incomes of over $40,000 per year, only 12% (5) earning outside fishing;
- evidence of recent outboard, nets, boat and ute/car purchases more than $1,000;

- Dependants- 14 had no dependent children and the others had 34 dependent children under 16 years. 28% had a dependant spouse.
- 71% considered they would not be able to get work outside fishing and 33% considered themselves too old to retrain.

The case profile of travelling fishers indicates a group of predominantly full time fishers who will be economically and socially impacted by the zoning policy. This policy will require fishers to adjust. Mitigation has been applied in the form of a two step process, with an appeals mechanism being available. Fishers should be made aware of their potential position under stage 2 as soon as possible and if all fishers are reduced to single zone access, further mitigating steps may be necessary. Fishers are expected to have reductions in income during the adjustment period.

The areas of operation are in some of the most disadvantaged areas of the NSW coast according to the SEIFA index as reported in Tables H1: Tweed-Richmond 926; Clarence 919; Hunter 933; Wallis Lake 939; Tuggerah Lakes 977; Lake Illawarra 935; Bateman's Bay 958; and Ulladulla 942.
It is essential that the FMS monitors impacts on these fishers and regions as the FMS is implemented.

Reduction in haul nets

Reduction in hauling nets sizes from 1,000m and 725m, to 500m, has the capacity to impact up to as many 20-30 fishers in estuaries where larger scale hauling is permitted. The impacts on some fishers with higher dependence on estuarine hauling would be a significant alteration in operational style, with competition from other smaller haulers and a reduction in the gross value of catch. For a few fishers highly dependant on larger hauling net fishing, the social impact would be a significant inconvenience and adjustment to smaller hauling net use.

It is unlikely that fishers would be displaced from the fishery, but they will have their income reduced. The SEIFA index of disadvantage in impacted areas are: St. George 1,047; Lake Illawarra 935; Botany Bay 1,047; Lake Macquarie 977; Tuggerah Lakes 977; and Wallis Lakes 939. This with other social index data, illustrates the need to monitor these communities as the policy is implemented.

Mitigation for this policy may be to implement the reduction from 1,000m to 725m and then to appraise impacts, before further reduction to 500m. Continuation with the proposal would

require the reduction of the welfare of impacted haul netters, to be reduced by a remedial policy initiative from NSWF who proposed the change.

Managing 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. Estimates of adjustment in the EG fishery in the economic issues section (Chapter G) indicate that 141 businesses may be removed by share trading in the 2001-2006 period. At the endorsement level, the change to shares will also impact fishers who hold EG endorsements. A 15% rate of increase in minimum shareholding over five years would lead to 15% of 1,003 endorsed fishers, potentially 150 fishers being displaced. Some of these fishers would be latent effort holders and some active effort holders.

It is likely that the impact of adjustments at the business and endorsement level will cumulative. For example, it is likely that some endorsement adjustments would lead to a business exiting the fishery. A combined impact of 20% is estimated[2]. 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 was investigated via the social survey and results reported in Appendix 3.

Discussion

Regional impacts can be estimated from the information reported from ABS social data in Table H1. The impacts of a greater than 15% reduction, say 20% in fisher numbers across the EG fishing communities is assumed, due to no way to predict who sells businesses or endorsements. A 20% reduction in EG fisher numbers is reported in Table H10.

[2] If business adjustment removes 15% of businesses, this will remove endorsements also. Then the 15% adjustment of endorsement numbers will be more easily reached. The net effect will be greater than 15% and much less than 30%. 20% is used as an estimate.

Table H10: Summary table of social indices for EG fishers with an estimated reduction of 20% in fisher numbers shown by district and zone

Zone	Home District	P'code Population	P'code Fishers	EG P'code Fishers	20% of EG fishers no's	Unemployed (%)	SEIFA	Med. Ind. Income (wk)	Employed in C.F. as (%) of labour force	Employed in EG as (%) of labour force
1	TWEED	41,938	63	26	5.2	16.9	922	250	0.4	0.2
	RICHMOND	28,558	87	31	6.2	16.6	930	227	0.9	0.3
	Zone	**70,496**	**150**	**57**	**11.4**	**16.8**	**926**	**238**	**0.6**	**0.2**
2	**CLARENCE**	**43,353**	**259**	**139**	**27.8**	**18.8**	**919**	**222**	**3.1**	**1.7**
3	COFFS HARBOUR	55,625	110	30	6	18.8	940	215	0.7	0.2
	HASTINGS	61,291	90	45	9	17.7	936	227	0.7	0.3
	Zone	**116,916**	**200**	**75**	**15**	**18.4**	**938**	**220**	**0.7**	**0.3**
4	MANNING	37,878	80	48	9.6	17.5	914	203	0.7	0.4
	WALLIS LAKE	22,704	105	76	15.2	14.8	939	250	2.8	2.0
	PORT STEPHENS	52,562	101	43	8.6	13.0	967	250	1.3	0.6
	HUNTER	52,557	55	26	5.2	13.8	933	233	0.2	0.1
	CENTRAL COAST	206,143	102	76	15.2	10.6	977	267	0.0	0.0
	Zone	**371,844**	**443**	**269**	**53.8**	**13.3**	**951**	**244**	**0.7**	**0.4**
5	HAWKESBURY	2,380	30	12	2.4	7.4	1004	300	0.0	0.0
	SYDNEY	3,276,207	189	72	14.4	7.3	1047	350	0.0	0.0
	Zone	**3,278,587**	**219**	**84**	**16.8**	**7.4**	**1019**	**317**	**0.0**	**0.0**
6	ILLAWARRA	65,532	50	25	5	14.5	935	215	0.1	0.1
	SHOALHAVEN	53,871	75	46	9.2	15.1	945	215	0.8	0.5
	Zone	**119,403**	**125**	**71**	**14.2**	**14.7**	**938**	**215**	**0.4**	**0.2**
7	BATEMANS BAY	34,836	105	38	7.6	17.0	958	227	1.2	0.4
	MONTAGUE	8,135	53	13	2.6	15.9	955	180	1.5	0.4
	FAR SOUTH COAST	3,726	61	6	1.2	12.1	916	250	2.6	0.3
	Zone	**46,697**	**219**	**57**	**11.4**	**15.8**	**949**	**222**	**1.5**	**0.4**
Grand Total		**4,047,296**	**1615**	**752**	**150.4**	**15.1**	**945**	**236**	**0.9**	**0.4**

The number of EG fishers in zone 2, (Clarence) and zone 4, (Manning to Central Coast) are highest.

An estimate of EG fishing community vulnerability to social and economic impacts is reported in Table H11. This ranks EG 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 EG fishers, (from ABS and NSWF data).

District	Employed in EG as (%) of labour force	Rank labour	SEIFA	Rank SEIFA	Joint rank score
CLARENCE	1.7	2	919	1	2
WALLIS LAKE	2.0	1	939	3	3
FAR SOUTH COAST	0.3	6	916	1	6
COFFS HARBOUR	0.2	3	940	4	12
HASTINGS	0.3	4	936	3	12
TWEED	0.2	7	922	2	14
SHOALHAVEN	0.5	4	945	4	16
RICHMOND	0.3	6	930	3	18
MANNING	0.4	6	914	3	18
PORT STEPHENS	0.6	3	967	6	18
HUNTER	0.1	8	933	3	24
ILLAWARRA	0.1	8	935	3	24
BATEMANS BAY	0.4	5	958	5	25
MONTAGUE	0.4	5	955	5	25
CENTRAL COAST	0.0	9	977	7	63
HAWKESBURY	0.0	9	1004	10	90
SYDNEY	0.0	9	1047	10	90

Table H10 indicates the potential impact on fishing communities of a 20% reduction in fisher numbers. Table H11 is an index of the vulnerability of EG fishing communities generated from ranking of community dependence and the ranked SEIFA index giving each equal weighting.

This indicates that the EG fishing communities in Clarence, Wallis Lake and the Far South Coast are most vulnerable to changes from the plan 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 difficultly in fishers finding alternative employment.

It is apparent in Table H11, that outside of Sydney and the Hawkesbury, EG fisher communities are more vulnerable to changes in their economic well being. This does not mean that fishing families in the Sydney/Hawkesbury area are less impacted by the share trading, but that these communities have more socio-economic alternatives than small rural isolated communities in coastal NSW. Table H2 presents SEIFA data for areas at the post code region. 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)[3].

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 125 of 640 fishers (20%) are likely candidates. This indicates that the desired 20% adjustment in the fishery, could be filled by elderly fishers alone.

The majority of fishers are below 60 years of age and wish to operate in EG 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 fishers. Some fishers are rural, low income part-time fishers, representing a "cottage industry", rather than the

[3] As noted in Appendix 1, the Tables combining ABS and NSWF licence data are for postcodes with more than 10 NSW fishers. In the EG analysis approximately another 20% of fishers live in postcodes with fewer than 10 fishers in the NSW fishing industry. The EG analysis does not include these 20% of fishers and their communities could be relatively more impacted than those postcodes with more fishers.

professional full time industry proposed under the FMS. This requires further study (see section 3).

The social impacts of displacement of 150-200 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	
Displaced fishers		150	200
Dependents			
Mean number of dependent children/ fisher	1.1	165	220
no dependents	63%	0	0
Spouse	23%	35	46
Other dependents	14%	21	28
Total dependents		**221**	**294**

The numbers of dependants associated with 150-200 typical EG fishers is between 220 and 294. This is an upper estimate, as if older fishers exit the fishery, then the number of dependent children below 16 reduce substantially.

The impact of fisher displacement on the communities will also depend on 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 20% 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 interviewed fishers who refused to complete social surveys. Such levels of resistance to FMS initiatives, could also impact the acceptance of new gear 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 EG 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 EG 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. Managing by zones should help these processes to develop, but communication and the management advisory committee process are central to reducing conflict in the EG fishery. Estimates of social cooperation and communication are difficult to guage in any industry when there is downward adjustment being proposed.

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 fishery, than one comprised of part time fishers? The ESD aspects of this issue needs to be examined nationally and is recommended in further work.

(d) Compare the social implications of implementing the plan or feasible alternative resource implications options in the short, mid or longer term (if relevant, consider regional, sub-regional or fleet issues).

(i) identify any existing or likely conflicts within or between communities

(ii) consider the affects on conflicts of any proposed changes in resource allocations

The plan will impact fishers in several ways. There are specific short and medium term changes, such as the movement to share management, which will impact fishers directly, forcing a decision to stay, or exit the fishery. The plan will reduce the number fishers, impacting older fishers, latent effort endorsement holders, low income businesses and part-

time fishers. Fishers with high opportunity costs may also exit. This process should be monitored to assist in predicting impacts of implementing share management. The plan will accelerate natural rates of fisher retirement as a payment from sales of shares is now available.

There are also other implications for fishers in the way they operate, through the development of codes of conduct and new regulations. This will also require social change among fishers. Similarly fishers have new levels of cooperation in regional management initiatives with new communication and social challenges. Many fishers will have to move from competitive practices to more cooperative thinking in developing local operating systems.

There are conflicts among EG fishers. These will be lessened with zoning, to keep out non-local fishers. There may be conflict between different groups of commercial fishers within regions as new dynamics emerge as a result of shares trading. It is envisaged that share trading will reduce conflict among fishers facilitating fishers to get their desired combination of fishing access

Commercial and recreational fishers have also significant conflict issues. These stem from perceptions among recreational fishers of over harvesting by the commercial sector and thus a reduction in the chance of a recreational fisher catching a fish. The Recreational Fishing Area process will set aside recreational fishing areas to address these concerns. The FMS seeks to reduce recreational and commercial conflict through more control of commercial fishing through zoning and more cooperative regional management.

Other concerns in the community are over commercial fishing methods and their destructive impacts on the fish habitat (Roy Morgan, 1999). The FMS addresses these through several gear regulations and a reduction in the number of fishing businesses.

(e) 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 move to fishers operating in one zone will enable fishers to be more aware of fishers in their region

and to mutually monitor each others fishing practices. This should help identify malpractice for notification to the local fisheries officer.

The increases in the cost of operations and displacement of fishers, may lead to an increase in illegal fishing. This will have to be monitored, particularly through information from fishers in a given region. As fishers pay more for access and management, there should be an increased sense of stewardship among fishers in a given zone. This may take time to develop.

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

Approach will be discussed under ESD criteria.

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 EG FMS intends to contain latent effort and adjust active effort across the fishery. The management process has previously had insufficient economic and social input and insufficient mechanisms and incentives for fishers to adjust effort. Capacity, in terms of effort and the number of fishers has not been sufficiently addressed. The FMS addresses this and thus it is meeting the inter-generational objective of ESD. Implementing the changes to business numbers through minimum shareholdings is also a positive steps 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 EG 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 EG fishery. Fundamental questions on the nature of the estuarine fish 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 EG fishery under ESD principles.

(2) 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

As there was little social information on commercial fishers in NSW, ABS survey data (ABS, 1996) and a Rapid Social Appraisal questionnaire (Roy Morgan, 2001b) was executed by a telephone. This is a first step towards the formal incorporation of social information in the management of fishers in NSW. Given the complexity of the fishery production inter-relationships, multiple communities and political climate among industry members facing significant allocation issues, the survey gave an over view of some social issues raised by 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 following areas require research:

- The social profile of EG fishers can be augmented through time by further studies, preferably by community rather than just fishery.
- 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 expenditures by businesses, employees, and examines employee residential locations and social infrastructure services and existing social networks (Fenton and Marshall, 2001). Future social survey work should address community structure and inter-relationships (linkages) at a regional level (Fenton et al. 2000) and articulate with regional economic studies previously recommended in section G. Community studies would give more understanding of cumulative community impacts through the series of fishery management strategies now being undertaken. This should be developed in the next five years.
- Investigation of fisher community structure, part-time and full-time fishers, “professional industry” and fisher mobility (Bell and Nalson, 1974).
- More information and measures of community views are required.

- Investigation of available ABS data, and the potential development, or alteration to ABS data surveys to gain more information for fisheries assessments.

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

Fuller social profiles and regional analysis should be undertaken in the next five years to assist in monitoring the impacts of adjustment and in preparation for appraisal of future management strategies. The telephone survey information has a limited shelf life.

More complete regional industry and fishing community studies need to be undertaken recognising the communities can be impacted through multiple fisheries management strategies. 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 across all fisheries in the next five years.

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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 postcode level

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**					

(Source: ABS, 1996 /BRS and NSWF).

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

The data contained within Appendix Table HA1 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[4] 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[5] 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

[4] 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.

[5] 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.

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 fishing; Marine fishing; Marine fishing undefined; Aquaculture; and Commercial fishing undefined.

The data in Appendix Table HA1 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 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, 502 replies (57%) were from Estuary General endorsement holders who constitute 52% of all licence holders state-wide. Of 502 EG endorsement holders contacted, 449 interviewed in the social survey had been fishing in the EG in the previous 12 months. Given there are 1,003 licence holders in the EG and 623 of these went fishing in 1999-00, 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 H3: Social profiling of fishers likely to exit the EG fishery under the FMS

Two categories of fishers are examined. Those who are currently constitute latent effort and fishers grossing under $10,000 from the EG fishery.

The social profile of latent effort share holders.

There are EG endorsed fishers who are latent in all fisheries. This means they did not catch fish in any commercial fishery administered by NSW Fisheries in 1999-00, but have previously fished in NSW. Appendix Table HA3 reports the regional dispersion of EG 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 HA3. 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 HA3: The social survey coverage of latent EG endorsed fishers (Yes is a SS response).

Zone	Yes	No	Total latent	Total end.	Latent as % of Total
1	7	13	20	72	27%
2	11	14	25	158	16%
3	12	17	29	106	27%
4	52	58	110	302	36%
5	13	38	51	123	41%
6	15	34	49	126	38%
7	15	22	37	59	62%
Total	**125**	**196**	**321**	**946**	**34%**

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

- The median age bracket is 40-44 years old, with 46% being 35-60 years old. Approximately 57% have fished 16-40 years (median bracket was 16-20 years).
- Less than 40% of fishers responded to the "how many generations in the fishing industry" question. Of those who did, the median response (over 40% of the remainder) was one generation.

- Gross income: 34% of the interviewed fishers chose not to reply and 10% apparently earned $100,000 pa. Over 75% of those interviewed said that 90-100% of their income is from fishing. The median income bracket is $30,000 - $35,000 (8% of fishers), with only 11% claiming less than $20,000 in gross income. Most (76%) had no employees, while a further 15% had one or two employees. A minority (22%) claimed to have employment in other industries.
- Of 125 interviewees, 27 could get full time employment in other industries, 10, possibly could and 85 indicated fishing was all they knew. Only 15 would consider retraining, 26 being too old.
- These 125 fishers (latent effort) have 225 dependent children and 25 dependent spouses.

The survey has thrown some light on the characteristics of latent effort holders in the EG fishery. Their apparent lack of revenue from fishing in NSW means their 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, approximately 20% considering themselves to be too old for retraining.

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

Social impacts also are likely to arise from low earning EG 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 EG endorsement holders there were 149 fishers in 1999-00 who grossed less than $10,000 in all their fishing in NSW. Appendix Table HA4 reports the regional location of low earning fishers in the EG fishery and the proportion sampled in the social survey.

Appendix Table HA4 reports small business (< $10,000 per annum) numbers as percentages of total active fishing businesses in each area. On average it is 24% state-wide with least

small businesses by percentage in zone 2 and most by number in zone 4. Zone 7 has the highest percentage of small businesses.

Appendix Table HA4: Survey Coverage of EG Endorsed Fishers earning less than $10,000 in the fishing industry (Yes is a SS response).

Zone	Yes	No	Total	No. of active FBs	Small Bus as % of active FBs
1	4	9	13	52	25%
2	7	10	17	133	13%
3	13	11	24	77	31%
4	25	19	44	192	23%
5	9	12	21	72	29%
6	7	9	16	77	21%
7	9	5	14	22	64%
Total	**74**	**75**	**149**	**625**	**24%**

The characteristics of the fishers involved with fishing businesses grossing less than $10,000 of fish in 1999-00 are:

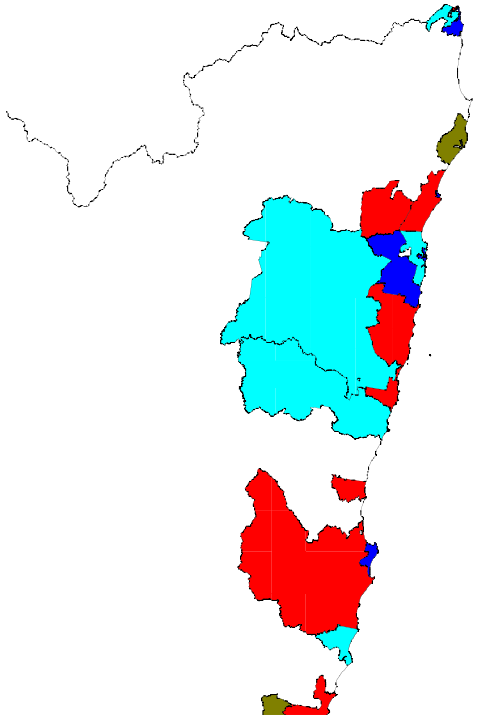
- aged from 21 to 86 years old, with over 50% of these being between 35 and 55 years old. Most of these fishers (62%) have been in the industry for between 6 and 25 years.
- Over half (53%) were first generation fishers, with an additional 34% being second or third generation fishers. Only 14% had one or two employees.
- Gross income: 36% of the fishers interviewed declined to respond to the income from all industries question. 70% of interviewees said that 90- 100% of their income was from fishing. The median income bracket from all industries is $20,000 - $25,000 (15% of fishers) for catch values at under $10,000 by the Sydney index. This means their fishing income was either not within NSW, was in processing or from fishing, welfare or other industries. A minority (32%) claimed to have employment in other industries.
- Of 75 interviewees, 9 could get employment in other industries, 13, possibly could and 47 indicated fishing was all they knew and only 6 would consider retraining, 11 being too old.
- These 75 fishers have 53 dependent children and 15 dependent spouses.

Fishers earning less than $10,000 a year in 1999-00 have a range of ages and a longer family connection with fishing than the fishers who are latent effort holders. A significant number chose not to answer the income question and 70% indicated they were full time fishers. As with latent effort, approximately 30% could get employment in other industries and 20% considered themselves too old to retrain.

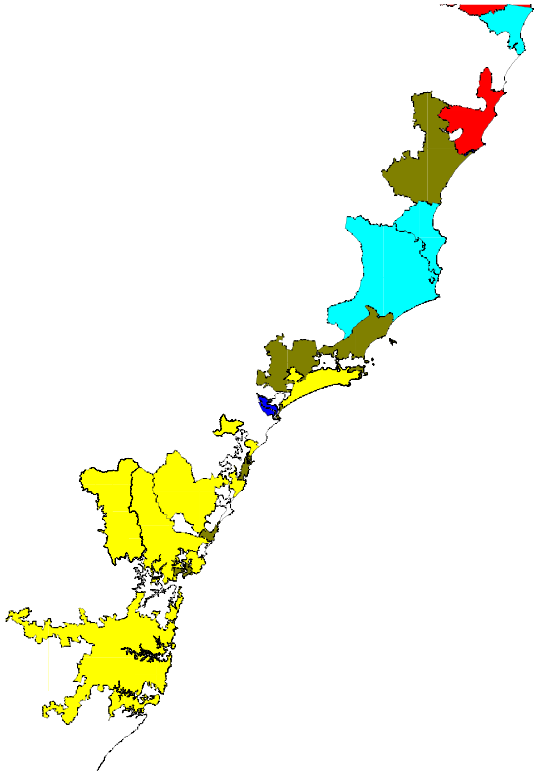
Appendix 4: Socio-economic maps for NSW fishers.

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.

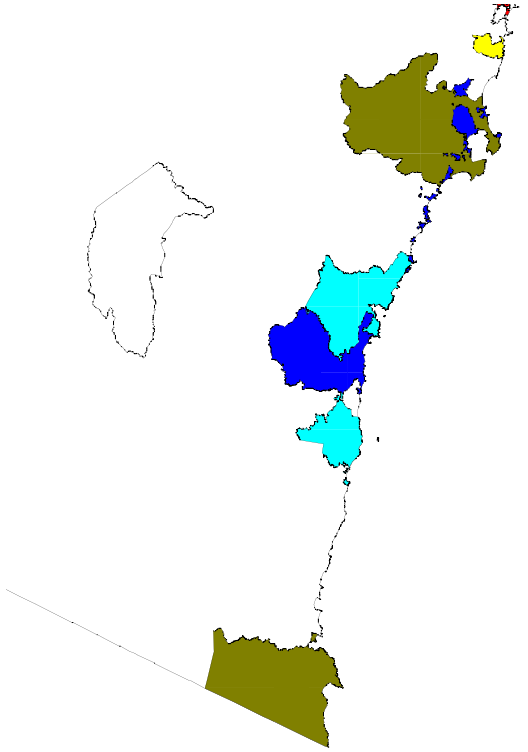
Maps 1a, 1b & 1c: Unemployment across Selected Post Code Areas (NSW), 1996



Map 1a: Tweed to Hastings



Map 1b: Manning to Sydney

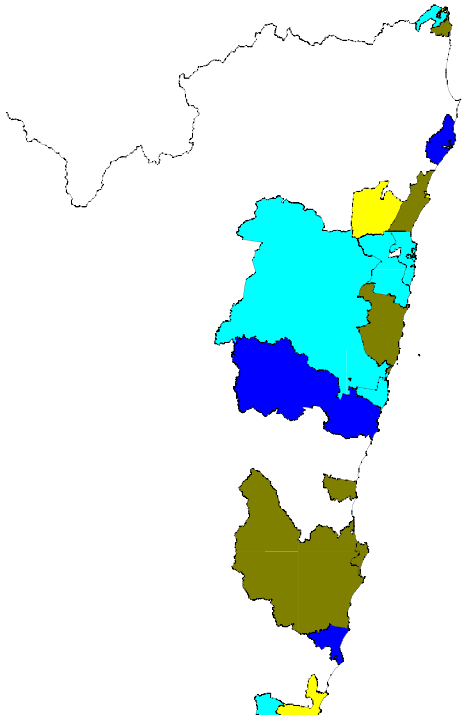


Map 1c: Illawarra to Far South

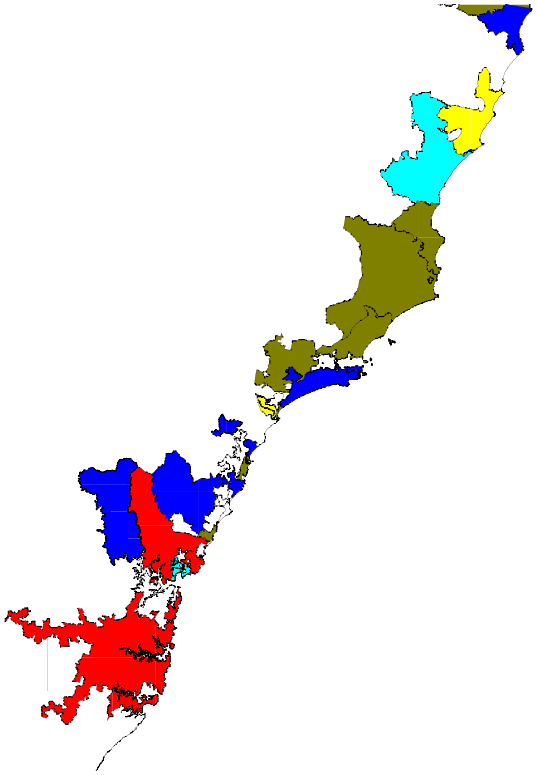
Unemployment (%)

- 18.9 to 27.2
- 16.2 to 18.9
- 14.4 to 16.2
- 11.6 to 14.4
- 5.7 to 11.6

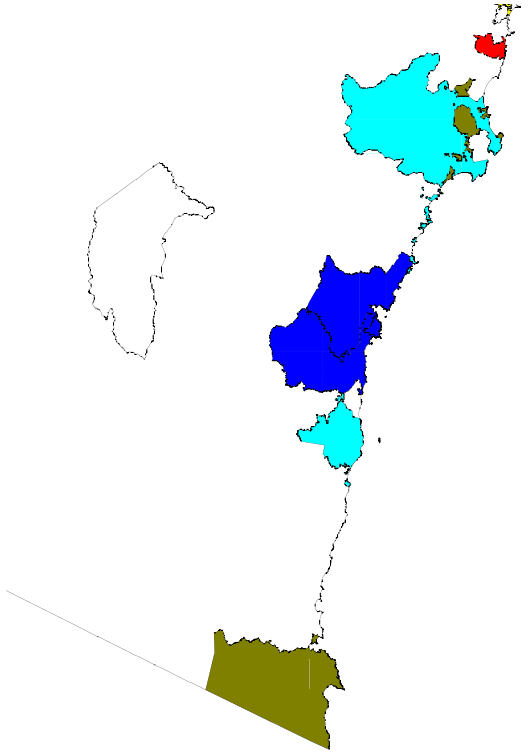
Maps 2a, 2b & 2c: SEIFA (Disadvantage) Scores across Selected Post Code Areas (NSW), 1996



Map 2a: Tweed to Hastings



Map 2b: Manning to Sydney

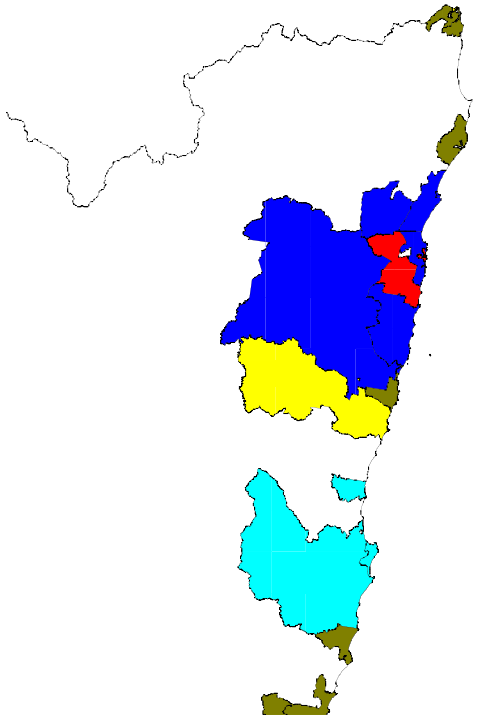


Map 2c: Illawarra to Far South

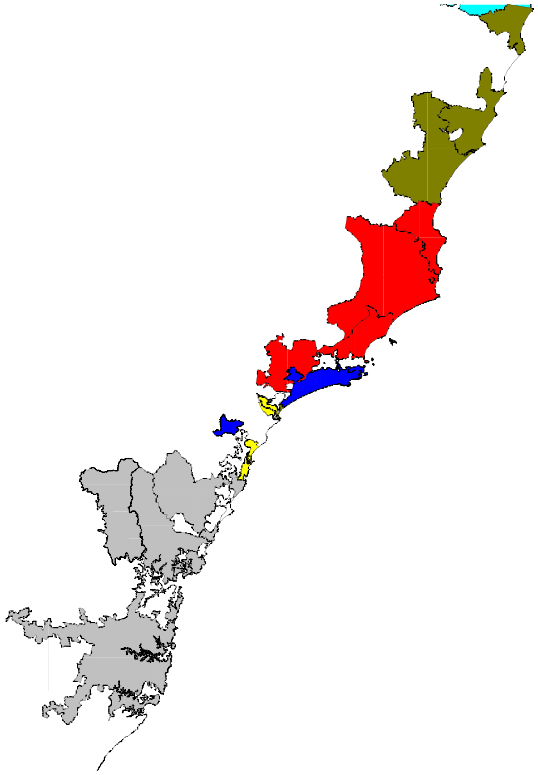
SEIFA (disadvantage)

- 1000 to 1067
- 960 to 1000
- 940 to 960
- 910 to 940
- 827 to 910

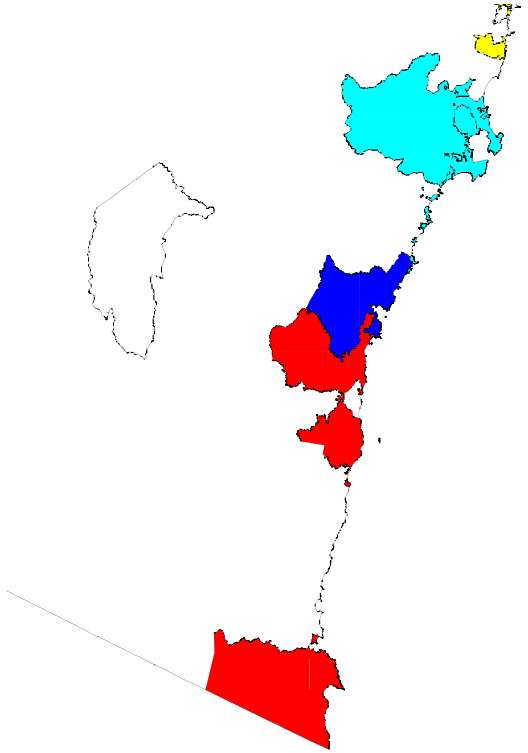
Maps 3a, 3b & 3c: Employment in Commercial Fishing across Selected Post Code Areas (NSW), 1996



Map 3a: Tweed to Hastings



Map 3b: Manning to Sydney

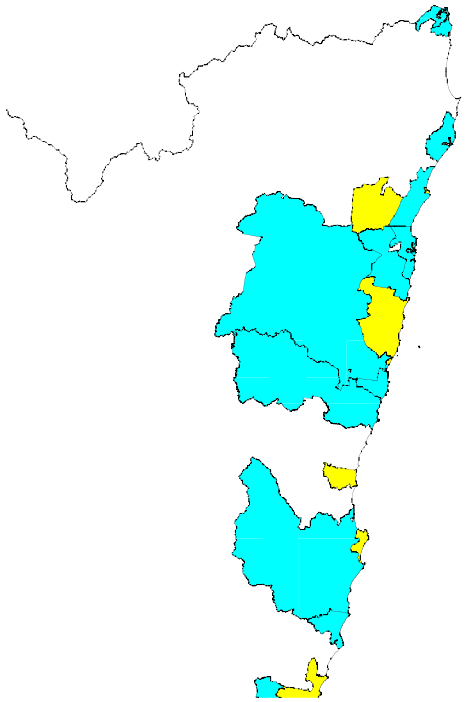


Map 3c: Illawarra to Far South

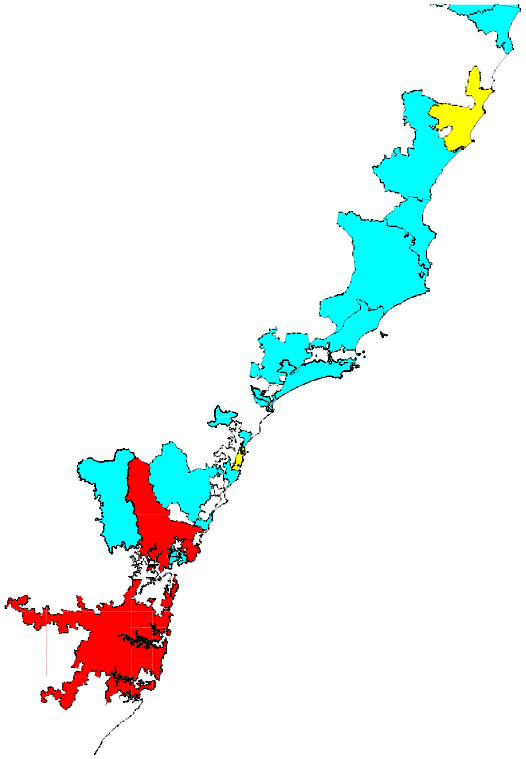
Workforce (%)

- 1.54 to 4.46
- 1.02 to 1.54
- 0.78 to 1.02
- 0.41 to 0.78
- 0.05 to 0.41
- Insufficient data

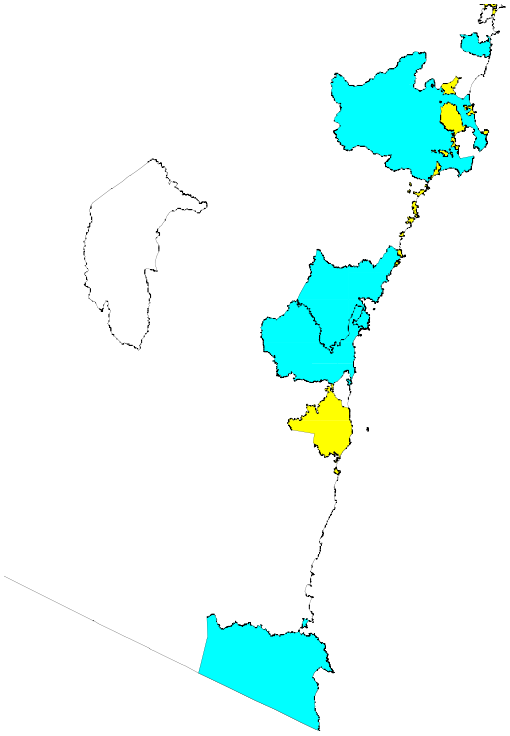
Maps 4a, 4b & 4c: Weekly Individual Income ($) across Selected Post Code Area (NSW), 1996



Map 4a: Tweed to Hastings



Map 4b: Manning to Sydney

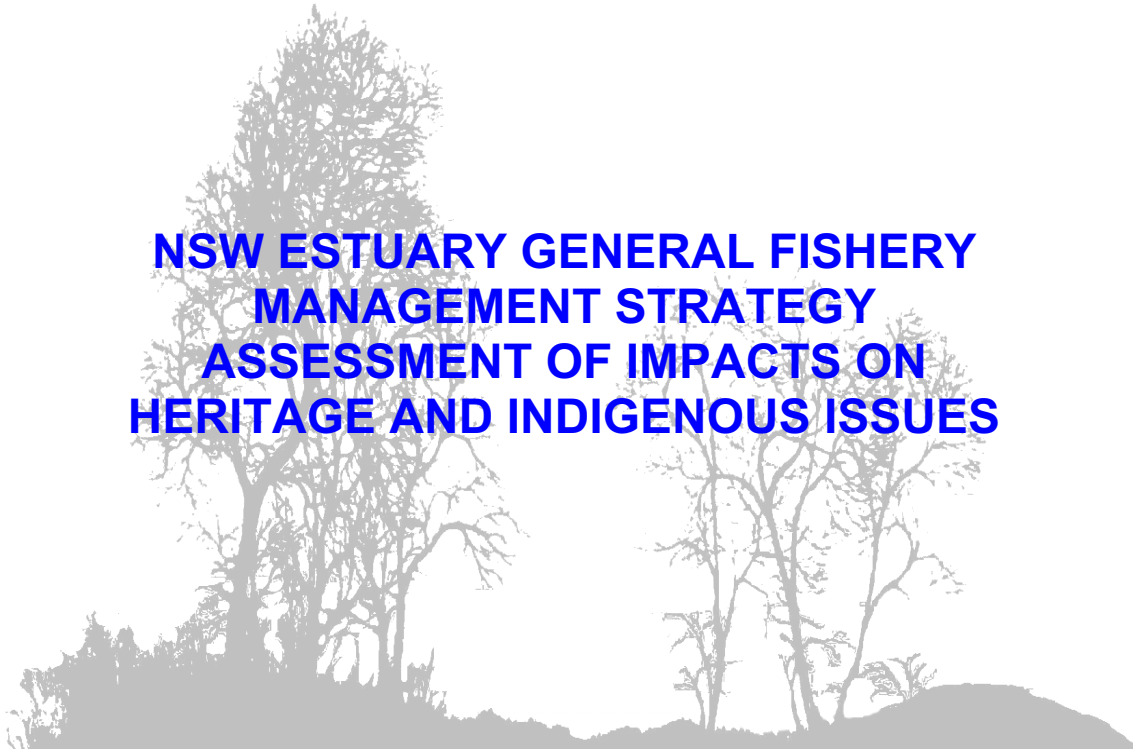


Map 4c: Illawarra to Far South

Week Individual Income ($)

- 300 to 399
- 200 to 299
- 160 to 199

NSW FISHERIES



NSW ESTUARY GENERAL FISHERY MANAGEMENT STRATEGY ASSESSMENT OF IMPACTS ON HERITAGE AND INDIGENOUS ISSUES

Prepared by:

Umwelt (Australia) Pty Limited
Environmental and Catchment Management Consultants

September 2001

1479/R01/V2

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Prepared for:

NSW FISHERIES

NSW ESTUARY GENERAL FISHERY MANAGEMENT STRATEGY
ASSESSMENT OF IMPACTS ON HERITAGE AND INDIGENOUS ISSUES

Umwelt (Australia) Pty Limited
Environmental and Catchment Management Consultants

PO Box 838
Toronto NSW 2283

Ph. (02) 4950 5322

Fax (02) 4950 5737

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APPENDICES

1.0 INTRODUCTION

The draft Estuary General Fishery Management Strategy (May 2001) has been prepared by NSW Fisheries to fulfil the requirements of the Fishery 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 Estuary General Fishery Management Strategy (EGFMS), 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 EGFMS, the activity for which approval is sought under Part 5 of the EP&A Act is the commercial taking of species such as yellowfin bream, dusky flathead, sand whiting, longfinned eels and sea mullet from estuarine waterways using handline, trap, mesh and gill nets and hand collection. The estuary fishery is also defined to include commercial hand collection of pipis and beach worms from ocean beaches. The commercial fishery operates in more than 80 estuaries along the NSW coast, but NSW Fisheries statistics indicate that approximately 95% of the commercial catch is obtained from 24 estuaries. These estuaries are listed in **Appendix 1**.

The activity that is being assessed in this EIS includes the actual fish catching and collecting activities in estuaries and on beaches. 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 and trap 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.

The core study area for this environmental assessment is therefore the bed and internal banks of estuarine waterways (upstream as far as the tidal limit and to the elevation of mean high water), and the intertidal zone of beaches from which pipis and worms are collected.

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;
3. government policies on Indigenous fisheries issues, including the NSW Indigenous Fisheries 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 located in many estuaries. This assessment considers potential impacts of estuary general 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 estuary general fishing activities will impact on these sites, although some shipwreck sites may present safety risks to estuary fishers. In this context, the assessment does not explore the historical details for European heritage sites.

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

There is abundant ethnographic and archaeological evidence for past use of estuaries and beaches 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 thousands of known sites located on the banks of estuaries or along beaches. Sites are known from the banks of virtually every estuary in NSW, and middens are reported from many beaches (although the distribution of midden sites is heavily influenced by the nature of the beach and dune system). In addition to the known sites in these landscape contexts, 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. Very few known Aboriginal sites are located within the channel of estuaries that are used for commercial fishing activity.

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

There are more than 80 estuaries in NSW that are within the estuary general fishery. A search of the NPWS Aboriginal Site Register for each of these estuaries 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 estuary general fishing on physical evidence of past Aboriginal occupation does not justify the mapping of every known site along the banks of estuaries. 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 estuary resources in the past, and discuss the types of risks to sites that could be associated with estuary general 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 estuary fishery is not directly related to the size of the commercial fishery in any one estuary. Approximately 95% of the commercial estuary fish catch is obtained from only 24 estuaries, but issues about Indigenous access to the estuary fishery are reported by the Aboriginal community from many other estuaries. The issues are frequently associated with the regulatory framework for the fishery, rather than the scale of individual enterprises in each estuary. 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 estuary 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 NSW estuaries. 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 estuarine 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 boatsheds, landing ramps, seawalls, breakwaters, wharves and boat harbours, but also includes such developments as structures for oyster culture, groynes and piles. This latter group of structures may have no physical connection to the shoreline.

2.1 TRANSPORT HERITAGE

This section addresses shipwrecks that have been recorded in estuaries. It is heavily based on data contained in the Australian National Shipwreck Database (ANSD), which is maintained by the Australian Institute for Marine Archaeology.

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 state-wide 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, of which 393 could be related to the entrances and bodies of estuaries. 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 estuarine from open-water 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 in Sydney Harbour is relatively definitive, one that refers to the wreck location as being simply 'Port Stephens' may refer to the estuary or to the stretch of coastline, but a reference to 'Hannah ([sic: Anna] Bay' will place the wreck in open water;

2. The nature of the vessel's voyage, eg. international, inter-colonial, coastal intra-state, or port service. Thus, a vessel in transit from Valparaiso to Newcastle will have been unlikely to enter Port Stephens;

3. For other than port services, the origin and destination of the voyage: for instance, a vessel engaged on a late 19th Century voyage from Port Macquarie to Sydney, wrecked on the Hastings bar will be deemed to be outbound and the wreck will be included in the Port Macquarie estuary;

4. For a port service, whether a vessel was in-bound or out-bound. For example, a vessel towing another vessel into open water to be scuttled, and wrecked at the port entrance as a result of the tow will be included as an estuary wreck; and

5. 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, 393 shipwrecks appear to be located within New South Wales coastal estuaries.

The particulars of these shipwrecks are contained in a table included **Appendix 2**. The table sets out:

- the name of the vessel;
- the best estimate of date-of-loss;
- the best estimate available of the location of the wreck, sorted by estuary from north to south;
- the primary and other sources of data about the loss;
- the reference of the shipwreck in the ANSD; and
- any comments that appear relevant.

2.2 STRUCTURAL HERITAGE

This section is concerned, essentially, with all historic heritage resources, other than shipwrecks, that have been recorded in estuary precincts 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 estuaries; and

- Information from state-wide and local newspapers.

The sources of data are collectively described as 'the archaeological record' and are appropriately referenced in the following material (see also **Appendices 2** and **3**).

Search of the archaeological record revealed that, as related to the entrances and bodies of estuaries:

- a total of 35 sites have been entered in the Register of the National Estate (RNE), as either 'Registered' or 'Indicative Place'. The status entry 'Indicative Place' confirms that the site has been proposed for registration but that the registration process is not yet complete. Accordingly, the submission of the site may be either accepted or rejected for registration;

- a total of 26 sites have been entered on the (NSW) State Heritage Register (SHR), as either 'Registered' or 'Interim Heritage Order'. The status entry 'Interim Heritage Order' confirms that the site has been proposed for registration but that the registration process is not yet complete. Accordingly, the submission of the site may be either accepted or rejected for registration; and

- the (NSW) State Heritage Inventory (SHI) indicates that 293 sites have been recorded on Regional Environment Plans (REP) and Local Environment Plans (LEP) pursuant to the (NSW*) Environmental Planning and Assessment Act* 1979.

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 estuaries 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 within an estuary by reference to maps and charts;

2. concurrent with 1. above, the probable capacity of tidal reaches within estuaries to support commercial fishing; and

3. more precise location of sites by the use of peripheral or explanatory data. For example, reference to a bridge on a named highway over a named river could be identified on a map of the area and its location taken into account with criteria 1. and 2. above.

2.2.2 Results

By an application of the judgement criteria to the raw results of research of the archaeological record, 354 sites appear to be located within New South Wales estuaries. Of these sites, 35 are entered on the RNE, 26 are entered on the SHR and 293 are recorded in the SHI as being recorded on either REPs or LEPs.

The particulars of these sites are contained in a table attached to this report as **Appendix 3**. The table deals separately with the results of research of the RNE on one hand (**Part 1**) and of the SHR and SHI jointly, on the other (**Part 2**). **Part 1** of the Table sets out:

- the name of the site, item or resource;
- the status of the site, item or resource in the RNE process;
- the estuary to which the resource relates;
- the date of construction or an indication of the age of the resource;
- the location of the resource; and
- the reference to the database entry of the resource in the RNE (the RNEDB).

Part 2 of the table sets out:

- the name of the site, item or resource;
- the location of the resource;
- the estuary to which the resource relates;
- the date of construction or age of the resource, where this is evident from the registration records;
- appropriate comments regarding the resource;
- the reference to the database entry of the resource in the SHR and/or SHI; and
- the level of heritage listing, which indicates the level of significance that has been accorded to the resource.

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 state-wide historical/geographical context or to an identifiable contemporary state-wide 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 estuaries for commercial fishing.

2.4.1 National Constraints

Appendix 2 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 3 Part 1** tabulates 35 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 3 Part 2 tabulates 26 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 3 Part 2 also tabulates 293 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 netting styles including trawled nets, traps and static and mobile handlines, as well as the manual recovery of some species.

The physical and spatial presence of heritage resources within estuaries 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.

Similarly, structures such as oyster racks, pile and submerged material evidence, pose a greater threat to fishers than the reverse, and land-based resources have survived, usually, because they have been constructed of relatively impervious materials. Some timber jetties and wharves may have deteriorated or will progressively deteriorate to the point of fragility, such that impact from a vessel would be capable of causing damage or destruction.

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. For example, fishers on Lake Innes obtain access to the lake shoreline along a partly-corduroyed track across an area of natural reclamation of peat and silt on a (sub-surface) rock-ledge base. The road is close to the site of the former (1830s) boathouse and sensitivity is called for in any proposal to vary, maintain or manage this access.

2.5 RECOMMENDATIONS

These recommendations are made on the basis of:

- the limited review of historical context of the estuary precincts contained in this report;
- the review of the archaeological context of the estuary 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) if any is 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;

   (iv) if any is 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;

   (v) 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 in an estuary, 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 shell fish 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 banks of estuaries and on beaches, 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 ESTUARY FISHERY RESOURCES IN NSW

In general, the archaeological and ethnographic evidence clearly indicates that fishing and shell fish 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 estuary and 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 section reviews and synthesises the ethnohistorical and archaeological evidence for Aboriginal use of and occupation of estuarine and beach habitats. This evidence provides the cultural context for ongoing Indigenous, recreational and commercial use of estuarine fishing resources. The archaeological evidence also provides the background to contemporary Indigenous fishing activity in estuaries and on beaches. The analysis shows quite clearly that the modern commercial estuary 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, at estuary mouths 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 coast estuaries.

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 estuaries 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.

- 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 shell fish 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 light weight craft in sometimes dangerous currents. There are references from the north and central coasts of people cooking fish and shellfish in their canoes.

- 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.

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 estuary 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 the dominant shell fish 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 shell fish 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;

- The shell fish 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. Shell fish 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 shell fish 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.

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 ESTUARY GENERAL FISHERY AND ABORIGINAL HERITAGE SITES

The EGFMS provides a framework for commercial use of estuarine fish species, and also for commercial harvesting of beach pipis and worms.

There are many Aboriginal sites along the banks of estuaries that provide abundant evidence of the value of estuarine resources to Aboriginal people, and in fact these sites underestimate the values of estuaries because no plant materials are preserved, and only a portion of the more robust animal parts remain.

Estuary general fishing techniques involve the placement and inspection of traps and nets. The traps and nets are operated from small boats. These fishery activities are most unlikely to impact on the stability of estuary banks or beds. The nature of estuary fishing means that although the banks of estuaries are lined with known Aboriginal sites, there is a low risk that sites will be impacted by general estuary fishing activity.

There is potential for fishery related activities to impact on Aboriginal sites at restricted locations along estuarine waterways, 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 estuary to another, and definition of the risk for an individual estuary will depend heavily on the availability of local knowledge (eg 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.

In general, the physical evidence of past Aboriginal occupation of estuary banks is most severely threatened by land uses and activities other than estuary general 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).

Aboriginal sites along the sandy coastline are at some risk of impacts by commercial collectors of pipi and worms, principally because of access to these areas by four wheel drive vehicles. It should be noted, however, that commercial collectors of pipi and beach worm (ie. those whose activities are regulated by the estuary general fishing strategy) comprise only a small proportion of the four wheel drive users of those ocean beaches that were traditional fishing and shell fishing 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 (eg 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.

In the cases of both Aboriginal sites along the banks of estuaries, and Aboriginal sites along the dunes of ocean beaches, the overall risk that activities authorised by the EGFMS will detrimentally impact on cultural heritage evidence 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 EGFMS 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 estuary bank or foreshore. This would include maintenance of existing ramps, new launching ramps, wharves 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 beach pipi and worm 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 estuary fishing and collection of pipis and beach worms 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 estuarine general fishery interact with and impact on the interests of Aboriginal communities. As noted in **Section 4**, 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 estuary fishery, and the ethnographic evidence from the first years of competition for the resources of NSW estuaries 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 shell fish gathering along the shorelines at Wreck Bay, with extensive middens containing shell fish, 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;
- 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 estuary fishing

The number of Aboriginal people fishing in estuaries today is not well documented. Few Aboriginal people now hold commercial licences that provide access to the estuary general 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 fisheries in NSW (Schnierer pers.com.).

Under current licensing arrangements, most Aboriginal fishers are included in the recreational sector of the fishery.

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 in the past ten months 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 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 estuary 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
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**

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) (not currently available).

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 estuary 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 estuary 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 ESTUARY FISHERY RESOURCES

Commercial fishing has existed in NSW estuaries since the mid nineteenth century, and by historical accounts from 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 estuaries early in the twentieth century. Thus, the interaction of traditional Aboriginal fishing activity in estuaries (and shell fishing on beaches) with the commercial estuary 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.

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.

Today, 50% of licensed estuary fishers account for 90% of the revenue from the fishery, and the largest 10% of operations are responsible for 38% of the revenue from the fishery. The number of Aboriginal people who are licensed as commercial fishers in the estuary general sector and the relative scale of their fishing effort, is not known.

The introduction of greater regulation in the estuary general fishery from the mid 1980s had several unintended consequences in relation to the access of Aboriginal communities to the estuary 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 Estuary General Fishing

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 estuary general 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.

Table 4.2 - Increasing Regulation of Estuary General Fishing (cont)

Date	Regulation	Effects on Aboriginal fishers (advice from Aboriginal community representatives)
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 haul and prawn haul components of the fishery, 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).
	Closure of certain beaches and estuaries to commercial activity during holiday periods	Several NSW estuaries are closed to commercial fishing over weekends and during holiday periods when recreational demand is greatest, or to protect habitat/resources (total of 200 closures current). 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

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, and the extent to which some of these species are currently exploited by the commercial fishery.

Table 4.3 - Species valued by commercial and Indigenous fishers

Species	Commercial fishery	Indigenous fishery
Sea mullet	Important resource, likely to be fully fished	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	Widely fished, anecdotal information
Yellowfin bream	Fully fished	Black bream (not yellow fin bream) reported ethnographically and in midden sites; reported from the Wreck Bay community in 1950s
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	To be determined	Widely fished, anecdotal information
Sand whiting	Moderately fished	Reported ethnographically and in midden sites; reported in recreational survey of Indigenous fishers; reported from the Wreck Bay community in the 1950s
Longfinned eels	Moderately to fully fished	Ethnographic reports of eel trapping in upper estuaries and wetlands
Pipi	To be determined	Most common species in ocean beach middens; pipi gathering a strong contemporary Indigenous fishery activity, both recreational and small scale commercial
Flat-tail mullet	To be determined	No information available
Silver trevally	Fully fished to overfished	Reported ethnographically and in midden sites
Mulloway	To be determined	Reported from archaeological sites; reported from the Wreck Bay community in 1950s
Tarwhine	To be determined	No information available
Leatherjacket	To be determined	Reported from archaeological sites

Table 4.3 - Species valued by commercial and Indigenous fishers (cont)

Species	Commercial fishery	Indigenous fishery
Garfish	To be determined	Reported in recreational survey of Indigenous fishers
Tailor	To be determined	Reported ethnographically; reported in recreational survey of Indigenous fishers
Snapper	Fully fished to overfished	Reported from archaeological sites; reported in recreational survey of Indigenous fishers
Yellowtail	Fully fished	No information available
Trumpeter whiting	To be determined	No information available – probably widely fished
Australian salmon	To be determined	Commonly reported in ethnographic descriptions
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)	To be determined	Contemporary Indigenous fishery, 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

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 shell fish harvesting, although a number of the shell fish 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.

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) 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 Estuary General 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 Estuary General 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 FISHERY AND ESTUARY GENERAL 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 haul) 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 estuary general 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 EGFMS

The draft estuary general fishery management strategy identifies Indigenous people as stakeholders in the estuary general 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 EGFMS 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 estuary 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.*

Part 4 of the Estuary General Fishery Management Strategy relates to performance monitoring and review. The performance indicator listed for appropriate sharing of the estuary general 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 estuaries, as well as in pipis and beach worms. The NSW Government now also acknowledges that Indigenous community interests in the estuary 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 Fisheries Strategy for NSW.

The working paper does not provide a specific definition of Indigenous fishery 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 many issues, which were summarised in the working paper into fifteen principal issues of concern to Aboriginal people that should be addressed by the Indigenous Fisheries 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 traditional cultural fishing under the Indigenous Fisheries Strategy. Until the strategy is released an interim arrangement has been implemented. Local Aboriginal land council (LALC) members and any Indigenous persons fishing with them are exempt from the fee if fishing in the LALC area. A practical process for issuing certificates of fee exemption is now being considered; and

- Principles for the Indigenous Fisheries Strategy have been proposed.

4.5.4 Interaction of the EGFMS and the Indigenous fishery strategy

The time frame for the finalisation of the Indigenous Fisheries 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 Estuary General Fishery Management Strategy will be assessed and will commence implementation before negotiations about the Indigenous Fisheries Strategy are complete.

The preliminary indications are that the Indigenous Fisheries Strategy will, subject to Government funding address many of the issues that remain as outstanding concerns to the Aboriginal community in relation to the estuary general 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 estuaries and other fisheries, ensuring that any necessary changes to the EGFMS will also be gradual.

Ongoing review of the Estuary General Fishery Management Strategy will be essential to ensure that any changes in the policy approach to Indigenous fisheries are adopted within the EGFMS. It is proposed that the EGFMS 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 EGFMS.

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 by the 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 fisheries.

- 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 a sustainable Indigenous fishery.

- 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 estuary general 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 ESTUARY GENERAL FISHERY ACTIVITIES ON ABORIGINAL SITES AND INDIGENOUS ISSUES

As noted above, the risk of impacts on Aboriginal sites from estuary general 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 estuary general 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 the banks of estuaries 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 estuary general sector (and other sectors) highlighting risks to Aboriginal sites and how these can be minimised. This is particularly important for beach pipi and worm collectors who access beaches in 4WD vehicles;
- 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 EGFMS should be reviewed after two years, so that changes to Indigenous fishery policies can be accommodated.

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APPENDIX 1

Principal Commercial Fishery Estuaries

Average production of estuaries that make up 95% of the estuary general catch in NSW, 1997-98 and 1998-99

Estuary	Production (kg)
Clarence River	979,373
Myall Lakes / Port Stephens	520,205
Wallis Lake	443,152
Lake Macquarie	278,441
Tuggerah Lakes	270,471
Hawkesbury River	221,853
Richmond River	219,065
Tweed River	178,184
Camden Haven River	165,101
Lake Illawarra	164,666
Manning River	164,244
Hunter River	153,355
Botany Bay	122,030
Shoalhaven River	107,151
St Georges Basin	100,562
Port Jackson	86,739
Macleay River	86,605
Hastings River	78,828
Nambucca River	69,845
Turros Lake	41,419
Jervis Bay	28,973
Smiths Lake	27,031
Bellinger River	26,386
Coila Lake	20,752

APPENDIX 2

Shipwreck Sites associated with New South Wales Estuaries

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Annie	07/1903	TWEED RIVER	Tweed River Heads	SMH 4/7/1903; RBS	AIMA North Riv 270	
Arrow	03/07/1859		Tweed River Bar	SMH 14/7, 4/8, 6/8/1859; RBS	AIMA North Riv 46	
Atalanta	28/02/1868		Tweed River bar	SMH 2/3/1868; RBS	AIMA North Riv 1054	
Bellinger	30/07/1873		Tweed River, north head	RBS; Sydney Register of Wrecks off NSW in 1873	AIMA North Riv 994	
Chindera	09/12/1896		Tweed River bar	RBS; SMH 29/9/1896, 12/1/1897	AIMA North Riv 264	
Comet	30/03/1851		Tweed River, nth side of entrance	RBS; SMH 12/4/1851; Parsons, R Pre-1850 Registers	AIMA North Riv 1169	
Dollar Bird	26/11/1884		Tweed River, north head	RBS; SMH 27/11, 28/11/1884; Dundon, G, The Shipbuilders of Brisbane Water NSW, 1997.	AIMA North Riv 226	Struck bar while under tow.
Ebenezer	01/08/1859		Tweed River bar	RBS; SMH 6/8/1859; Loney, J Vol 2	AIMA North Riv 122	4 lives lost.
Emma Pyers	02/1930		Tweed River	RBS	AIMA North Riv 1872	
Fanny	18/10/1862		Tweed River Bar		20611	
Fanny Morris	20/06/1848		Tweed River bar, nth spit	RBS; SMH 1/6/1848	AIMA North Riv 128	
Favorite	01/02/1857		Tweed River bar		20606	
Flirt	01/01/1875		Tweed River Bar		20674	
Flirt	17/07/1860		Tweed River, on bank at mouth	RBS; Syd 39/1853; SMH 7/3, 11/3/1857	AIMA North Riv 175	
Friendship	28/11/1912		Tweed River Heads, rocks at end of south wall	RBS; SMH 30/11, 2/12, 3/12/1912	AIMA North Riv 983	
Jane	07/1848		Tweed River	RBS	AIMA North Riv 137	
Koh I Noor	05/09/1858		Tweed River bar	SMH 11/8, 4/10/1859; RBS	AIMA North Riv 140	
Minerva	26/11/1865		Tweed River bar	SMH 21/12/1865; RBS	AIMA North Riv 149	
Murwillumbah	01/1909		Tweed Heads	RBS; Dundon, G, The Shipbuilders of Brisbane Water NSW, 1997	AIMA North Riv 282	
Ocean Queen	1851		Tweed River, bar	RBS 26/1845; SMH 29/8/1851, 9/9/1851; The Empire 2/9/1851	AIMA North Riv 152	
Panic of 66	20/05/1870		Tweed River, rocks at the north head	SMH 30/5, 3/6//1870; RBS	AIMA North Riv 153	
Pastime	1916		Tweed River	Loney, J 'Australian Shipwrecks Vo 4 1901-1986' Marine History Publications, 1987	AIMA North Riv 291	
Perseverance	14/04/1870		Tweed River, bch below north head, on rocks	SMH 3/4, 26/4, 29/4, 30/4/1870; RBS	AIMA North Riv 1488	
Pioneer	13/01/1877		Tweed River entrance on rocks	RBS; Marine Board register of NSW wrecks 1877	AIMA North Riv 600	
Rose	01/01/1847		Tweed River	RBS 15/1841 & 77/1842	AIMA North Riv 160	
Settlers Friend	17/08/1877		Tweed River entrance	SMH 20/3/1878; Marine Board register of NSW wrecks in 1878; RBS	AIMA North Riv 1060	
Terranora	22/02/1933		Tweed River, north breakwater	SMH 23/2/1933, 24/2/1933, 25/2/1933; RBS	AIMA North Riv 2052	
True Blue	9-10/1881		Tweed River bar, rocks on north head	RBS	AIMA North Riv 219	
Tweed	19/04/1888		Tweed River Heads	RBS	AIMA North Riv 239	
Tweed	06/1849		Tweed, on beach near River mouth, capsized	SMH 14/6/1849	AIMA North Riv 1065	
Annie C Lynn	1891	BRUNSWICK RIVER	Brunswick River, north head	SMH 2/5/1891; RBS	AIMA North Riv 252	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Centurion	03/02/1875		Brunswick River, bar	RBS; Marine Board Register of ships lost, from 1875; SMH 6/2, 18/3/875	AIMA North Riv 989	
Clara	04/1850		Brunswick River, north head, ashore	RBS; SMH 30/4/1850	AIMA North Riv 1159	
Dolphin	19/02/1887		Brunswick River, bar	RBS; SMH 21/2/1887	AIMA North Riv 2	
Endeavour	14/02/1892		Brunswick River, bar	RBS; SMH 15/2, 16/2, 1/3, 8/3/1892	AIMA North Riv 922	
Lizzie Frost	28/12/1887		Brunswick River Heads, north beach	SMH 29/12, 30/12/1887 SMH 24/7/1889; RBS	AIMA North Riv 238	
Louisa	03/1849		Brunswick River	SMH 14/6/1849; RBS	AIMA North Riv 143	
Miranda	29/12/1874		Brunswick River, ashore on south side	SMH 31/12/1874; RBS 7/1874; Brisbane Lloyd's Register	AIMA North Riv 1108	
Nambuccra	13/03/1880		Brunswick River, ashore	SMH 16/3/1880; Marine Board register of wrecks for 1880; RBS	AIMA North Riv 973	
Star of The Sea	22/02/1878		Brunswick River bar, south spit	SMH 27/7/1878; Marine Board register of NSW wrecks - 1878; RBS	AIMA North Riv 207	
Titania	06-07/1879		Brunswick River, entrance	SMH 6/7/1879, 15/3/1880; Marine Board register of NSW wrecks 1879; RBS 41/1871 and 31/1855 Sydney	AIMA North Riv 213	
West Hartley No 1	11/02/1874		Brunswick River, entrance	SMH 23/3/1864, 24/2/1874; Marine Board register of NSW wrecks - 1874; RBS	AIMA North Riv 1659	
Adventure	1855?	RICHMOND RIVER	Richmond River	RBS	AIMA North Riv 865	
Alert	06/1854		Richmond River, north spit	SMH 1/8/1854; RBS	AIMA North Riv 39	
Australasian League	05/09/1857		Richmond River, north head	SMH 19/9/1857; RBS, Sydney	AIMA North Riv 74	
Australia	11/02/1874		Richmond River bar	SMH 20/2/1874; RBS; Sydney Dept of Navigation - Register of Wrecks for 1874	AIMA North Riv 197	
Britannia	1945-50		Richmond River, Ballina	RBS, Sydney	AIMA North Riv 1822	
Callender	06/06/1871		Richmond River bar, rocks to nth of entrance	SMH 15/6/1866, 20/6/1871; RBS, Sydney	AIMA North Riv 188	
Champion	27/11/1860		Richmond River	RBS; SMH 8/12/1860	AIMA North Riv 1140	
Colleen Dhas	04/1883		Richmond River bar	RBS; SMH 3/4/1883	AIMA North Riv 221	
Columbine	01/02/1851		Richmond River, inside	RBS; SMH 4/3/1851; Parsons, R Pre-1850 Registers	AIMA North Riv 1166	
Comet	28/07/1887		Richmond River, btwn channel and Nth Head	SMH 29/7/1887	AIMA North Riv 247	
Comet	19/03/1890		Richmond River, south spit	RBS; SMH 21/3/1890	AIMA North Riv 563	
Culloden	28/04/1872		Richmond River north spit	RBS; SMH 1/5, 14/5, 15/6/1872	AIMA North Riv 190	File includes map of Richmond River and location of supposed wreck of Culloden.
Dragon	06/04/1869		Richmond River Heads	RBS 4/1862; Sydney SMH 13/4, 14/4, 16/4, 17/4 19/4/1869	AIMA North Riv 120	
Ellesmere	26/02/1873		Richmond River Heads, ashore	RBS; SMH 3/3, 3/4/1873; Marine Board Register of ships lost 1873	AIMA North Riv 195	
Enterprise	04/07/1847		Richmond River bar	RBS; SMH 27/7, 30/7/1847	AIMA North Riv 124	Grounded on bar, 2 deaths.
Falcon	18/12/1866		Richmond River bar	RBS	AIMA North Riv 127	
Favourite	03/1857	RICHMOND RIVER	Richmond River bar	RBS; SMH 13/3/1857, 3/5/1857	AIMA North Riv 129	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Fox	07/01/1871		Richmond River bar	RBS; SMH 16/1/1871	AIMA North Riv 975	
Francis Hixson	12/01/1883		Richmond River bar, 100yds inside beacons line	RBS; SMH 1/9, 15/9/1894	AIMA North Riv 223	
Golden Fleece	04/1847		Richmond River bar, south spit	RBS; SMH 14/4, 15/4, 11/5/1847	AIMA North Riv 131	
Goldseeker	02/1861		Richmond River bar	SMH 22/2/1861; Maitland Mercury 26/2/1861 p4a; RBS	AIMA North Riv 132	
Goodiron	1895		Richmond River entrance	RBS	AIMA North Riv 262	
Grace Lynn	03/06/1892		Richmond River bar	RBS; SMH 14/6/1892	AIMA North Riv 256	
Harp	1863		Richmond River bar	RBS; Syd 23/1853; 149/1853	AIMA North Riv 141	
Harriett	1851		Richmond River bar	SMH 19/5, 26/5/1851 RBS	AIMA North Riv 133	
Henry	06/03/1861		Richmond River bar, north spit	RBS 160/1854 Syd	AIMA North Riv 134	
Hilander	07/10/1872		Richmond River Heads, north spit	RBS	AIMA North Riv 980	
Hope	06/1845		Richmond River bar, south spit	Sydney Gazette & General Trade List 28/6/1845 p 163; RBS	AIMA North Riv 1732	
J and T Fenwick	01/04/1883		Richmond River entrance	SMH 3/4, 8/5/1883; RBS	AIMA North Riv 224	
Jane	1862		Richmond River	RBS	AIMA North Riv 138	
John Bullock	02/09/1871		Richmond River, north head on rocks	SMH 5/9, 6/9/1871; RBS 18/1871 Sydney	AIMA North Riv 1035	
Josephine	25/11/1865		Richmond River Heads, on Middle Spit	SMH 5/12, 7/12, 21/12/1865; RBS 69/1854 Sydney	AIMA North Riv 139	
Lady Musgrave	27/03/1904		Richmond River bar	NMH & Miners' Advocate 29/31904; SMH 115/2/1905; RBS	AIMA North Riv 272	
Lismore	10/05/1885		Richmond River entrance	SMH 12/5, 13/5, 27/7/1885; RBS	AIMA North Riv 229	
Lizzie Blair	01/05/1869		Richmond River bar, south spit	SMH 8/5, 13/5/1869; RBS	AIMA North Riv 142	
Madge Wildfire	28/03/1851		Richmond River, near bar	SMH 7/5/1851; RBS	AIMA North Riv 145	5 deaths.
Margaret and Mary	06/10/1871		Richmond River bar	SMH 10/10/1871; RBS	AIMA North Riv 1029	
Mary Ann	13/08/1851		Richmond River, sand spit at entrance	SMH 3/9/1851; The Empire 2/9/1851; RBS	AIMA North Riv 146	
Mary Jane	1852		Richmond River bar	SMH 15/4, 23/4/1852; RBS	AIMA North Riv 883	
Matilda	05/1849		Richmond River, north bar	SMH 15/5/1849; RBS 73/1849	AIMA North Riv 1112	
Matilda Ann	06/1849		Richmond River, north head	SMH 14/6/1849 RBS	AIMA North Riv 148	
Nautilus	03/03/1844		Richmond River bar, south spit	RBS; Dunn, Gwen 'Shipbuilders of Brisbane Water, NSW' 1997	AIMA North Riv 35	
Northumberland	07/01/1845		Richmond River bar, on south spit	SMH 6/2, 1/5/1845; RBS	AIMA North Riv 151	
Ocean Bride	20/05/1881		Richmond River, Ballina, north side of channel	SMH 21/5, 24/5, 1/6, 23/8/1881; RBS	AIMA North Riv 1746	
Oscar S	30/09/1930		Richmond River, Ballina	SMH 1/10/30	AIMA North Riv 1990	
Petrel	08/03/1866		Richmond River bar	SMH 21/03/1866; RBS	AIMA North Riv 156	
Pianet	24/12/1854		Richmond River	RBS	AIMA North Riv 1492	
Platypus	1883/84		Richmond River, south arm	SMH 13/1/1883; RBS	AIMA North Riv 227	
Protector	01/07/1901		Richmond River bar	NMH & Miners' Advocate 2/7/1901; RBS	AIMA North Riv 269	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Ranger	07/11/1865		Richmond River Heads	SMH 25/11, 7/12/1865; RBS	AIMA North Riv 158	
Rescue	09/04/1908		Richmond River entrance, inner south spit	NMH & Miners' Advocate 29/7/1908; RBS	AIMA North Riv 280	
River Chief	25/11/1865		Richmond River Heads	The Perth Gazette 25/4/1845; 14/3, 31/10, 19/12/1846; 16/1, 27/2, 14/3/1847; Western Australian Journal 5/7/1845; RBS	AIMA North Riv 159	
Samuel Merritt	13/01/1877		Richmond River, ashore at north spit	SMH 16/1/1877; RBS; Marine Board register of NSW wrecks - 1877	AIMA North Riv 1063	
Sarah	22/05/1848		Richmond River, on rocks at north head	SMH 1/6/1848; RBS	AIMA North Riv 161	
Sarah Ann	08/10/1871		Richmond River bar, north spit	SMH 10/10, 12/10, 23/10/1871; RBS 49/1869 Sydney	AIMA North Riv 1062	
Sarah Fenwick	27/03/1900		Richmond River Heads, nth end of breakwater	NMH & Miner's Advocate 17/6/1900; RBS Sydney 37/1892; 3/1895	AIMA North Riv 267	
Sarsfield	10/02/1887		Richmond River bar, south spit	SMH 15/2, 23/2/1887; NMH & Miners' Advocate 15/2/1887; RBS	AIMA North Riv 237	
Scotia	01/10/1869		Richmond River bar, on south beach	SMH 11/10/1869 RBS	AIMA North Riv 162	
Sisters	05/05/1880		Richmond River bar, north spit	SMH 6/5, 12/5, 7/5/1880; Marine Board register of NSW wrecks 1880; RBS	AIMA North Riv 1759	
Sophia Ann	09/04/1908		Richmond River entrance, southern sand spit	NMH & Miners' Advocate 17/4/1908	AIMA North Riv 281	
Spitfire	21/01/1857		Richmond River bar	SMH 17/3/1857; RBS	AIMA North Riv 163	
Susannah Booth	23/04/1876		Richmond River bar	SMH 10/5/1876; RBS (Syd) 10/1863 and 5/1876	AIMA North Riv 200	
Sylvanus	13/04/1871		Richmond River, on rocks at the north head	SMH 22/4, 1/5/1871; RBS	AIMA North Riv 1021	
Tayfield	01/12/1859		Richmond River bar	SMH 1 or 12 December 1859 PRO, Kew, RBS, BT107/432 Dundee 1837/29. Re-reg 20/12/1850 Dundee No.66. Hofc Acc. & Papers 1845 XLVII.287 Return of steam vessels reg. at 31/12/1844. H of C 1851 LII.197 Ret of sv reg. as at 1/1/1851. H of C 1839 XLVII.1 RBS 3/1859 Newcastle	AIMA North Riv 1067	
Tidal Wave	01/06/1879		Richmond River bar	SMH 15/3, 8/7/1879 Marine Board register of NSW wrecks - 1879 RBS	AIMA North Riv 212	
Tomki	13/09/1907		Richmond River, near north wall	NMH & Miners' Advocate 14/9/1907; RBS 52/1891 Syd	AIMA North Riv 278	
Union	28/04/1892		Richmond River bar	SMH 29/4/1892; RBS	AIMA North Riv 257	
Vesta	26/03/1873		Richmond River Heads, south spit	SMH 231/3, 3/5/1873; Marine Board register of NSW wrecks 1873; RBS	AIMA North Riv 196	
Waimea	10/01/1872		Richmond River Heads, north side	SMH 13/1, 16/1, 22/1, 2/4/11972; RBS	AIMA North Riv 192	
Wallaby	14/05/1874		Richmond River, north spit	SMH 6/6, 2/7/1874; RBS; Marine Board Register of Wrecks for 1874	AIMA North Riv 1015	
Walrus	07/01/1871		Richmond River bar	SMH 16/1/1871; RBS	AIMA North Riv 1091	
William and James	15/07/1856		Richmond River	RBS	AIMA North Riv 958	
William Langford	15/11/1894		Richmond River bar	SMH 17/9, 26/9/1894; RBS	AIMA North Riv 261	
Winnie	1887		Richmond River bar	RBS	AIMA North Riv 1764	
Alexander Macleay	01/1841	CLARENCE RIVER	Clarence River bar	RBS	AIMA North Riv 42	
Banzai	02/05/1909		Clarence River, Tucabia, near Ulmarra	RBS; SMH 5/5/1909	AIMA North Riv 328	Burnt at moorings at Upper Coldstream

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Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Cakobau	1914c		Clarence River, opposite Harwood Mill	RBS; Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters', 1998.	AIMA North Riv 326	
City of Sydney	09/11/1868		Clarence River Heads on nth shore	RBS; SMH 10/11, 11/11, 19/11, 19/11, 27/11/1868; Parsons, R Pre-1850 Registers	AIMA North Riv 1157	
Clarence	08/1877		Clarence River, ashore in river	RBS; Clarence & Richmond Examiner 4/9, 11/91877	AIMA North Riv 250	
Coldstream	11/12/1937		Clarence River, Ulmarra	Listed in RANZS list of lost, missing or taken from active service, 1949 edition. No newspaper reference but Register annotation provides details of loss.	AIMA North Riv 1842	
Coquette	31/12/1873		Clarence River Heads, west spit	Clarence & Richmond Examiner Tues 7 Jan 1873; SMH Mon 6 Jan 1873; RBS 72/1869	AIMA North Riv 194	
Cornstalk	1921		Clarence River	RBS Syd 50/1877 12/1889 56/1891; Parsons, R & Plunkett, G 'Scuttled and Abandoned Ships in Australian Waters', 1998.	AIMA North Riv 380	A river 'drogher'. After being left lying across the Pacific Highway in the 1921 flood, the vessel was cut up and dumped in the Clarence River.
Daring	14/02/1861		Clarence River bar, South Head	SMH 22 /2/1861, 4 /3/1861; Clarence and Richmond Examiner 2/4/1861; Maitland Mercury 26/Feb 1861, p4a; Daily Examiner 22/08/1936 (report on CD Rowley lectures); RBS 38/1860	AIMA North Riv 121	
F W Tucker	07/1878		Clarence River bar, north beach	Clarence & Richmond Examiner 9/7/1878; SMH 9/7/878; RBS 17/1875; Register of Marine Board Register of Ships lost, 1878.	AIMA North Riv 205	
Favourite	10/06/1896		Clarence River bar, north spit	SMH 11/6/1896, 12/1/1897; Clarence & Richmond Examiner 13/6/1896.	AIMA North Riv 263	
Grafton Punt	11/12/1943		Clarence River, Grafton	NMH 13/12/43 P. 3	AIMA North Riv 1892	
Helen Macgregor	1875		Clarence River, on reef at South Head	Argus 15 March 1875; SMH 18 March 1876; Marine Board Register of Wrecks for 1875; RBS 71/1867.	AIMA North Riv 198	
Induna	1932		Clarence River, south bank, 200m upstream from Grafton bridge	Daily Examiner 8 Oct 1975, 31 Aug 1990; Daily Telegraph Mirror 18 Oct 1994, p35; 'The Main Line Fleet of Burns Philip' by Wilkinson and Willson; Grafton Heritage Inventory Listing Sheet (No. 6.31).	AIMA North Riv 2122	Memorial plaque includes: " Operated by Burns Philip & Co Ltd 1904 to 1920 in the Pacific Islands serving Lord Howe Is, Norfolf Is, New Hebrides, Gilbert Is, Marshall Is, Caroline Is. Later used as a train ferry then a wharf in the Clarence River. The vessel's history includes the escape of Sir Winston Churchill from the Boers during the Boer War and its capture in the Marshall Islands by the Germans during WWI."

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Josephine	24 or 21/03/1879		Clarence River, Yamba, Hickey Island	SMH 15/3, 2/4/1879; RBS; Marine Board listing of shipwrecks for 1879; Richards, Mike, 'Shipwreck Heritage of the Clarence River', 1996; Australasian Shipping News 29.3.1879.	AIMA North Riv/Mid N 211	
Kalipso	07/05/1939		Clarence River, Cowper	RANZ 1937; RBS	AIMA North Riv 1923	
Lennie	01/1893		Clarence River, entrance	C & R 21/11, 25/11/1893	AIMA North Riv 80	Note: The 'Lennie' has been spelt 'Leonie' elsewhere.
Lillie	01/1887		Clarence River, near 'Factory Sawmill'	Clarence & Richmond River Examiner 29 Jan 1887; RBS 62/1878	AIMA North Riv 235	Struck by a tree while moored alongside the riverbank.
Mary Ann	13/01/1874		Clarence Heads, north spit	SMH ?/1, 6/1/1874; Clarence & Richmond Examiner 6/1/1874; Marine Board register of NSW wrecks - 1874; RBS Syd 5/1863.	AIMA North Riv 1025	
Mary Ann Christina	06/06/1876		Clarence Heads, north beach	Clarence & Richmond Examiner 3/6, 13/6/1874; SMH 29/5, 15/6/1876; Marine Board register of NSW wrecks - 1876; RBS Syd 9/1872, 29/1875; Index to NZ section RBS 1840-1950 - M Watt.	AIMA North Riv 965	Previously beached at Manning River, in 1874. Registered originally in NZ as 'Marie Ann Christie'. In Sydney, registered as 'Mary Ann Christina' also used in all contemporary newspapers.
Mary Bannatyne	13/01/1886		Clarence Heads, on spit inside the bar	SMH 16/1/1886; Clarence & Richmond Examiner 16/1/1886; RBS.	AIMA North Riv 232	
New England	12/1882		Clarence River bar, north spit	SMH 28/12, 29/12, 30/12/1882, 2/2/1883,10/6/1886; NMH & Miners' Advocate 5/1, 8/1, 16/1/1883.	AIMA North Riv 220	
Nina Meg	1920c		Clarence River, below Harwood Mill	SMH 24/2/1917; Richards, Mike, 'Shipwreck heritage of the Clarence River', 1996.	AIMA North Riv 292	Ran aground at Turners Beach 22/2/1917, salvaged, tied up below Harwood Mill on Clarence River for some years and eventually sank.
Perseverance	18/04/1864		Clarence River Heads, ashore on sand bank	SMH 20/5, 25/4, 2/5/1864; Clarence & Richmond River Examiner 19/4, 26/4/1864; RBS 1/1861 Newcastle.	AIMA North Riv 154	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Phoenix	14/04/1852		Clarence River entrance, north side	SMH 22/8/1845, 26/4, 3/5, 4/5, 5/5, 15/6/1852; Daily Examiner 10/3/1947; RBS; 'The Bawden Lectures', from the records of the Clarence River Historical Society.	AIMA North Riv 157	Police constables were sent to protect cargo and personal property that washed ashore but newspapers record that by the time they arrived, Europeans and Aborigines had taken advantage of the windfall and removed much of the material.
Ramornie	1968c		Clarence River, near Mountain View	RBS; Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters' 1998; Clarence River Historical Society records (date of scuttling).	AIMA North Riv 310	Converted into a pontoon landing at Grafton in 1950s for use by flying boat service.
Susan	08/1850		Clarence River, inside the bar	SMH 28/8/1850; RBS	AIMA North Riv 1069	
Urara	02/05/1866		Clarence River Heads	Clarence & Richmond Examiner 2/5/1866; SMH 4/5, 8/5/1866; RBS.	AIMA North Riv 166	
Euroka	03/1875	SANDON RIVER	Solitary Islands, Sandon River, inside mouth	RBS; SMH Marine Board Register of Ships lost 1875	AIMA North Riv 985	
Lucynder	29/12/1867		Solitary Islands, Sandon River, inside	SMH 11/1/1868	AIMA North Riv 1031	
Doris	03/11/1919	BELLINGER RIVER	Bellinger River, north spit	RBS; RANZ 1917-1918; SMH 5/11, 6/11/19	AIMA Holiday 1862	
Ellerslie	22/05/1913		Bellinger River, across end of south wall	RBS; SMH 24/5, 26/5/1913	AIMA Holiday 330	
Elliston	02/1904		Bellinger Heads, south spit	RBS; SMH 15/2, 20/2, 22/2/1904	AIMA Holiday 320	
Emily T	1884		Bellinger River, inside point of the nth beach	RBS; SMH 24/4, 1/5, 2/5/1884	AIMA Holiday 174	
Emu	24/04/1884		Bellinger River, nth spit	Parsons (personal files);RBS 17/1853 Syd; SMH 24/4, 26/4, 1/5, 2/5/1884	AIMA Holiday 297	
Harrington	20/03/1896		Bellinger River entrance	RBS; SMH 23/3, 24/3, 5/5/1896, 12/1/1897	AIMA Holiday 312	
Hope	25/11/1865		Bellinger River bar, north spit	RBS; SMH 5/12/1865	AIMA Holiday 979	
Kate	13/06/1880		Bellinger River, north beach	Marine Board Register of Wrecks for 1880; RBS; SMH 15/6/1880	AIMA Holiday 411	
Lucy Ann	12/1857		Bellinger River, ashore	Dunn, 1997; RBS Syd 15/1851, 172/1853; SMH 16/12/1857	AIMA Holiday 1032	
Mary	25/02/1866		Bellinger River	RBS, Syd 20/1859	AIMA Holiday 518	
Matilda	24/06/1844		Bellinger River, north spit	RBS 52/1843; SMH 18/07/1844	AIMA Holiday 930	
Petrel	20/03/1896		Bellinger River entrance	RBS 12/1/1897; SMH 23/3, 24/3/1896	AIMA Holiday 314	
Princess Alexandra	10/04/1874		Bellinger River bar	Marine Board Register of Wrecks 1874; RBS 49/1867 Syd; SMH 18/4, 16/4, 30/4/1874	AIMA Mid Nth 1079	
Prosper Coulon	14/05/1884		Bellinger River Bar	Marine Board Register of NSW Wrecks, 1879; RBS; SMH 15/3/1880; 17/6, 5/7/1884	AIMA Holiday 299	Struck bar under tow
Repton	26/01/1933		Bellingen Heads, breakwater	RANZ 1932-33; RBS; SMH 28/1/1933	AIMA Holiday 2012	

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Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Sancho Panza	1861	BELLINGER RIVER	Bellinger River bar	RBS 54/1856 Syd; SMH 10/5/1861	AIMA Holiday 180	
Venus	09/06/1891		Bellinger River, on beach nth side near entrance	RBS; SMH 10/6, 11/6, 23/6/1891	AIMA Holiday 968	
William Hezlet	03/12/1864		Bellinger River bar, south spit	RBS; SMH 21/12/1864	AIMA Holiday 959	
Alert	28/07/1904	NAMBUCCA RIVER	Nambucca River bar	SMH 13/9/1904, 29/7/1904, 30/7/1904, 15/2/1905; RBS	AIMA Holiday 319	
Bellinger	26/04/1912		Nambucca River bar	SMH 29/4/1912 RBS, Syd	AIMA Holiday 373	
Bismark	09/06/1878		Nambucca River bar	SMH 6/7/1878; RBS, Syd; Register of Wrecks off NSW, 1878	AIMA Holiday 294	
Britannia	22/08/1878		Nambucca River entrance	SMH 23/8, 12/9/1878; RBS, Syd	AIMA Holiday 178	
Curlew	16/02/1914		Nambucca River, on outer edge of the bar	RBS; SMH 18/2/1918	AIMA Holiday 331	
Helena Davies	14/02/1891		Nambucca River Bar	RBS; SMH 20/2, 3/3, 10/3, 17/3, 30/3/1891	AIMA Holiday 306	Capsized on bar.
Thomas and Henry	18/06/1877		Nambucca Heads, Flat Rock on south spit	Marine Board Register of NSW Wrecks, 1877; SMH 20/6, 28/6, 12/7/1877	AIMA Holiday 1019	
Undine	31/01/1878		Nambucca River, north head	Marine Board Register of NSW Wrecks, 1878; RBS; SMH 1/2, 27/2/1878	AIMA Holiday 957	
Wellington	11/11/1892		Nambucca bar, north side, on rocks	RBS; SMH 12/11, 14/11, 29/12/1892	AIMA Holiday 307	
Zoe	12/1877		Nambucca River, south spit	SMH 114/12/1877	AIMA Holiday 1086	
Dove	28/07/1932	BOWRA RIVER	Nambucca Heads, Bowra River, Macksville	SMH 28/7/32	AIMA Holiday 1864	
Absalam	04/1863	MACLEAY RIVER	Trial Bay, Macleay River, bar	RBS, Syd 169/1853, 170/1853; SMH 9/4/1863	AIMA Mid Nth 6	
Agnes Irving	28/12/1879		Trial Bay, Macleay R, off Sth Spit, old entrance	Macleay Chronicle, 1/1/1880; Marine Board List of Wrecks, 1879; RBS 59/1862; SMH 15/3/1880, 7/1/1880	AIMA Mid Nth 34	
Bellinger	05/09/1918		Trial Bay, Macleay River, entrance	RBS, Syd; SMH 17/9, 20/9/1918	AIMA Mid Nth 389	
Belmore	09/12/1916		Trial Bay, Macleay River bar	RBS, Syd	AIMA Mid Nth 387	
Catherine	11/1836		Trial Bay, Macleay River, bar	Sydney Herald 3/11/1836; SMH 3/11/1836	AIMA Mid Nth 870	
Coraki	29/11/1900		Trial Bay, Macleay R, new entrance, nth wall, 40 yds inside	NMH 30/11/1900; RBS	AIMA Mid Nth 1180	
Euphemia	1863		Macleay River	RBS	AIMA Mid Nth 984	
*Fairy	05/1839		Trial Bay, Macleay River bar	Bateson, ?; RBS; Sydney Gazette 29/6/1839 p 2f	AIMA Mid Nth 876	*Register of National Estate places this wreck in Manning inlet.
Jolly Rambler	12/1836		Macleay River	RBS; Supplement to the Sydney Herald 12/12/1836	AIMA Mid Nth 879	
Julia	02/06/1864		Trial Bay, Macleay River, ashore, beached	RBS; SMH 8/6, 9/6, 21/6/1864	AIMA Mid Nth 880	
Kangaroo	20/02/1858		Trial Bay, Macleay River, on spit	Lloyd's Register; SMH 3/3/1858	AIMA Mid Nth 881	
Kirribilli	1890		Macleay River	Parsons, (personal files); RBS Syd 63/1866, 62/1880; SMH 11/8/1879	AIMA Mid Nth 422	Probably little or no wreckage remaining, sank during floods.

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Margaret Jane	31/01/1895		Trial Bay, Macleay River, entrance, ashore	RBS; SMH 1/2, 31/1, 2/2, 12/2, 19/2/1895	AIMA Mid Nth 360	
Milton Badger	23/05/1877		Trial Bay, Macleay River, entrance, north spit	Marine Board Register of NSW Wrecks, 1877; RBS; SMH 26/5/1877	AIMA Mid Nth 1744	
Rocket	28/05/1882		Trial Bay, Macleay River, entrance, inside bar	RBS 57/1878 Syd; SMH 29/5/1882	AIMA Mid Nth 349	
Twins	1865		Macleay River	Loney, 1980?	AIMA Mid Nth 893	
Undaunted	22/06/1873		Trial Bay, Macleay River bar	RBS	AIMA Mid Nth 971	
Advance	17/06/1933	MANNING RIVER	Manning River, Taree	SMH 19/6/33 p10h, (?)	AIMA Mid Nth 1792	
Amy	13/10/1879		Manning River bar	Parsons, ?; RBS; SMH 15/10/1879, 15/3/1880	AIMA Mid Nth 421	
Atalanta	1882		Manning River, north beach	RBS	AIMA Mid Nth 428	
Black Swan	04/06/1868		Manning River bar	Parsons (pers com); Richards, 1997; RBS Syd; SMH 9/6, 11/6, 18/6, 25/6/1868	AIMA Mid Nth 95	
Bortonius	1885		Manning inlet / entrance		RNE entry	
Brunswick	18/12/1886		Manning River bar	NMH 21/12/1886; RBS Syd	AIMA Mid Nth 437	
Bunyip	18/11/1889		Manning River, inside Old Bar	RBS Syd; SMH 21/11/1889	AIMA Mid Nth 449	
Burrawong	27/03/1909		Manning River breakwater (near northern training wall)	Brit Reg Syd 9/1890; RBS Syd; SMH 8/5, 28/5/1907	AIMA Mid Nth 118	
Challenger	08/1845		Manning River	RBS; Bateson Australian Shipwrecks 1845	AIMA Mid Nth 1139	
Chance	12/06/1874		Manning River	Marine Board Register of Ships Lost, 1874; RBS; SMH 18/6/1874	AIMA Mid Nth 397	
Cooloon	28/02/1917		Manning River, Coopernook	SMH says Cooloon sunk at Richmond River	AIMA Mid Nth 1179	
Coomba	1876		Manning inlet / entrance		RNE entry	
Diamantina	1881		Manning inlet / entrance		RNE entry	
Emma	1853		Manning River	RBS; SMH 2/2/1852	AIMA Mid Nth 1243	
*Fairy	1839		Manning inlet / entrance		*RNE entry - but SW DB record in Macleay River	
Fanny	03/1835		Manning River bar	Plantation Registry; State Records NSW; Sydney Herald 26/3/1835	AIMA Mid Nth 927	
Fire King	30/04/1873		Manning River bar, drifted onto north beach	Marine Board Register of Ships Lost, 1873; RBS; SMH 3/5, 7/5/1873	AIMA Mid Nth 982	
Florrie Ellison	04/05/1902		Manning River Heads, Harrington Inlet	RBS; SMH	AIMA Mid Nth 477	
Fly	10/10/1845		Manning River bar	RBS; SMH 27/10, 28/10/1845	AIMA Mid Nth 1266	
Gipsy	24/04/1856		Manning River bar, nth spit	RBS; SMH 30/4, 5/5/1856	AIMA Mid Nth 1294	
Go Ahead	19/03/1875		Manning River bar	Marine Board Register of Ships Lost, 1875; SMH 18/03, 23/03/1875	AIMA Mid Nth 16	
Gorilla	30/09/1872		Manning River bar, north beach	RBS; SMH 4/10, 12/10/1872	AIMA Mid Nth 1040	
Jane	1835		Manning River bar	Sydney Herald 22/1/1835	AIMA Mid Nth 1734	
Kincumber	22/10/1908		Manning River Heads	NMH & Miners' Advocate 16/7, 23/10/24/10/1908; RBS	AIMA Mid Nth 493	
Manning	1942		Manning River, Taree, on riverbank, north side	RANZ 1937; RBS	AIMA Mid Nth 1951	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Mary Ann	26/07/1849		Manning River, north spit	RBS 39/1843 Syd; SMH 11/8/1849	AIMA Mid Nth 1026	
May Queen	1868		Manning inlet / entrance		RNE entry	
Minimbah	13/04/1910	MANNING RIVER	Manning River, Coopernook (National Estate database: near northern training wall)	RBS; SMH 14/4, 19/4, 14/7/1910	AIMA Mid Nth 1440	
Oceana	07/10/1903		Manning River bar	RBS; SMH 21/9/1903	AIMA Mid Nth 481	
*Peacock	1876		Manning inlet / entrance		*RNE entry - but SW DB record in Camden Haven	
Pomona	19/10/1878		Manning River bar, north spit	Marine Board Register of NSW Wrecks, 1878; RBS 5/1863; SMH 16/8/1878, 13/11/1878	AIMA Mid Nth 420	
Providence	04/1836		Manning River, south spit	Sydney Herald 25/4/1836	AIMA Mid Nth 2104	
Sea Nymph	1885		Manning inlet / entrance		RNE entry	
Tam O'Shanter	22/02/1846		Manning River entrance	RBS; SMH 3/3/1846	AIMA Mid Nth 1597	
Trusty	06/05/1885		Manning River	RBS; SMH 9/5/1885	AIMA Mid Nth 435	
Ulmarra	10/10/1872		Manning River Heads, north beach	RBS; SMH 14/10/1872	AIMA Mid Nth 394	
Urana	31/08/1937		Manning River	Lloyd's Register 1932-33; RANZ 1937; RBS; SMH 1/9, 2/9/1937, 6/1/1938	AIMA Mid Nth 2067	
Ballina	13/02/1879	HASTINGS RIVER	Port Macquarie, entrance	Dept of Navigation Register of Wrecks for 1879; Illustrated Sydney News 21/7/1877; Port Macquarie News 2/6/1995; RBS Syd; SMH 19/6/1877, 5/3/1879, 15/3/1880, 15/7/1890	AIMA Mid Nth 77	
Barrangarry	04/04/1891		Port Macquarie, north spit	RBS; SMH 6/4, 7/4, 14/4, 21/4/1891	AIMA Mid Nth 358	
Dart	13/03/1832		Port Macquarie bar	SMH 18/9/1832 mentions the cutter 'Dart' being bought (by Hughes & Hosking) to be used as a trader between Newcastle & Sydney. Not possible to say if this is the same 'Dart'.	AIMA Mid Nth 872	
Hastings	29/07/1937		Port Macquarie bar	Maritime Services Board 1938 list of wrecks for the year 1937.	AIMA Mid Nth 1899	
Jessie Sinclair	31/07/1898		Port Macquarie bar	NMH & Miners' Advocate 2/8/1898; RBS; SMH 6/7, 8/7/1891	AIMA Mid Nth 362	
Josephine	02/06/1885		Port Macquarie bar, near gaol	SMH 4/6/1885; RBS	AIMA Mid Nth 354	
Narani	31/08/1933		Port Macquarie Breakwater	NMH 4/9/1933	AIMA Mid Nth 1980	
Port Macquarie Packet	07/1835		Port Macquarie, ashore	Sydney Herald 9/4, 9/7/1835	AIMA Mid Nth 1750	
Possum	1911		Hastings River	RBS	AIMA Mid Nth 382	
Richmond	21/01/1884		Port Macquarie, inside the bar	SMH 22/1, 23/1, 12/2/1884; RBS 60/1878 Sydney	AIMA Mid Nth 352	
Sally	13/04/1825		Port Macquarie, entrance	Sydney Gazette 5/5/1825; Col Sec letters received 1825 NSW Archives reel 2188 (4/1816); Letter from H Gillman & 2 letters from Port Macquarie Pilot/Harbour Master Richard Neave; Plantation Register abstract	AIMA Mid Nth 1545	
Somaki	12/12/1946		Port Macquarie	RBS; RANZ 1946	AIMA Mid Nth 2031	
Trilby	16/10/1907		Port Macquarie bar, north side	NMH 5/11/1907; RBS	AIMA Mid Nth 379	
Vixen	22/08/1866		Port Macquarie bar, rocks near Pilot Station	SMH 8/8, 23/8/1866; RBS 16/1863 Sydney	AIMA Mid Nth 894	
Wanderer	1906		Port Macquarie bar	Loney, J, 'Australian Shipwrecks', Vol4 1901-1986', Marine History Publications, 1987	AIMA Mid Nth 375	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Wanderer	15/11/1851		Port Macquarie, Gaol Point	SMH 16/11, 25/11/1851	AIMA Mid Nth 1649	
Alice	05/07/1877	CAMDEN HAVEN RIVER	Camden Haven bar, north spit	SMH 1/8/1877; RBS	AIMA Mid Nth 340	
Idant	13/03/1940		Camden Haven River, northern breakwater	SMH 14/3/1940; RBS	AIMA Mid Nth 1910	
Shamrock	19/02/1911		Camden Haven	British Register (Syd) 22/1904	AIMA Mid Nth 451	
*Peacock	22/01/1876		Camden Haven entrance	SMH 9/2/1876; Marine Board register of NSW wrecks - 1876 RBS	AIMA Mid Nth 338	*RNE places this wreck in Manning Inlet
Princess Marie	11/05/1876		Camden Haven, north spit	SMH 4/5/1876; RBS Marine Board register of NSW wrecks - 1876	AIMA Mid Nth 339	
Tottie	23/11/1896		Camden Haven Bar	SMH 24/11, 8/12/1896, 12/1/1897; RBS Syd 44/1890	AIMA Mid Nth 951	
Unique	29/11/1901		Camden Haven bar, aground	NMH & Miners' Advocate 21/12/1901; RBS	AIMA Mid Nth 365	Probably refloated.
Waldenses	10/10/1878		Camden Haven, entrance	SMH 14/10, 7/11/1878; RBS	AIMA Mid Nth 1092	
Bell Bird	31/05/1897	FORSTER	Cape Hawke, bar	NMH 2/6/1897; RBS, Sydney	AIMA Mid Nth 462	
Oberon	25/07/1876		Hawke River, ashore	SMH 16/8/1876; RBS	AIMA Mid Nth 258	
Empress of India	23/07/1900		Cape Hawke, Forster on outer bar	RBS; NMH 25/7, 21/8/1900, 17/8/1901	AIMA Mid Nth 473	
Forster Punt	05/01/1938		Forster	SMH 6/1/1938; NMH 6/1/1938	AIMA Mid Nth 1882	
Thistle	12/02/1907	PORT STEPHENS	Forster bar	SMH 14/2/1907	AIMA Mid Nth 492	
Ann	1876		Port Stephens, entrance	SMH 27/7/1876	AIMA Hunter 405	
Brighton	1916		Port Stephens, Duck Hole	RBS; Sydney Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters' 1998	AIMA Hunter 106	
Corra Lynn	17/11/1914		Port Stephens, entrance, on beach	NMH 10/12/1914; RBS 46/1902 Sydney Lloyds Register	AIMA Hunter 505	Report of a salvage.
Cyclone	10/04/1867		Port Stephens, north head	SMH 15/4, 22/4, 23/4/1867	AIMA Mid Nth 1191	
Cynthia	15/09/1900		Port Stephens, north head	RBS; NMH 17/9/1900	AIMA Mid Nth 472	
Dart	19/03/1876		Port Stephens, north head	RBS; SMH 21/3, 30/3/1876; Marine Board Register of ships lost, 1879	AIMA Mid Nth 408	
Dolly Wamsley	16/05/1894		Port Stephens, Stoney Point	RBS; NMH 24/5/1894	AIMA Hunter 556	
Dove	05/06/1828		Port Stephens, north head	Sydney Gazette 13/6/1828	AIMA Mid Nth 1207	
Dove	12/10/1857		Port Stephens, Long Island, ashore	RBS; SMH 2/11/1857	AIMA Hunter 1208	
Duroby	after 1923		Port Stephens, Duckhole	RBS Parsons, R & Plunkett, G 'Scuttled and Abandoned Ships in Australian Waters', 1998.	AIMA Mid Nth 438	
Echo	21/09/1894		Port Stephens, north head	RBS; SMH 26/9, 27/9/1894	AIMA Mid Nth 915	
Eldriss	26/02/1932		Port Stephens, Narrow Gut	SMH 29/2/32	AIMA Hunter 1870	
Emperor	30/03/1886		Port Stephens, north head, ashore	RBS; SMH 1/4/1886	AIMA Mid Nth 440	
Endeavour	25/07/1852		Port Stephens, ashore	Sydney Mail 11/8/1852	AIMA Hunter 1249	Set on fire by Aborigines. Aboriginal contact site.
Ethel	11/10/1884		Port Stephens, north head	RBS; SMH 13/10/1884	AIMA Mid Nth 430	
Fanny	17/04/1885	PORT STEPHENS	Port Stephens	RBS 141/1884 Sydney	AIMA Hunter 433	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Fire Queen	1896c		Port Stephens, hull on beach	RBS	AIMA Mid Nth 976	
Flying Fish	05/03/1870		Port Stephens, ashore	SMH 7/3, 8/3/1870 SMH 2/12/1864; RBS	AIMA Hunter 1268	This appears to be the same vessel that went ashore on the Manning River bar in a southerly gale that claimed a number of ships in November 1864.
Forest Queen	23/06/1902		Port Stephens, near inner light	SMH 26/6/1902; RBS 41/1894 Sydney	AIMA Hunter 1730	
Francis Freeling	06/1839		Port Stephens, inside, grounded	SMH 17/6/1839; British Register, Syd, 28/1839	AIMA Hunter 1275	
Freak	07/10/1864		Port Stephens, middle bank	RBS; SMH 21/10/1864	AIMA Hunter 1276	
Governor Musgrave	1925>		Port Stephens, Duckhole	Parsons, R & Plunkett, G 'Scuttled and Abandoned Ships in Australian Waters', 1998.	AIMA Central 502	
Hawke	11/09/1876		Port Stephens, north head	SMH 14/9/1876; RBS 22/1876 Sydney	AIMA Mid Nth 1039	
Hope	06/1817?		Port Stephens	Sydney Gazette 6/9/1817	AIMA Hunter 1323	Bateson (1972) in Australian Shipwrecks.p.57 says the crew may have been killed by Aborigines.
Huntley Castle	04/03/1883		Port Stephens, rocks near entrance	SMH 6/3/1883; RBS	AIMA Hunter 429	
Ida	19/06/1911		Port Stephens, Nelsons Bay, ashore	SMH 20/6/1911	AIMA Hunter 500	
Iluka	after 1911		Port Stephens	RBS; Parsons, R & Plunkett, G 'Scuttled and Abandoned Ships in Australian Waters', 1998.	AIMA Central 519	Originally a paddle steamer, converted into a lighter after 1911. Reportedly later transformed into a screw propelled drogher for use in the Port Stephens timber export industry. Abandoned in that area at an unknown date.
Isle of Thanet	05/03/1870		Port Stephens, ashore	SMH 7/3/1870; RBS	AIMA Hunter 1338	
Jane	8/06/1900		Port Stephens, Shoal Bay near Nelsons Head	NMH & Miner's Advocate 24/7/1900; RBS	AIMA Hunter 230	
Jessie Kelly	20/11/1886		Port Stephens, north head	NMH & Miner's Advocate 25/11/1886; RBS	AIMA Mid Nth 441	
Kate Thompson	before 1972		Port Stephens, Tea Gardens	RBS; Parsons, R, 'Ships Registered at Newcastle NSW before 1900', 1982.	AIMA Central 89	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Lord	06/1874		Port Stephens, Nelsons Beach	SMH 30/6/1874; RBS 43/1871	AIMA Hunter 399	
Lurline	10/09/1869		Port Stephens	SMH 15/9/1869; RBS	AIMA Hunter 1400	
Pandora	01/1836		Port Stephens, north head	Sydney Herald 18/1/1836; RBS Syd 19/1831	AIMA Mid Nth 1480	
Perseverance	05/1877		Port Stephens, north head	RBS; Marine Board register of NSW wrecks 1877	AIMA Mid Nth 662	
Psyche	1940		Port Stephens, Salamander Bay	Bastock, J 'Ships on the Australia Station' p. 120 . Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters' 1998	AIMA Hunter 2007	Ex third class cruiser RAN. Hulked 1922. Used at Port Stephens as a timber lighter. remains used in Clearnance Diving team excercises from 1950-1973. Remains now scattered.
Reliance	22/10/1928		Port Stephens, Tea Gardens	SMH 23/10/28; RANZ 1927-28 RBS	AIMA Mid Nth 2010	
Rose	07/10/1916		Port Stephens, Tea Gardens	SMH 10/10/1916; RBS	AIMA Mid Nth 538	
S A Hayward	13/03/1913		Port Stephens, on rocks inside north head	SMH 15/3/1913; NMH & Miners' Advocate 15/3/1913; RBS , Syd 14/1885	AIMA Mid Nth 504	
Sally	18/04/1925		Port Stephens	Loney, 'Australian Shipwrecks' vol. 4 p.120	AIMA Hunter 2022	
Sea Foam	29/01/1894		Port Stephens, Shoal Bay	SMH 31/1, 2/2, 6/2/1894; RBS 69/1878	AIMA Hunter 459	
Sea Ripple	13/05/1875		Port Stephens, north head	SMH 15/3, 26/3/1875; 18/3/1876; RBS	AIMA Mid Nth 403	
Secret	09/05/1869		Port Stephens, Providence Bay, ashore	SMH 13/5/1869; RBS	AIMA Hunter 1560	
Stag	27/01/1885		Port Stephens, north head, southside, ashore	SMH 29/1/1885; Mercury 3/2/1885;Launceton Examiner 7/8, 8/8, 10/8, 12/8, 18/8/1882; 229/1/1885; RBS	AIMA Mid Nth 434	
Terara	1930c		Port Stephens, Witt Island	Richards, Mike ' Pig & Whistle Run' 1997; Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters' 1998.	AIMA Mid Nth 451	Remains still visible.
Thordis	04/03/1906		Port Stephens, Nth Head	NMH & Miners' Advocate 5/3, 5/3, 6/3/1906; Lloyd's Register 1904-05	AIMA Mid Nth 1604	
Traveller	03/05/1874		Port Stephens, Nelsons Bay, Myall Beach, off	SMH 6/5, 8/5, 14/5/1874; Marine Board register of NSW wrecks - 1874	AIMA Hunter 400	
Trial	18/05/1861		Port Stephens, north head	SMH 21/5/1861; RBS	AIMA Mid Nth 1612	
Tybee	1865		Port Stephens, ashore	Loney, J, 'Shipwrecks of the NSW North Coast'	AIMA Hunter 1623	Tybee lost in PS 2/10/64 after taking shelter.
Active	18/02/1852	HUNTER RIVER	Newcastle, Hunter River entrance	RBS	AIMA Hunter 11	
Ajax	1928		Newcastle, nth of Stockton Bridge - West side	SMH 28/4, 1/5, 3/5/1897 (acquisition); Register of Australian and NZ Shipping; Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters' 1998.	AIMA Hunter 1793	
Alexander and John	1861		Newcastle, Nobbys Head	SMH 29/8/1861; RBS	AIMA Hunter 30	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Alice	02/04/1861		Newcastle, Nobbys Head	SMH 4/4/1861, 12/4/1861; RBS	AIMA Hunter 48	
Boatman	30/05/1901		Newcastle Harbour, near No. 12 Crane	NMH 31/5/1901	AIMA Sydney 1721	
Champion	10/05/1877		Newcastle, Hunter River entrance	SMH 1/5/1887	AIMA Hunter 537	
Delight	12/04/1838		Newcastle, Hunter River, entrance	RBS; SMH 16/4/1838	AIMA Hunter 1201	
Doorebang	31/07/1873		Newcastle, on rocks btwn Stoney Pt & Nobbys	RBS; SMH 1/8, 2/8/1873	AIMA Hunter 517	
Elaine	1914		Newcastle, Stockton, River Bank	RBS	AIMA Hunter 637	
Elamang	02/1905		Newcastle Harbour, nothern arm of breakwall	RBS; NMH 4/2/1905	AIMA Hunter 1225	
Gazelle	07/1860		Newcastle, ashore near lighthouse	SMH 24/7, 25/7/1860; RBS 30/1857 Melbourne	AIMA Hunter 1286	Outbound
Gilbert Jamieson	1859		Newcastle, nth side of Nobbys	RBS	AIMA Hunter 1293	
Goolwa	1919		Hunter River, entrance to South Arm	RBS; Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters' 1998.	AIMA Hunter 1890	
Heather Bell	before 1972		Hunter River	RBS; Parsons, R, 'Ships Registered at Newcastle NSW before 1900', 1982.	AIMA Hunter 73	
Jesse	12/03/1831		Hunter River, near Hog Island	Sydney Gazette 24/3, 7/4/1831; RBS Syd 8/1829	AIMA Hunter 1349	
Kate Tatham	04/11/1907		Newcastle, North Stockton, on River Bank	SMH 5/11/1907; RBS	AIMA Hunter 1362	
Katoomba	02/1905	HUNTER RIVER	Newcastle, nth breakwater	RBS	AIMA Hunter 1364	
King William IV	02/07/1839		Newcastle, ashore on Nobbys Island	Sydney Herald 22/1/1838; 5/7/1839; RBS	AIMA Hunter 1671	Outbound
Kuring Gai	1930		Hunter River, Hexham	RANZ 1929-30; Lloyd's Register 1927-28; RBS	AIMA Hunter 1932	
Marie	06/05/1914		Hunter River, Paterson	NMH 7/5/1914; RBS	AIMA Hunter 1014	
Mary Lloyd	05/05/1874		Newcastle, Nobbys Head	SMH 5/5/1874; Marine Board register of NSW wrecks - 1874	AIMA Hunter 526	Outbound
Norfolk	10/1800		Newcastle, Pirate Point	HRA I, ii, p564; HRA I, iii, p14, 38, 759, 760; Parsons, R (personal files)	AIMA Hunter 1464	Ship was rescued and wrecked in Tahiti, 1802.
Otago	31/07/1867		Newcastle	SMH 1/7/11867; RBS	AIMA Hunter 1477	
Rob Roy	07/1838		Newcastle, Nobbys Head, ashore	Sydney Herald 16/7/1638; RBS	AIMA Hunter 888	
Swansea	02/12/1915		Newcastle Harbour	Newcastle Morning Herald 8 March 1916; RBS	AIMA Hunter 645	
Sylvan	12/1924		Newcastle, near Stockton Hospital	RBS Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters' 1998.	AIMA Hunter 2046	
Topsey	before 1972		Hunter River	RBS; Parsons, R, 'Ships Registered at Newcastle NSW before 1900', 1982.	AIMA Hunter 49	
Toronto	14/09/1944		Newcastle, Stockton	NMH 15/9/1941 P.1	AIMA Hunter 2055	
Vulcan	24/12/1837		Newcastle, entrance to Hunter River	Sydney Herald 28/12/1837; 8/1/1838 RBS	AIMA Hunter 1645	
Yarra	01/1908		Newcastle Harbour, opposite Pilot Station	SMH 3/1/1908	AIMA Hunter 623	Likely to have been refloated.
Alpha	before 1862	WILLIAMS RIVER	Williams River, near Newcastle	Australasian Shipping Record Jul 1975 RBS Melbourne 9/1841; 12/1843	AIMA Hunter 901	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Cooreei	03/08/1906		Clarencetown, opp Williams River SNC whvs	British Register (Newcastle) 5/1886	AIMA Hunter 617	
Currumbene	09/01/1934		Williams River, near Seaham (Hunter R trib.)	RBS Lloyds Register - Steamers & motorships under 300 tons; RANZ 1933-34	AIMA Hunter 1855	
Garnet	03/1930		Williams River, Seaham (Hunter R tributary)	British Register (Syd) 45/1900 , but re-registered in Newcastle in 1904. 1904 register not yet acquired.	AIMA Hunter 1886	
Blue Gum*	19??	LAKE MACQUARIE	Swansea channel	MSB unsourced list of vessels wrecked off NSW coast	AIMA Hunter 97	
Crescent I	1916		Swansea	RBS	AIMA Hunter 643	
Frederick	1831		Lake Macquarie, Reids Mistake, near,	Sydney Gazette 25/6, 30/6/1831	AIMA Hunter 1278	
Free Trade	29/04/1884		Lake Macquarie Heads	SMH 1/5/1884; RBS	AIMA Hunter 557	
Maggie Johnson	26/06/1902		Lake Macquarie, Young Wallsend, Cockle Ck	NMH & Miners' Advocate 27/6/1902; RBS 31/1888 Sydney	AIMA Hunter 629	
Paris	09/02/1912		Lake Macquarie, breakwater	SMH 14/2, 16/2/1912; NMH & Miners' Advocate 19/2, 28/3/1912; RBS	AIMA Hunter 635	
Portable	1910		Swansea, Belmont	SMH 14/5/1910, p14	AIMA Hunter 631	
Sally	16/07/1812		Lake Macquarie, Reid's Mistake	Sydney Gazette 1/8/1812	AIMA Central 1544	
Scottish Queen	21/12/1919		Lake Macquarie	NMH 22/12/1919, 30/12/19	AIMA Central 2024	Hit bar, engine failed. 7 deaths.
Sea Sovereign	01/01/1938		Lake Macquarie, northern breakwater	SMH 3/1/1938; NMH & Miners' Advocate 3/1/1938	AIMA Hunter 2026	
Uncle Tom	21/12/1875		Lake Macquarie bar	Marine Board register of NSW wrecks - 1875; RBS	AIMA Hunter 532	
Village Maid	06/09/1876		Lake Macquarie entrance	RBS	AIMA Hunter 521	
West Hartley No. 2	07/1866		Lake Macquarie entrance		Reids Mistake	Wreck probably recovered.
Anne Maria	21/07/1857	HAWKESBURY RIVER / BROKEN BAY	Broken Bay, 'Bungarees Noragh'	SMH 10/8/1857	AIMA Central 61	
Argument	03/1809		Broken Bay, East & West Reef	SG 2/4/1809, 26/3/1809	AIMA Central 69	
Ariel	30/07/1857		Broken Bay, Barranjoey Head, ashore	SMH 31/7, 1/8/1857	AIMA Central 70	Probably refloated.
Bella Coulter	06/10/1872		Hawkesbury River mouth, Flint & Steel Point	SMH 22/10/1872	AIMA Central 461	
Brothers	10/1845		Broken Bay, entrance in 2 fathoms	SMH 13/10/1845; RBS, Sydney	AIMA Central 112	
Brothers	1870		Sydney, Pittwater	RBS, Sydney	AIMA Sydney 113	
Caroline	12/02/1869		Brisbane Water, bar, west spit	RBS, Sydney; SMH 17/2, 26/2/1869	AIMA Central 1123	
Charlotte Fenwick	29/04/1920		Hawkesbury River	RBS; RANZ (18 - 19)	AIMA Central 1834	
Denmark Hill	26/04/1839	HAWKESBURY RIVER / BROKEN BAY	Sydney, Pittwater	RBS; SMH 26/7/1822 p3c; SG 7/10/1824 p2a; 29/4/1839	AIMA Sydney 1202	
Dora	30/9/1871		Broken Bay Bar (Brisbane Waters)	RBS 30/1870 Sydney	AIMA Central 2116	
Elizabeth	1876		Hawkesbury River	RBS	AIMA Central 918	
Endeavour	1850		Hawkesbury River	RBS	AIMA Central 1248	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Experiment	12/03/1818		Broken Bay, sth east arm	Sydney Gazette 1/1/1809, 21/3/1818	AIMA Sydney 1254	
Happy Days	05/05/1931		Hawkesbury River, Brooklyn, 'The Gunya'	SMH 6/5/31	AIMA Central 1898	
Hawkesbury	11/1916		Hawkesbury River	Lloyd's Register 1916-17; RBS Syd 51/1886, 40/1892	AIMA Central 760	Previously burnt and scuttled at Sadeville, Hawkesbury River in 1891, but refloated and rebuilt.
Industry	10/09/1876		Broken Bay, under Mt Elliot, (Lion Is), ashore	SMH 13/9, 29/9/1876; RBS Syd 114/1854, 34/1858	AIMA Central 558	
John	22/05/1803		Broken Bay, at Flint and Steel Bay	Sydney Gazette 29/5/1803	AIMA Central 1353	
Kellermont	16/02/1868		Hawkesbury River, Flint & Steel Bay	SMH 19/2/1868; RBS	AIMA Central 1365	
L.H.E.	04/10/1947		Hawkesbury River, Jerusalem Bay	RBS	AIMA Central 1935	
Lady Alicia	28/07/1934		Broken Bay, Patonga	SMH 30/7/34	AIMA Central 1936	
Linnett	04/1834		Broken Bay	SMH 28/4/1834	AIMA Central 1388	
Maitland	06/05/1898		Broken Bay, Maitland Bay	SMH 9/5, 10/511/5, 12/521/5, 25/5, 6/10/1898; 10/1/1899; State Archives Office Vice Admiralty Court of NSW 1787-1911: 32/1888, 2/8584, 7/3866; RBS	AIMA Central 1408	Lost in the 'Maitland Gale'. 21 deaths.
Mako	16/01/1935		Sydney, Broken Bay, Lion Island	SMH 17/1/35 p.16 report of wreckage of launch - no name	AIMA Central 1946	
Marian	18/10/1936		Hawkesbury River, Croppy Point	SMH 20/10/1936, 26/10/1936	AIMA Central 1956	
Marion	1856	HAWKESBURY RIVER / BROKEN BAY	Broken Bay	SMH 14/11/1856; RBS	AIMA Central 1419	
Mariposa	1870		Broken Bay, near Juno Head, ashore	SMH 15/3/1870; RBS	AIMA Central 1420	
Mary	04/10/1864		Broken Bay, near Sth Head	SMH 8/10, 21/10/1864	AIMA Sydney 1426	
Midshipman	09/09/1857		Broken Bay, Brisbane Water entrance	Empire 14/9/1857; RBS Sydney 116/1853	AIMA Central 182	
Minmi	1889 ~		Hawkesbury Bridge	RBS	AIMA Central 944	
Mischief	01/01/1928		Broken Bay, Pearl Beach	SMH 3/1, 4/1/1828; RBS	AIMA Central 1965	
Morewa	1948		Broken Bay, Pittwater	RANZ 1941; Loney, 'Australian Shipwrecks' vol. 4, p.199.	AIMA Sydney 1969	
Narooma	04/02/1909		Broken Bay, Boat Harbour, ashore	NMH & Miners' Advocate 6/2/1909; RBS Syd 23/1904	AIMA Central 372	
Nauwai	21/12/1941		Broken Bay, Pittwater	RBS; RANZ 1937	AIMA Sydney 1981	
Notion	28/04/1870		Broken Bay	SMH 29/4, 30/4, 4/5, 2/5/1870; RBS	AIMA Central 1468	
Pea Hen	10/07/1878		Broken Bay, ashore, middle of Brisk Bay (Patonga)	SMH 15/07, 28/8/1878; RBS; Marine Board register of NSW wrecks - 1878	AIMA Central 666	
Phantom	03/05/1872		Broken Bay, Mount Elliott	SMH 6/5/1872	AIMA Central 1084	
Phoenix	25/05/1931		Hawkesbury River	RBS; RANZ 1930-31	AIMA Central 1999	
Rapid	1857		Broken Bay, West Head, near	SMH 31/7/1857; RBS 15/1856 Melbourne	AIMA Central 1518	
Rover	03/11/1842		Broken Bay, Pittwater	Sydney Herald 7/11/1842; RBS	AIMA Sydney 1539	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Songariti	09/01/1938		Broken Bay, Pittwater, Palm Beach	SMH 10/1/1938 p.9; RBS	AIMA Sydney 2032	
Southern Light	27/11/1864		Broken Bay, near Mt Ettalong (Ettalong Head)	SMH 2/12, 21/12/1864; Dunn, Gwen 'Shipbuilders of Brisbane Water' 1997	AIMA Central 1572	
Speedwell	04/1814		Hawkesbury River, ashore near	Sydney Gazette 23/4/1814; Loney, J, 'Wrecks of the NSW North Coast'	AIMA Central 1578	May have been recovered.
Star	08/1857		Broken Bay, Back Beach, ashore	SMH 17/8, 18/8/1857	AIMA Central 1580	
Swan Ex-H.M.A.S.	02/02/1934		Hawkesbury River	Bastock 'The Great War - Torpedo Boat Destroyers' p40	AIMA Central 2043	
Trusan	19/05/1949		Broken Bay, Saltpan Cove, Pittwater	SMH 20/5/1949; RBS; RANZ 1949	AIMA Sydney 2057	
Valiant	1981		Broken Bay, Barranjoey	Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters' 1998.	AIMA Central 1633	
A21 Japanese Submarine	31/05/1942	SYDNEY HARBOUR	Sydney Harbour, in or near	none	AIMA Sydney 1787	
Agnes	27/01/1906		Sydney Harbour	SMH 29/1/1906, 28/4/1906; NMH 28/4/1906	AIMA Sydney 897	Ferry service, collision, 2 deaths.
Alice	1938		Sydney Harbour	Not in SMH; Loney, update, p. 100	AIMA Sydney 1794	
Annie	30/06/1858		Sydney Harbour, Nth Hd	SMH 1/7/1858	AIMA Sydney 63	
Arabian	1857		Sydney Harbour, Balmain, Waterview Bay	RBS	AIMA Sydney 67	Scuttled for wharf.
Aryfield	1972		Sydney, Parramatta River, Homebush Bay	RBS; Sydney Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters' 1998.	AIMA Sydney 65	
Brisk	10/06/1865		Sydney Harbour, North Head	SMH 21/6/1865; RBS, Sydney	AIMA Sydney 108	
Cadet	02/1912		Sydney Harbour	RBS 40/1905 Sydney	AIMA Sydney 748	
Capella	23/12/1925		Sydney, North Head 600m inside	SMH 24/12/1925; RBS, Sydney	AIMA Sydney 1827	Thieves suspected of stealing the yacht from its moorings at Rushcutter Bay, prior to its recreational departure for Tasmania. The yacht had been blown onto rocks and the thieves fled.
Cateaux Wattel	04/05/1860		Sydney Harbour, Walsh Bay	SMH 5/5, 11/5, 12/5, 14/5, 15/5, 21/7/1860; Bureau Veritas 1860	AIMA Sydney 1130	
Catherine Adamson	24/10/1857		Sydney Harbour, North Head, Old Man's Hat	Lloyd's Building Survey Report Lloyds Register SMH 26 - 29/10/1857; The Argus 31/10, 9/11, 11/11, 30/12/1856; Shipping Gazette 26/10/1857	AIMA Sydney 1128	21 deaths.
Centennial	23/08/1889		Sydney Harbour, Taylors Bay	RBS; SMH 24/8, 26/8/1889	AIMA Sydney 1134	
Centurion	16/01/1887		Sydney Harbour, North Head	Lloyds Survey Report 1869; SMH 17/1/1887	AIMA Sydney 1136	
Claude	07/11/1908		Sydney Harbour, Waterview Bay, Balmain	SMH 9/11/1908 pp 1a & 7f; RBS Syd 25/1889 (For account of collision with 'White Heather' and 'Newcastle')	AIMA Sydney 1763	Most likely refloated.
Cobaki	1946c		Sydney, Middle Harbour, Salt Pan Creek	RBS Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters', 1998.	AIMA Sydney 353	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Colonist	01/03/1890		Sydney Harbr, btwn Fort Denison & Bradleys Hd	The Australian 29/7/1826	AIMA Sydney 696	
Como	28/02/1848		Sydney, Sow and Pigs Shoal	Loney, J Vol 5 Australian Encyclopaedia Eds. Wilberforce & Carter. Vol 2 M - Z	AIMA Sydney 1172	
Coombra	1888		Sydney Harbour, Athol Gardens (Bight)	RBS Dunn, Gwen 'Shipbuilders of Brisbane Water' 1997	AIMA Sydney 691	Hull probably removed.
Corsair	02/1825		Sydney, South Head Reef	The Australian 17/2/1825	AIMA Sydney 1183	
Currajong	8/03/1910		Sydney Harbour, Bradley's Head, off	RBS; Courier (Melbourne) 29/6/1973 Parsons, R Wrecks of steamships in NSW	AIMA Sydney 1188	
Daphne	09/06/1916		Sydney Harbour, Balmain, Waterview Bay	RBS; SMH 10/6/1916	AIMA Sydney 900	
Defiance	17/07/1857		Sydney Harbour, South Reef	SMH 18/7/1857	AIMA Sydney 1200	
Dido	01/07/1902		Sydney Harbour, Millers Point, (refloated?)	SMH 2/7/1902	AIMA Sydney 1725	
Eagle	28/07/1866		Sydney Harbour, North Head	RBS; SMH 31/7, 23/8/1866	AIMA Sydney 986	
Edward Lombe	25/08/1834		Sydney Harbour, Middle Head	Lloyds Register 1829 and 1830; The Australian 2/9/1834; Sydney Herald 28/8, 1/9, 4/9, 8/9, 10/9/1834; Sydney Gazette 28/8, 30/8, 2/9, 4/9, 6/9, 9/9, 11/9, 18/9/1834; Supplement 13/9/1834; Colonial Times (Hobart) 5/8, 19/8, 23/8/1834; The Colonist - Hobart Town 5/8/1834 Log of Logs	AIMA Sydney 1221	12 deaths.
Ellen	09/02/1849		Sydney Harbour, between Heads	RBS; SMH 10/2, 12/2/1849	AIMA Sydney 1238	
Emily Ann	25/01/1889		Sydney Harbour, northward of Nth Head	RBS; SMH 26/1, 29/1/1889	AIMA Mid Nth 336	
Emily Hort	13/10/1861		Sydney Harbour, North Head, Old Man's Hat	SMH 14/10, 15/10, 18/10/1861; Illawarra Mercury 18/10/1861, p4b; RBS	AIMA Sydney 1241	
Emma Matilda	1895		Sydney Harbour, North Head	SMH 3/1/1895	AIMA Sydney 705	
Erna	11/02/1940		Sydney Harbour, Shark Island	SMH 12/2/1940	AIMA Sydney 1876	
Esther	04/11/1920	SYDNEY HARBOUR	Sydney Harbour	RBS; RANZ	AIMA Sydney 1877	
Failford	29/05/1899		Sydney Harbour, outer North Head	RBS; SMH 30/5, 6/6/1899	AIMA Sydney 716	
Falcon	1886		Sydney Harbour, North Head, Old Man's Hat	RBS; SMH 16/6/1886	AIMA Sydney 688	
Fame	02/08/1857		Sydney Harbour, Sow & Pigs Shoal	SMH 29/7, 30/7, 1/8, 10/9/1857; Empire 29/7, 19/9/1857; Melbourne Argus 5/8/1857; Shipping Gazette and Sydney Trade List 3/8/1857; RBS; Lloyds Register Lloyd's Building Survey Report	AIMA Sydney 1255	
Fanny Louise	19/02/1870		Sydney Harbour, South Head near	RBS; SMH 21/2, 25/2, 3/3/1870	AIMA Sydney 1258	
Friend In Need	06/06/1876		Sydney, Nth Hd, Blue Fish & Tumbledown, btwn	Marine Board Register of ships lost, 1876	AIMA Sydney 658	
Gem	1880		Sydney Harbour	RBS; RANZ 1917 - 18; Lloyd's Register	AIMA Sydney 547	
Helen	18/07/1928		Sydney, South Head, near Hornby Light	SMH 19/7/1928	AIMA Sydney 1900	
Heroic	c1973		Homebush Bay	SMH 1/5, 3/5, 25/8, 27/8/1909; Daily Telegraph 25/10/1911; NMH & Miners' Advocate 24/7/1959; Lloyds Register; RBS	AIMA Sydney 2129	
Hope	31/10/1803		Sydney Harbour, North Head	Cumpston A' Arrivals & Departures' 1803; Sydney Gazette 24/7, 6/11/1803	AIMA Sydney 1322	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Inflexible	26/08/1889		Sydney Harbour, The Sisters, off	SMH 28/8/1889; RBS	AIMA Sydney 792	
Iserbrook	09/10/1880		Sydney Harbour, Mrs Macquarie's Chair	RBS	AIMA Sydney 668	
Itata	12/01/1906		Sydney Harbour, Middle Hbr, Salt Pan Ck	Sydney Mail 17/1/1906; NMH 25/1/1906; Lloyd's Register	AIMA Sydney 1339	
Jane	1866c		Sydney Harbour, Balmain	RBS	AIMA Sydney 1343	
Jessie	19/05/1905		Sydney Harbour, NE or NNE of South Reef	NMH & Miners Advocate 22/5/1905; SMH 22/5/1905; RBS	AIMA Sydney 733	
Julia	10/08/1873		Sydney Harbour, North Head, Old Man's Hat	SMH 13/8/1873; Marine Board register of wrecks for 1873; RBS	AIMA Sydney 650	
Kaludah	22/03/1911		Sydney, Parramatta R, Tarban Ck, near Head of	SMH 23/3/1911; RBS	AIMA Sydney 746	
Karangi H.M.A.S.	1970c		Sydney, Parramatta River, Homebush Bay	Bower, R 'Historical Research of three abandoned hulks in Homebush Bay' 1993.	AIMA Sydney 1006	
Kate	02/04/1914		Sydney Harbour, Middle Harbour, Dobroyd	NMH 3/4/1914; RBS 21/1884 Sydney	AIMA Sydney 752	
Kate	22/08/1898		Sydney Harbour, Garden Island, near	SMH 23/8/1898	AIMA Sydney 1736	
Lady Emma	30/04/1880		Sydney Harbour, North Head	SMH 1/5/1880; Marine Board list of wrecks for 1880; RBS Syd 44/1869; Marine Board register of wrecks for 1880	AIMA Sydney 669	
Lah Loo	09/12/1920		Sydney Harbour, Manly	RBS	AIMA Sydney 2096	
Lalla Rookh	1898		Sydney Harbour, broken up at Kerosene Bay	SMH 18/3/1862; RBS	AIMA Sydney 1375	
Leichhardt	09/06/1916		Sydney Harbour, Balmain, Waterview Bay	SMH 10/6/1916; RBS	AIMA Sydney 999	
Leila	01/11/1898		Sydney Harbour, just outside of Circular Quay	NMH & Miners' Advocate 24/11/1898	AIMA Sydney 1738	
Leveret	28/12/1895		Sydney Harbour, South Reef, near	NMH & Miners' Advocate 30/122/1895; RBS	AIMA Sydney 707	
Liberty	20/01/1830		Sydney Harbour, North Head	Sydney Gazette 15/1, 21/10/1824; The Australian 22/1/1830 'Applications for Registration of vessels - letters of 28 Oct and 1 Nov 1824', State Records of NSW Microfilm reel 2775; Abstract of all Registers of vessels from the "Plantation Registry", State Records NSW Ref 4/1710, pp141-142.	AIMA Sydney 1385	
Lilian	28/02/1914		Sydney Harbour, Watsons Bay	RBS	AIMA Sydney 416	
Lucretia	26/06/1839		Sydney Harbour, Kirribilli Point, ashore	Sydney Gazette 25/6, 28/6/1839	AIMA Sydney 1397	
Marlean H.M.A.S.	12/11/1944		Sydney Harbour	SMH 13/11/1944; Loney, vol. 4, p.189	AIMA Sydney 1957	
Mary Ann	25/09/1867		Sydney Heads?	SMH 26/9/1867; Parsons, R (personal files)	AIMA Sydney 815	
May Byrnes	02/02/1901		Sydney Harbour, North Head	NMH & Miners' Advocate 4/2/1901; RBS	AIMA Sydney 719	
Missie	30/12/1870		Sydney Harbour Heads, ashore South Reef	SMH 31/12/1870; 27/1/1871; RBS 7/1865 Sydney	AIMA Sydney 1442	

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Mortlake Bank	1972		Sydney, Parramatta River, Homebush Bay	RBS Parsons, R & Plunkett, G, 'Scuttled and Abandoned Ships in Australian Waters' 1998.	AIMA Sydney 1011	
Mureegar	27/06/1927		Sydney Harbour, Middle Harbour	SMH 28/6/1927	AIMA Sydney 1971	
Nereus H.M.A.S	02/07/1942		Sydney Harbour	SMH 3/7/1942 p5; Loney, vol. 4, p.179	AIMA Sydney 3	
Northern Light	16/03/1878		Sydney Harbour, Bradley's Head	SMH 18/3, 23/3/1878; Marine Board register of NSW wrecks - 1878; RBS	AIMA Sydney 665	
Omeo	04/06/1899		Sydney Harbour, Darling Harbour, Bathurst St	SMH 5/6/1899; RBS	AIMA Sydney 717	
Orphan Girl	20/01/1880		Sydney Harbour, Darling Harbour	SMH 22/1, 3/2/1880	AIMA Sydney 885	
Osprey	06/06/1882		Sydney Harbour, Point Macquarie, Farm Cove	SMH 9/6, 10/6/1882	AIMA Sydney 1748	Passenger ferry. Likely to have been salvaged but no report found to date.
Perseverance	05/1843		Sydney Harbour, South Reef	SMH, Mon 8/5/1843; RBS	AIMA Sydney 2126	
Pinnace, H M Penguin	09/07/1914		Sydney Harbour, near Dawes Point	SMH 10/7/1914; NMH & Miners' Advocate 10/6/1914	AIMA Sydney 755	
Police Launch	16/01/1938		Sydney, Parramatta River	NMH 17/1/38	AIMA Sydney 2002	
Pomme de Terre	19/05/1887		Sydney Heads, between	SMH 20/5, 21/5/1887; RBS	AIMA Sydney 948	
Potts & Paul	1941		Kerosene Bay, Sydney Harbour	RBS 70/1885 Sydney	AIMA Sydney 737	
Prince Patrick	17/12/1869		Sydney Harbour, North Head, just inside	SMH 31/12/1869; RBS Melb 196/1853, 45/1866, Syd 33/1867	AIMA Sydney 1505	
Prosperous	30/11/1856		Sydney Harbour, between Heads	RBS; Dunn, Gwen 'Shipbuilders of Brisbane Water' 1997	AIMA Sydney 1511	
Ranger	05/12/1842		Sydney Heads, between	RBS	AIMA Sydney 1517	
Ranger	24/11/1881		Sydney Harbour	SMH 26/11/1881	AIMA Sydney 1754	
Robert R Hind	11/02/1929		Sydney, Kerosene Bay	Parsons, R & Plunkett, G 'Scuttled and Abandoned Ships in Australian Waters', 1998.	AIMA Sydney 685	Parsons & Plunkett note that some records indicate that this vessel was scuttled.
Robert Syers	05/11/1854		Sydney Harbour	RBS 5/1854 Sydney	AIMA Sydney 1530	
Rodney	13/02/1938		Sydney Harbour	NMH 14/2/1938; SMH 15/2/1938	AIMA Sydney 2019	
Rose	04/04/1927		Sydney Harbour, Fivedock Bay	SMH 5/4/1927; RBS; RANZ 1924-25	AIMA Sydney 2020	
Sarah	06/1839		Sydney Harbour, between the Heads	Sydney Herald 12/6, 16/12/1839; RBS	AIMA Sydney 1068	
Siesta H.M.A.S.	23/09/1942	SYDNEY HARBOUR	Sydney Harbour	Loney, 'Australian Shipwrecks' vol 4. p 179	AIMA Sydney 2028	
Silver Cloud H.M.A.S.	23/09/1942		Sydney Harbour	Loney, 'Australian Shipwrecks' Vol. 4, P.179	AIMA Sydney 2029	
Snowdon	28/01/1863		Sydney Harbour, North Head	SMH 29/1/1863; RBS 27/1861 Melbourne	AIMA Sydney 1568	
Sophia	10/07/1881		Sydney, North Head, at Old Man's Hat	SMH 11/7/1881; RBS	AIMA Sydney 672	
Souvenir	28/11/1860		Sydney Harbour Heads, South Reef	SMH 29/11, 5/12, 7/12/1860	AIMA Sydney 1574	

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
St Albans	17/05/1882		Sydney, Long Bay, on North Head	SMH 18/5, 23/5, 2/6/1882; RBS 40/1881	AIMA Sydney 677	
Suki	13/06/1938		Sydney Harbour, Clifton Gardens	SMH 14/6/1938 p11	AIMA Sydney 2040	
Thelma	08/03/1913		Sydney Harbour, Dobroyd Point	SMH 10/3/1913	AIMA Sydney 750	
Three Bees	20/05/1814		Sydney Harbour, Bennelong Point	Sydney Gazetts 7/5, 14/5, 21/5/1814; Historic Records of Australia (HRA) I viii Cumpston 'Arrivals and Departures' 1814	AIMA Sydney 1605	
Torch	25/03/1917		Sydney Harbour, Fort Denison, near	SMH 7/5/1917	AIMA Sydney 762	
Tramp	01/1915		Sydney Harbour, North Head	SMH 1/2, 2/2/1915; NMH & Miners' Advocate 8/3/1916; RBS	AIMA Sydney 758	
Turtle	1881/03/27		Sydney Harbour Heads	SMH 15/3/1880; RBS	AIMA Sydney 673	
Two Friends	1851		Sydney, off Sth Reef, nearly mid channel	SMH 29/11, 1/12, 5/12, 13/12/1851; RBS	AIMA Sydney 1621	Thought to have carried over to Dobroyd Head.
Una	04/04/1927		Sydney Harbour, Five Dock Bay	SMH 5/4/1927; RBS; RANZ 1924-25	AIMA Sydney 2061	
Undine	28/12/1936		Sydney Harbour, Walsh Bay	SMH 29/12/1936; RANZ 1934; RBS	AIMA Sydney 2062	
Voyager	07/03/1937		Sydney Harbour, North Head - Blue Fish Point	SMH 8/3/1937, 29/4/1937	AIMA Sydney 2071	
W H Lincoln	04/01/1892		Sydney Hbr, Woolloomooloo B, Cowper Wharf	SMH 6/1, 3/2, 14/1/1892; Lloyd's Register 1891-92	AIMA Sydney 700	
Wanderer	09/07/1848		Sydney Harbour, Middle Hd, drifted 0.25ml sth	SMH 10/7, 11/7, 12/7, 14/7, 15/7, 31/7/1848; Morten Bay Courier 22/7/1848; Australian Encyclopaedia 1926, p 712 RBS	AIMA Sydney 1650	
William Cossar	14/02/1825?		Sydney Harbour, Sow and Pigs Shoal	Sydney Gazette 19/7/1817, 1/5/1819, 17/2/1825; Cumpston 'Arrivals and departures - 1817'	AIMA Sydney 1666	
William Hill	28/11/1865		Sydney Harbour, North Head	SMH 29/11/1865; RBS 1/1861 Geelong	AIMA Sydney 1667	
William Woolley	09/05/1854		Sydney Harbour, Darling Harbour	SMH 10/5/1854; Lloyd's Register 1845	AIMA Sydney 1669	
Young Charlie	21/04/1900		Sydney Harbour, Woolloomooloo Bay	SMH 23/4/1900	AIMA Sydney 718	
Advance	11/02/1884	BOTANY BAY	Sydney, Botany Bay, inside Nth Hd, Henry Hd Bight	SMH 12/2/1884; RBS	AIMA Sydney 682	
Advance	12/06/1902		Sydney, Botany Bay, Henrys Head	SMH 13/6/1902; NMH & Miners' Advocate 16/7/1902; RBS	AIMA Sydney 844	
Aorangi	13/12/1928		Sydney, Kogorah Bay	SMH 14/12/28	AIMA Sydney 1801	
Eileen	25/12/1934		Sydney, Kurnell	SMH 26/12/34	AIMA Sydney 1869	
Fanny	07/1870		Sydney, Botany Bay, North Head	RBS	AIMA Sydney 981	
Kelloe	13/05/1902		Sydney, Botany Bay (Off Little Bay)	SMH 14/5, 28/6/1902; Daily Commercial News & Shipping List 14/5/1902; RBS; Lloyd's Register 1900-1901	AIMA Sydney 1366	
Minmi	13/05/1937		Sydney, Botany Bay, Cape Banks	SMH 14/5, 15/5, 27/5, 3/7/1837; RBS; Lloyd's Register 1937-38; RANZ 1934	AIMA Sydney 1963	
Minnie Wamsley	1903		Sydney, Botany Bay	RBS	AIMA Sydney 727	
Olive	01/06/1930		Sydney, Botany Bay, Frenchman's Bch	SMH 2/6/, 3/6/1930	AIMA Sydney 1989	Possibly salvaged.

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
Peri	21/06/1874		Sydney, Botany Bay, Herrings Head	SMH 22/6/1874; Marine Board register of NSW wrecks 1874; RBS	AIMA Sydney 654	
Pioneer	27/06/1875		Sydney, Botany Bay, South Head, ashore	SMH 13/3/1876; RBS 14/1873 Adelaide	AIMA Sydney 770	
Prompt	30/01/1881		Botany Bay, ashore near govt wharf	SMH 1/2/1881	AIMA Sydney 2103	
Sea Breeze	15/05/1883		Sydney, Botany Bay, north head	SMH 117/11/1879, 6/5/1883; RBS 82/1877	AIMA Sydney 679	
Albion	16/04/1867	PORT HACKING	Port Hacking, south head	SMH 23/4/1867, 1/4/1867, 2/4/1867; RBS (Syd) 36/1857	AIMA Sydney 36	
Cambrian Packet	20/06/1861		Port Hacking (Aiken), Cape Solander	RBS; SMH 18/6, 20/6, 22/6/1861; Lloyd's Register	AIMA Sydney 1116	
Dauntless	26/04/1870		Port Hacking, South Head	SMH 26/4, 29/4, 3/5/1870; RBS; Lloyds Register	AIMA Sydney 1195	
Hilda	20/06/1893		Port Hacking, north head, near shore	RBS 42/1879; Australian Shipping News 22/7, 19/8/1893; Court of Marine Enquiry 2/10547, NSW Arch.	AIMA Sydney 1319	
James Afflick	11/07/1877		Port Hacking, south spit	SMH 18/7/1877; RBS; Marine Board list of wrecks for 1877	AIMA Sydney 775	
Lady Ellen	1936		Port Hacking	Loney update p. 98	AIMA Sydney 1937	
Malua	06/06/1886		Port Hacking, Wata Mooli Ck, under Sth Head	SMH 11/6/1886; RBS	AIMA Sydney 790	
Adele	07/05/1943	PORT KEMBLA	Port Kembla	RANZ 1927-28; RBS 3/1907	AIMA Illawarra 1791	
Clio	15/11/1927		Port Kembla, northern breakwater	SMH 16 - 17/11/1927; RANZ 1924 - 1925 - cannot determine which Clio is which	AIMA Illawarra 1840	
Hawkesbury Packet	08/1817?	MINNAMURRA	Minnamurra entrance (Gomorramorrah), reef	Sydney Gazette 6/7, 20/7/1816, 1/2, 6/9/1817; Cumpsten, Arrivals & Departures, 1817	AIMA Illawarra 1310	Owner, Solomon Wiseman's vessels/crews seem to have been in regular conflict with the Aboriginal people around Port Stephens. See 6/71816, 1/2/1817 and 6/9/1817 references. See also Bateson, C., Australian Shipwrecks. 1972, p.54.
Rangoon	22/03/1870		Minnamurra, E side of small island at mouth	SMH 23/3, 27/3, 29/3, 2/5/1870; RBS	AIMA Illawarra 933	
Budgaree	23/06/1891	BATEMANS BAY /CLYDE RIVER	Batemans Bay, Beagle Bay	SMH 27/6, 2/7/1891; RBS, Sydney	AIMA Eurobo 829	
*Conjola	21/07/1927	*St Georges Basin?	Batemans Bay or *Sussex Inlet	RBS; RANZ - 1924 - 25	AIMA Shoalhav 1848	Location information is unclear.

Shipwrecks in NSW Estuaries, from the Australian National Shipwreck Database (ANSD)						
Ship / Item	**Date of loss**	**Estuary**	**Location**	**Source**	**Database ref.**	**Comments**
DMR Ferry No. 41			Clyde River, 1km upstream from Nelligen	Press article - from Chris Breen	AIMA Shoalhav 71	In 9m of water, ~12-13m from shore. Press Release - detailing information relating to local scuba club's discovery and summary of the condition of the wreck. Owner Department of Main Roads.
Dureenbee	03/08/1942		Batemans Bay, north head	RBS; SMH 5/8/1942; RANZ 1937	AIMA Eurobo 1865	
Elizabeth	07/11/1839		Batemans Bay, ashore	Sydney Gazette 19/11/1868	AIMA Eurobo 1232	
Benandra	25/03/1924	MORUYA RIVER	Moruya Heads, sandspit near the bar.	NMH 8/4/1924; RBS; Sydney. Parsons, R, ' Steamships to the Illawarra' 1991.	AIMA Eurobo 1813	
Moses Fletcher	30/06/1891	MORUYA RIVER	Moruya breakwater	SMH 1/2, 2/7, 3/7, 8/7, 14/7/1891; RBS 1/1873 Sydney	AIMA Eurobo 830	
Mary Ann	27/03/1870	TUROSS RIVER	Tuross River mouth	SMH 29/3/1870; RBS	AIMA Eurobo 1429	
Revenge	25/03/1862		Tuross River	RBS; Dunn, Gwen 'Shipbuilders of Brisbane Water' 1977	AIMA Eurobo 8	
Porpoise	16/05/1866	WAGONGA INLET	Wagonga Heads	SMH 24/5, 23/5, 15/6/1866; RBS	AIMA Eurobo 1500	
Catherine	15/05/1851	BERMAGUI RIVER	Bermagui River, ashore	SMH 29/5, 2/6/1851; RBS	AIMA Eurobo 1127	Gale sprang up, forcing the Catherine to anchor. Parted moorings and dropped second anchor. Several large trees washed downstream caught in bows. Abandoned on captain's orders.

APPENDIX 3

Other European Heritage Sites in New South Wales Estuaries

NSW Heritage Office: State Heritage Register and Inventory						
Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
Heritage Register						
BELLINGER RIVER						
Bridge, Wharf, associated structures (former)	Ford Street, Bellingen, NSW 2454	Bellinger River			1315	Heritage Act - s.130 Order ; Gazette Apr 93
MACLEAY RIVER						
Kempsey rail bridge over Macleay River	North Coast railway, Kempsey, NSW 2440	Macleay River	1917	The Boundary of the bridge is an area for 20 metres around the bridge and viaduct approaches, including abutments and embankments at the end of Kemp St and the end Railway St to the south and the bridge itself crossing the river. SRA, 1997 (No SRA240).	5012062	Heritage Act - State Heritage Register 01041, Gazette Apr99; Heritage Act - s.170 NSW State agency heritage register.
LAKE INNES						
Lake Innes House ruins and environs	The Ruins Way, Port Macquarie, NSW	Lake Innes	pre 1850	A corduroy road towards the beach, another corduroy road to the lake, a boathouse by the lake. Connah, 2000; Connah, 1997; Lucas & Partners, 1987; NPWS, 1994; Rheinberger, 1999.	5045031	Heritage Act - State Heritage Register 00997, Gazette Apr99; Heritage Act - s.170 NSW State agency heritage register; REP Gazette Dec94; National Trust of Australia register.
MANNING RIVER						
Taree rail bridge over Manning River	North Coast railway, Taree, NSW 2430	Manning River		The listing boundary is the area on which the bridge is located including embankments, abutments, supports and track formation for a distance of 20 metres in all directions. note: Assess. Of Signif. Refers to PS Manning, not the bridge. SRA, 1997 (No SRA242).	5012241	Heritage Act - State Heritage Register 01059, Gazette Apr99; Heritage Act - s.170 NSW State agency heritage register.
HUNTER RIVER						
Boat Harbour Pilot Station	Wharf Road, Newcastle, NSW 2300	Hunter			11451	Heritage Act - s.130 Order, Gazette Jan 81
Morpeth Bridge over the Hunter River	Northumberland Street, Morpeth, NSW 2321	Hunter			5051380	Heritage Act - State Heritage Register 01476, Gazette 20 Jun 2000; REP Gazette 3 Nov 89; LEP 1993, Gazette 3 Sep 93
Nobbys Lighthouse & Breakwater	Port Hunter, Newcastle, NSW 2300	Hunter			11466	Heritage Act - s.130 Order Gazette Jan 81; REP Gazette Nov 89
LAKE MACQUARIE						
Wangi Power Station Complex	Wangi Wangi, NSW 2267	Lake Macquarie	officially opened on 7th Novembe r 1958	Highest level State heritage Significance for its association with leading the evolution of coalfields. EJE Architecture, 2000; Pacific Power, 1998.	5014146	Heritage Act - State Heritage Register 01014, Gazette Apr99; Heritage Act - s.170 NSW State agency heritage register 79, Gazette Mar98.
HAWKESBURY RIVER						

Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
Hawkesbury River rail bridge	Main Northern railway, Brooklyn, NSW 2083	Hawkesbury River	1889	The listing boundary is the area on which the bridges are located, including the causeway, and includes the supports, abutments, earthworks, abandoned tunnel and cutting, construction site for the bridge and foreshore area on each bank. It also includes the remains of the 1889 bridge piers and abutments.	5012052	Heritage Act - State Heritage Register 01040, Gazette Apr99; Heritage Act - s.170 NSW State agency heritage register.
SYDNEY HARBOUR						
Bantry Bay Explosives Depot	Killarney Heights, NSW 2087	Sydney Harbour			5014103	Heritage Act - State Heritage Register 00977
Cable Ferry - Mortlake/Putney	Pellisier Road, Putney, NSW 2112	Sydney Harbour			14052	Heritage Act - s.170 NSW State agency heritage register
Fort Denison	Port Jackson, NSW	Sydney Harbour	1840-62	Fort Dension was built in stages between 1840 to 1862 and is evidence of the design and changes to harbour defence works and tactics of the colony from 1836 to 1866. It reflects the impact of events and changes to personnel associated with the place including George Barney (the designer), George Gipps, James Gordon and William Denison. Fort Denison is mounted on a rock entirely surrounded by the waters of one of the finest harbours in the world. Its tower, battery and terrace afford a superb urban and marine panorama. It is evidence of the use of techniques of masonry fort construction. It is the only one of its type in Australia. Martello towers are normally freestanding and the combination of tower and bettery is rare. (Kerr 1986:46-48)	5045472	National Trust of Australia register, Register of the National Estate; Heritage Act - State Heritage Register
Goat Island	Port Jackson	Sydney Harbour			5045143	Register of the National Estate; Heritage Act - State Heritage Register 00989
Manly Wharf	West Esplanade, Manly, NSW 2095	Sydney Harbour	1856 first wharf	Together with Circular Quay, the wharf is the only substantial older style ferry wharf surviving in Port Jackson	5051365	State Heritage Reg. 01434
Man O'War Steps	Farm Cove Crescent, Sydney, NSW 2000	Sydney Harbour	built 1810	The only known remains of Macquarie-era harbour works still in existence in Sydney Harbour, in what appears to be its original configuration, and still in daily use. A valuable relic of the "Old Navy" days when men of war anchored in Farm Cove and when waterman plied on the harbour. Also the source of one of the longest-running bureaucratic correspondences in the history of NSW. (Tranter 1990)	5051356	Heritage Act - State Heritage Register 1432, Gazette 18 Apr 00; Heritage Act - s.170 NSW State agency heritage register 4920021; REP 23, Gazette 5 Jun 90; National Trust of Australia register, Gazette 31 Oct 90; Within a National Trust conservation area, Sydney Harbour LCA , Gazette 24 Jan 83.
Meadowbank rail bridges over Parramatta River	Main Northern railway, Meadowbank/Rhodes, NSW 2114	Sydney Harbour		The original Meadowbank bridge is one of the 12 lattice girder bridges built by Whitton in the first major construction phase on NSW railways with Albury it is one of only two such double line structures. It is highly visible and an important part of the history of the Parramatta River.	5012099	State Heritage 01189
Fenwick & Co Boat Store	2-8 Weston Street, Balmain, NSW 2041	Sydney Harbour		The site contains the J. Fenwick & Co. Boat Store, retaining walls, sea wall and J Fenwick & Co. Administration Building.	5051346	Heritage Act - State Heritage Register
STA Ferry Maintenance Depot	Waterview Street, Balmain, NSW 2041	Sydney Harbour			8341	Heritage Act - s.170 NSW State agency heritage register
Thames Street Ferry Wharf & Shelter	Thames Street, Balmain, NSW 2041	Sydney Harbour			8753	Register of the National Estate; Heritage Act - s.170 NSW State agency heritage register

Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
Walsh Bay Wharves 1 to 9 & buildings & bridges		Sydney Harbour		The wharves have a strong distinctive character created by the logical use of heavy timber construction and the regular grid layout of piles, columns, beams and infill cladding. (Little, Clarke, Whittaker 1979)	5045067	Heritage Act - State Heritage Register 00559; Gazette 2 Apr 99; Heritage Act - Permanent Conservation Order - former 00559, Gazette 25 Feb 88; REP Gazette 1 Jun 89; National Trust of Australia register, Gazette 15 Sep 76; Within a National Trust conservation area; Register of the National Estate
Waterview Wharf Workshops (Adelaide Steamship Company wharf)	37 Nicholson Street, Balmain, NSW 2041	Sydney Harbour			5045695	National Trust of Australia register; Heritage Act - State Heritage Register
Woolloomooloo Finger Wharf - Berths 6, 7, 8 & 9	Cowper Wharf Road, Woolloomooloo, NSW 2011	Sydney Harbour		Woolloomooloo Finger Wharf is off cultural significance for its rarity, scale, construction methods, artefacts of industrial archaeology and diverse history of uses and events. It contains the largest and most distinguished timber wharf building in Sydney Harbour and reflects in its form and contents the history of Woolloomooloo and the principal role of the wool industry in Australia during the nineteenth and early 20th century. (CSHI 3041) The Wharf is important as an example of a timber engineering structure on a scale unparalleled in Australia and exceptional in world terms. It also represents the use of Australian timbers in sizes and quantities which would never be matched in the future and in a situation in which their durability and other properties can be assessed.	5051359	State Heritage Reg. 01437
PORT HACKING						
Fisheries Research Institute	202 Nicholson Parade, Cronulla, NSW 2230	Port Hacking	1904	FORMER HATCHERY BUILDING: An L-shaped brick building with two wings, located on a flat (benched) area slightly above a boat shed and fish ponds at the western side of Hungry Point. Also Aboriginal Middens. NSW Fisheries, 1997.	5045100	Heritage Act - State Heritage Register 01011, Gazette Apr99; Heritage Act - s.170 NSW State agency heritage register; LEP Dec00.
LAKE WAPENGO						
Ness Property (Aboriginal and Chinese Significance)	Reserve Road, Wapengo, NSW 2550	Lake Wapengo		The property Ness at Lake Wapengo , located between Bermagui and Tathra on the NSW South Coast, is an area of 160 hectares (396 acres) with major frontage to the South Pacific Ocean, Bithry Inlet, Lake Wapengo and the northern section of Mimosa Rocks National Park.	5045716	Heritage Act - State Heritage Register 00519, Gazette Apr99; Heritage Act - Permanent Conservation Order - former 00519, Gazette Oct87.
PAMBULA LAKE / RIVER						
Yowaka Bridge near Eden	Princes Highway, Eden, NSW 2551	Pambula River and Lake			5051390	Heritage Act - State Heritage Register 01486, Gazette Jun00.
TOWAMBA RIVER						
Davidson Whaling Station	35km south of, Eden	Towamba River	1896	Davidson Whaling Station is located on the southern shore of Twofold Bay, 35km by road south of Eden on Kiah Inlet at the mouth of the Towamba River. NPWS, 1995; (NPWS, Register).	5000659	Heritage Act - State Heritage Register 00984, Gazette Apr99; Heritage Act - s.170 NSW State agency heritage register.
Heritage Inventory						
CLARENCE RIVER						
Bridge over South Arm (McFarlane Bridge)	Tullymorgan, NSW	Clarence R			1990081	LEP, Gazette May 01

Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
BONVILLE CK						
Rock Pool	Bonville Headland, Sawtell, NSW	Bonville Creek		Swimming Pool - tidal	1360037	Coffs Harbour City LEP 2000 - Sch 5
HASTINGS RIVER						
Ballina paddlesteamer wreck; PS Ballina	110m N of eastern end of southern breakwall of Port Macquarie - The Ballina remains inside the entrance channel near the northern breakwall.	Hastings River	constructed 1879, sank 109 yrs ago	The paddle wheel and engines are believed to have the potential for providing valuable information on the maritime technology in the 1860s. The site is likely to retain artefacts from the late 19th century, despite the use of explosives shortly after the sinking. Further specialised investigation is required. Loney, 1980; Port Macquarie News, 1989.	1730020	LEP 1993, Register of the National Estate - Interim
Former Pilots boatshed building	79 Clarence St, Port Macquarie 2444	Hastings River		Rare surviving example of a government boatshed. Representative of historical boatshed design and style. One of a number of items that collectively illustrates early maritime activities in Port Macquarie. North Coast Regional Heritage Study, 1990: Originally located on the "Village Green" at the end of Horton St, near The Royal Hotel, c 1900. Moved to its current location about 40 years ago. Currently being acquired by the Mid North Coast Maritime Museum Association. Mid North Coast Maritime Museum Association (oral report Dick Glen).	1730022	LEP 1993
Hibbard Slipway	Boundary St, Port Macquarie 2444, cnr Narimba Close, Hibbard	Hastings River	constructed 1884	(Shipyard consisting of timber slipway to the water.) Formed part of a large sawmilling and industrial complex of the late 19th Century. Reflects the high level of industrial development possible within the economies of the Northern River. Has historical association with this complex and John Hibbard, a prominent citizen. The site has the potential to contribute to the study of industry and communication on the Northern Rivers. Mid North Coast Maritime Museum Association (oral report Glen Dick and Laurie Hoare); National Trust.	1730019	LEP 1993, National Trust of Australia register
Hibbard slipway, comprising timber slipway, engine house	Boundary Street, Hibbard, NSW 2444	Hastings River			5233	Regional Environmental Plan 1994
Pedestrian Suspension Bridge	Rawdon Island 2446	Hastings	1930	Rawdon Island pedestrian suspension bridge is an unusual type of bridge construction using a simple light weight design. Illustrates the significance of river crossings to settlement in the lower Hastings. Together with the school and post office forms a significant group of items that demonstrate aspects of life in the area. Forms part of Rawdon Island school group HS0144. See also Items HS0146.	1730145	LEP 1993
Camden Head Pilot Station	Camden Head	Hastings	1907	The pilot station is a rare surviving and intact group of related buildings providing physical evidence of the living and working conditions of the pilot and boatmen. The group illustrates the importance of maintenance activities to the local community. Camden Head Pilot Station comprises the following structures: 1. Pilot's Residence. Weatherboard and corrugated fibro roof, single storey brick footings. 2. Double garage or boathouse, weatherboard 3. Garage or boathouse, corrugated. 4. Shed, weatherboard, corrugated iron. 5. Concrete shelter, partly sunk into hillslope. Plantings include Norfolk Island Pines. Part of the Camden Haven Maritime Group. See HS0112. See also Items HS0113, HS0115. Suters, 1991 (HS0114).	1730114	LEP 1993
Pilots Boatshed (former)	79 Clarence Street, Port Macquarie, NSW 2444	Hastings			5352	REP 1994

Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
Hastings River Railway Bridge	Wauchope 2446	Hastings River	1915	The Hastings River Railway Bridge is representative of the light engineering practice and technology of the North Coast Railway. It makes a contribution to the understanding of the development of communications within the Northern Rivers Region. Part of Wauchope Railway Station Group. HS0099 See also items HS0103 and HS0104. In conjunction with other items associated with the railway it reflects a theme which was important to the emergence of Wauchope as an important service centre. Port Macquarie News, 1916; Suters, 1991 (HS0089).	1730089	LEP 1993
The Cross navigational marker	Port Macquarie 2444	Hastings River	This area has been known as the Cross for many years, however, the age of the current marker is not known	The site has included navigational markers from an early date and illustrates early navigational technology. It is an important and well known local landmark Reinforces interpretation of the importance of maritime activities in the evaluation of Port Macquarie. Port Macquarie News, 1989; Suters, 1991 (HS0082).	1730082	LEP 1993
Training walls and breakwalls	Mouth of Hastings River at PM, Port Macquarie 2444	Hastings River	1897	These training walls are representative of the large government investment in improving coastal and riverine navigation on most of the major Northern Rivers, and indicate the technological difficulties of navigation as well as massive harbour works. Hastings District Historical Society (oral report); Suters, 1991 (HS0060).	1730060	LEP 1993
CAMDEN HAVEN RIVER						
Camden Haven River Rail Bridge	Off Graham Street, Kendall	ACROSS CAMDEN HAVEN RIVER	1915	The Camden Haven River Railway Bridge is representative of the light engineering practice and technology of the North Coast Railway. It makes a contribution to the understanding of the development of communications within the Northern Rivers Region. It illustrates the importance of the railway to the economy of Kendall. Suters, 1991 (HS0120).	1730120	LEP 1993
Camden Haven River Training Walls or Breakwaters	Camden Head, North Haven	Camden Haven River	1898	These training walls are representative of the large investment in improving coastal and riverine navigation on most of the major Northern Rivers, and indicates the technological difficulties of navigation as well as massive harbour works. Part of Camden Haven Maritime Group. HS0112. See also items HS0114, HS0115. Camden Haven Historical Society; Suters, 1991 (HS0113).	1730113	LEP 1993
MANNING RIVER						
Dairy Factory & Wharf (former)	Mitchells Island, NSW 2430	Manning			4959	LEP 1995, Gazette Aug 95.
Lime Kiln Wharf (former)	Nelson Street, Taree, NSW 2430	Manning			4990 & 5012	LEP 1995, Gazette Aug 95.
Martin Bridge	Pacific Highway, Taree, NSW 2430	Manning			4978	LEP 1995, Gazette Aug 95.
Wharf and Punt sites	Croki Road, Croki, NSW 2430	Manning			4979	LEP 1995, Gazette Aug 95.

Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
Wreck of vessel Manning (PS Manning)	River Street, Taree, NSW 2430	Manning	constructed 1878	The side paddle steamer Manning (official number 74962) was constructed of iron (riveted) with timber upper works. No masts. The vessel was 109.5 feet long, 18.9 feet wide and 5.9 feet deep. It had a tonnage of 89 tonnes and 56 tonnes net. The vessel was powered with a high pressure steam engine generating 30 hp. (Heritage Branch Dept of Planning, Sydney, 1993). Baker, 1999; Smith, 1993.	4989	LEP 1995, Gazette Aug 95.
PORT STEPHENS						
Allworth Wharf remains	Allworth, NSW 2425	Upper Port Stephens (Karuah River)			4592	LEP 1996
Booral Wharf Karuah River	Booral, NSW 2425	Upper Port Stephens (Karuah River)			4587	REP 1989, LEP 1996
Carrington Boat Harbour & Lime Kiln	Cock Renoyo Point, Carrington, NSW 2324	Port Stephens (Great Lakes)			4610	REP 1989, LEP 1996
HUNTER RIVER						
Boat Harbour	Wharf Road, Newcastle, NSW 2300	Hunter			11934	REP Gazette NOV 89
Hexham Bridge	Pacific Highway, Hexham, NSW 2322	Hunter			11526	REP Gazette NOV 89; LEP 1987
Lee Wharf No 1 - Building A	Lee Wharf Road, Newcastle, NSW 2300	Hunter			11768	REP Gazette NOV 89; LEP 1987
Lee Wharf No 2 - Building C	Lee Wharf Road, Newcastle, NSW 2300	Hunter			11931	REP Gazette NOV 89; LEP Gazette Jul 92
Nobbys Lighthouse, headland, breakwater	41 Nobbys Road, Newcastle East, NSW 2300	Hunter			11645	LEP 1987
Original Timber Wharves	Ingall Street, Mayfield North, NSW 2304	Hunter			11549	LEP 1987
Stone Boat Harbour	49 Wharf Road, Newcastle East, NSW 2300	Hunter			11613	LEP 1987
Hinton Bridge - Hunter River	Patterson Street, Hinton, NSW	Upper Hunter			2280010	LEP Sch2, Gazette Dec 00.
LAKE MACQUARIE						
Power Station on Lake Macquarie	Vales Point	Lake Macquarie			20377	LEP 1991
HAWESBURY RIVER						
HMAS Parramatta wreck	Cascade Gully, Hawkesbury River	Hawkesbury			4443	REP Gazette Oct 97; LEP 00020
Pylons, Old Hawkesbury River Railway Bridge		Hawkesbury			4438	LEP 00020

Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
Cable Ferry - Wisemans Ferry	Wisemans Ferry, NSW 2775	Hawkesbury			4436	REP Gazette Oct 97; LEP 00020
Ballast heap - Berowra Creek & Murramurra Creek	River Settlements	Upper Hawkesbury			6743	LEP 1994, Gazette Sep 89; LEP Gazette Jul 94; LEP 1994, Gazette Jul 94.
Bennets Bay - Jetty	River Settlements	Upper Hawkesbury			6744	LEP 1994, Gazette Jul 94
Boat shed	Berowra Waters Road, Berowra Waters, NSW 2082	Hawkesbury			6307	LEP 1994, Gazette Jul 94
Bradleys Beach	Grantham Crescent, Dangar Island, NSW 2083	Hawkesbury			6618	LEP 1994, Gazette Jul 94
Brown's boatshed	James Road, Brooklyn, NSW 2083	Hawkesbury			6568	LEP 1994, Gazette Jul 94
Cable Ferry & Bay Road	Berowra Waters Road, Berowra Waters, NSW 2082	Hawkesbury			6305	LEP 1994, Gazette Jul 94
Cable Ferry & Berowra Waters Road	Bay Road, Berowra Waters, NSW 2082	Hawkesbury			6306	LEP 1994, Gazette Jul 94
Cable Ferry - Berowra Waters	Berowra Waters, NSW 2082	Hawkesbury			6227	LEP 00020, Gazette Sep 89
Cable Ferry waterway	River Road, Wisemans Ferry, NSW 2775				6977	LEP 1994, Gazette Jul 94
Northern foreshore, 1889 railway bridge, seawall, wharf, trees	Dangar Island, NSW 2083	Hawkesbury			6608	LEP 1994, Gazette Jul 94
Railway bridge piers, pylon & plaque	Long Island	Hawkesbury	constructed 1889		6592	LEP 1994, Gazette Jul 94
Railway bridge, memorial & construction dock	Long Island	Hawkesbury	constructed 1946		6581	LEP 1994, Gazette Jul 94
SYDNEY HARBOUR						
Alexandra Street Wharf	Alexandra Street, Hunters Hill, NSW 2110	Sydney Harbour			7104	LEP 00014
Athol Gardens Dance Hall and Wharf	Ashton Park, Bradleys Head, NSW 2088	Sydney Harbour			10697	REP 00022
Balmoral Beach Heritage Conservation Area	Balmoral, NSW 2088	Sydney Harbour			10759	LEP 00022
Balmoral Beach, Rocky Point	Balmoral, NSW 2088	Sydney Harbour			10685	LEP 00022
Bay Street Wharf	Bay Street, Greenwich, NSW 2065	Sydney Harbour			8493	LEP 1987

Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
Boat Sheds & slips	O'Connell Street, Greenwich, NSW 2065	Sydney Harbour			8331	REP 00023
Boatshed	11a Bayview Street, McMahons Point, NSW 2060	Sydney Harbour			12298	LEP 1989
Boatshed, wharfage & slipway	23a King George Street, McMahons Point, NSW 2060	Sydney Harbour			12414	REP 00023
Boronia Park Walk, Mary St. Wharf remains	Bonnefin Road, Hunters Hill, NSW 2110	Sydney Harbour			7088	LEP 00014
Brandville Wharf	William Street, Henley, NSW 2111	Sydney Harbour			7478	LEP 00014
Careening Cove slipway	Bradley Avenue, Kirribilli, NSW 2061	Sydney Harbour			12430	REP 00023
Cargo Sheds, land & waterway around wharves	Cowper Wharf Roadway, Woolloomooloo, NSW 2011	Sydney Harbour			16729	REP
Clark Island	Port Jackson	Sydney Harbour			16734	REP 00023
Clifton Gardens Wharf and Pool	Clifton Gardens, NSW 2088	Sydney Harbour			10866	REP 00023
Clyde Carlingford Rail Bridge	1b adj Grand Avenue, Rosehill, NSW 2142	Sydney Harbour		While it is a relatively small bridge the brick detailing makes it one of the more elaborate of the early crossings and it forms an attractive historical feature of the river. Possesses the ability to demonstrate bridge building technology of the time.	2240234	LEP 234
Coal Loader, Quarantine Station	Balls Head Bay	Sydney Harbour			12088	LEP 1989
Corner Beach Reserve	Mosman, NSW 2088	Sydney Harbour			10717	LEP 00022
Darling Street Wharf Site	Darling Street, Balmain, NSW 2041	Sydney Harbour			8339	REP 00023
De Burghs Bridge	Lane Cove Road, Macquarie Park	Sydney Harbour			14050	LEP
Dorman Long Wharf - Luna Park (former)	Milsons Point, NSW 2061	Sydney Harbour			12444	REP 00023
Ermington Wharf	114 Wharf Road, Ermington, NSW 2115	Sydney Harbour		Demonstrates the importance of the river as an early transport route Site possesses potential to contribute to an understanding of traditional wharf construction techniques.	2240611	LEP 611
Ferry pier	Military Road, Watsons Bay, NSW 2030	Sydney Harbour			19732	REP 00023
Ferry Wharf	Bradleys Head Road, Mosman, NSW 2088	Sydney Harbour			10694	LEP 00022
Ferry Wharf (former)	The Spit, NSW 2088	Sydney Harbour			10845	LEP 00022
Ferry Wharf, Curruaghbeena Point (former)	Musgrave Street, Mosman, NSW 2088	Sydney Harbour			10818	LEP 00022

Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
Ferry wharves	Alfred Street, Circular Quay, NSW 2000	Sydney Harbour			16730	REP 00023
Gale Street Wharf	Gale Street, Gladesville, NSW 2111	Sydney Harbour			7334	LEP 00014
Gasworks bridge	198 adj George Street, Parramatta, NSW 2150	Sydney Harbour		The barrier formed by the river was a major factor in development as late as 1880, at which time it was only bridged at Church Street, Parramatta. In the 1880's both the Newlands (Gasworks) and Gladesville Bridges were opened.	2240221	LEP 221
Gladesville Bridge	Victoria Road, Gladesville, NSW 2111	Sydney Harbour			7468	LEP 00014
Gladesville Bridge Remains	Huntleys Point Road, Huntleys Point, NSW 2111	Sydney Harbour			7422	LEP 00014
Gladesville Wharf	Huntleys Point Road, Huntleys Point, NSW 2111	Sydney Harbour			7388	LEP 00014
Gladswood House private jetty	11 Gladswood Gardens, Double Bay, NSW 2028	Sydney Harbour			19749	REP 00023
Greenwich Baths	Albert Street, Greenwich, NSW 2065	Sydney Harbour			8323	REP 00023
Greenwich Point Wharf	Serpentine Road, Greenwich, NSW 2065	Sydney Harbour			8660	LEP 1987
Grotto Point Lighthouse and remains of wharf	Balgowlah (Grotto Point)	Sydney Harbour			101.23	REP; LEP 1988
Group of slipways	12, 14 & 26 West Crescent Street, McMahons Point, NSW 2060	Sydney Harbour			12446	REP 00023
Herberton Avenue Wharf	Herberton Avenue, Hunters Hill, NSW 2110	Sydney Harbour			7399	LEP 00014
Hermit Bay Wharf, slipway & landing	Vaucluse Road, Vaucluse, NSW 2030	Sydney Harbour			5001307 / 19740	REP / LEP 00023
HMAS Platypus	High Street, North Sydney, NSW 2060	Sydney Harbour			12162	LEP 1989
HMAS Sydney Bow	Olympic Drive, Milsons Point, NSW 2061	Sydney Harbour			12238	LEP 1989
Holmes slipway (former)	11a Henry Lawson Drive, Neutral Bay, NSW 2089	Sydney Harbour			12423	REP 00023
Horsely's Boatshed and Sea Wall (former)	217B Edinburgh Road, Castlecrag	Sydney Harbour			5000834	REP

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House, formerly boatshed	31 Bonnefin Road, Hunters Hill, NSW 2110	Sydney Harbour			7103	LEP 00014
Hunters Hill Wharf and Waiting Shed	Ferry Street, Hunters Hill, NSW 2110	Sydney Harbour			7355	LEP 00014
Huntleys Point Wharf Side	Huntleys Point Road, Huntleys Point, NSW 2111	Sydney Harbour			7425	LEP 00014
Itata and other wrecks	Salt Pan Creek, Middle Harbour	Sydney Harbour			5001345	REP
Jubilee Floating Dock Site	Datchett Street, Balmain, NSW 2041	Sydney Harbour			8340	REP 00023
Lavender Bay Ferry Wharf	Railway Avenue, McMahons Point, NSW 2060	Sydney Harbour			12275	REP; LEP 1989
Lavender Bay waterfront relics	Lavender Bay, NSW 2060	Sydney Harbour			12418	REP 00023
Little Manly Cove Pool	Stuart Street, Manly, NSW 2095	Sydney Harbour			10199	REP 00023
Longueville Wharf	Stuart Street, Longueville, NSW 2066	Sydney Harbour			8652	LEP 1987
Lucretia Baths	Dunois Street, Longueville, NSW 2066	Sydney Harbour			8534	LEP 1987
Manly Ferry Wharf	The Esplanade, Manly, NSW 2095	Sydney Harbour			5000823	REP
Manly Rowing & Sailing Club	East Esplanade, Manly, NSW 2095	Sydney Harbour			10043	REP 00023; LEP 1988
Marina Boatshed, Mosman Rowing Club	Mosman, NSW 2088	Sydney Harbour			10661	LEP 00022
Mary Street Wharf north end (former)	Park Road, Hunters Hill, NSW 2110	Sydney Harbour			7198	LEP 00014
Middle Harbour submarine syphon	Holmes Avenue, Clontarf, NSW 2093	Sydney Harbour			10197	REP 00023
Morts Dry Dock Woolwich Dock	Clarke Road, Woolwich, NSW 2110	Sydney Harbour			7112	LEP 00014
Mosman Bay sea wall, Mosman Bay	Mosman, NSW 2088	Sydney Harbour			10868	REP 00023
Mosman Rowing Club, Mosman Bay	Mosman, NSW 2088	Sydney Harbour			10865	REP 00023
Mount Street Wharf	Mount Street, Hunters Hill, NSW 2110	Sydney Harbour			7206	LEP 00014
Naval Warehouse	Wharf, Darling Island	Sydney Harbour			5000989	REP 00098
Navigation light tower, Eastern Channel	Port Jackson	Sydney Harbour			16741	REP 00023

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Navigation light tower, off Shark Island	Port Jackson	Sydney Harbour			16732	REP 00023
Navigation Light Tower, Western Channel	Georges Head, NSW 2088	Sydney Harbour			5000825	REP
Neutral Bay Wharf Group	Hayes Street, Neutral Bay, NSW 2089	Sydney Harbour			12447	REP 00023
Nielson Wharf remains (former)	Steel Point, Vaucluse, NSW 2030	Sydney Harbour			19742	REP 00023
Northwood Wharf	Northwood Road, Northwood, NSW 2066	Sydney Harbour			8412	LEP 1987
Parsley Bay Ferry Wharf	The Crescent, Vaucluse, NSW 2030	Sydney Harbour			19743	REP 00023
Paton's slipways	Willoughby Street, Kirribilli, NSW 2061	Sydney Harbour			12441	REP 00023
Pearl Bay Pleasure Grounds	The Spit, NSW 2088	Sydney Harbour			10810	LEP 00022
Pilkington's Bridge at Tarban Creek	Batemans Road, Gladesville, NSW 2111	Sydney Harbour			7069	LEP 00014
Punt Ramp	Dick Street, Hunters Hill, NSW 2110	Sydney Harbour			7097	LEP 00014
Punt Road Wharf Bedlam Point Wharf	Punt Road, Gladesville, NSW 2111	Sydney Harbour			7300	LEP 00014
Quarantine Station Boat Depot (former)	Balls Head Drive, Waverton, NSW 2060	Sydney Harbour			12420	REP 00023
Queens Wharf Reserve and stone wall	198 George Street, Parramatta, NSW 2150	Sydney Harbour	built 1834	The site of the Queens wharf, and stone walls along the banks of the Parramatta River.	2240219	LEP
Remains of bath house & site of jetty	Darling Point Road, Darling Point, NSW 2027	Sydney Harbour			19746	REP 00023
Remains of Baths	Hunters Hill, NSW 2110	Sydney Harbour			7076	LEP 00014
Remains of Ben Boyd Whaling Station	Ben Boyd Road, Neutral Bay, NSW 2089	Sydney Harbour			12432	REP 00023
Remains of Figtree Bridge	Joubert Street, Hunters Hill, NSW 2110	Sydney Harbour			7378	LEP 00014
Remains of former Grant Wharf	Spit Road, Mosman, NSW 2088	Sydney Harbour			10870	REP 00023
Remains of Former Tasmanian Ferry Terminal	Yeend Street, Balmain, NSW 2041	Sydney Harbour			8336	REP 00023

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Remains of Greenwich Point Wharf	21 George Street, Greenwich, NSW 2065	Sydney Harbour			8328	REP 00023
Remains of H.C. Press picnic ground & baths	Cammeray Road, Castle Cove, NSW 2069	Sydney Harbour			17865	LEP 00023
Remains of Manly public baths	East Esplanade, Manly, NSW 2095	Sydney Harbour			10204	REP 00023
Remains of Milsons Point ferry wharf and tram turning circle	Olympic Drive, Milsons Point, NSW 2061	Sydney Harbour			12437	REP 00023
Remains of Morts Dock, foreshore of park	Balmain, NSW 2041	Sydney Harbour			8327	REP 00023
Remains of Municipal Baths	241 Edinburgh Road, Castlecrag, NSW 2068	Sydney Harbour			17866	LEP 00023
Remains of Municipal Baths, structures and access steps	241 Edinburgh Road, Castlecrag	Sydney Harbour			5000837	REP
Remains of Neptune Engineering Slipway	King George Street, McMahons Point, NSW 2060	Sydney Harbour			12445	REP 00023
Remains of old ferry wharf	Musgrave Street, Mosman, NSW 2088	Sydney Harbour			10869	REP 00023
Remains of original Cremorne Point wharf	Cremorne, NSW 2090	Sydney Harbour			12434	REP 00023
Remains of Roseville Baths	99 Babbage Road, Roseville, NSW 2069	Sydney Harbour			7920	REP 00023
Remains of sea wall, former railway marshalling yards	Milsons Point, NSW 2061	Sydney Harbour			12452	REP 00023
Remains of Sydney ferries lay-up wharf	McMahons Point, NSW 2060	Sydney Harbour			12451	REP 00023
Remains of tram terminus & wharf for tram	Avona Crescent, Seaforth, NSW 2092	Sydney Harbour			10195	REP 00023
Remains of Vaucluse Point ferry wharf	83 Fitzwilliam Street, Vaucluse, NSW 2030	Sydney Harbour			19748	REP 00023
Remains of vehicular ferry ramp	Avona Crescent, Seaforth, NSW 2092	Sydney Harbour			10202	REP 00023
Remains of Western Rose Bay ferry wharf	New South Head Road, Rose Bay, NSW 2029	Sydney Harbour			19744	REP 00023
Remains of wharf, baths & waterfront relics	Tivoli Pier, Thorne's Wharf, Clarement Wharf	Sydney Harbour			19747	REP 00023
Remnant natural bushland & baths	Seaforth, NSW 2092	Sydney Harbour			10062	LEP 1988

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Riverglade Sandstone Seawall	Victoria Road, Huntleys Point, NSW 2111	Sydney Harbour			7553	LEP 0018
Riverglade Weir on Tarban Creek	Victoria Road, Huntleys Point, NSW 2111	Sydney Harbour			7550	LEP 0018
Rose Farm Wharf	1 Spurway Street (off), Ermington, NSW 2115	Sydney Harbour		Demonstrates the importance of the river as an early transport route Site possesses potential to contribute to an understanding of traditional wharf construction techniques.	2240528	LEP 528
Rowntree's Floating Dock Site	The Avenue cnr Hart St, Balmain, NSW 2041	Sydney Harbour			8332	REP 00023
Ryde Bridge	Church Street, Ryde, NSW 2112	Sydney Harbour			14049	LEP
Sailors Bay boatshed	Clive Park, Northbridge, NSW 2063	Sydney Harbour			5001305	REP
Sea wall, boundary of Luna Park	Milsons Point, NSW 2061	Sydney Harbour			12443	REP 00023
Shark Island	Port Jackson	Sydney Harbour			16733	REP 00023
Ship building and repair works	Munro Street, McMahons Point, NSW 2060	Sydney Harbour			12442	REP 00023
Silverwater Bridge	Silverwater Road, Ermington, NSW 2115	Sydney Harbour	opened 1962	Reinforced concrete box girder three span bridge, built across Parramatta River to carry road traffic. Two lanes of traffic in each direction.	2240490	LEP 490
Site & remains of Blues Point Ferry wharves (Blues Point Vehicular Ferry Dock)	Blues Point Road, McMahons Point, NSW 2060	Sydney Harbour			12449	REP 00023
Site & remains of Brightside cargo wharf	Stuart Street, Manly, NSW 2095	Sydney Harbour			10200	REP 00023
Site & remains of early wharfage	Rockley Street, Castlecrag, NSW 2068	Sydney Harbour			17862	LEP 00023
Site & remains of ferry wharf	Yeend Street, Balmain, NSW 2041	Sydney Harbour			8322	REP 00023
Site & remains of harbourside pool & steps	Stuart Street, Manly, NSW 2095	Sydney Harbour			10198	REP 00023
Site & remains of Manly Steamship Company	Kurraba Road, Neutral Bay, NSW 2089	Sydney Harbour			12413	REP 00023
Site & remains of Port Jackson & Manly Steamship Co. depot	Kurraba Road, Neutral Bay, NSW 2089	Sydney Harbour			12415	REP 00023
Site & remains of wharfage, Fig Tree Point	Hallstrom Close, Northbridge, NSW 2063	Sydney Harbour			17868 / 5000830	LEP 00023 / REP
Site and remains of early wharfage (Castlecrag Marina)	Rockley Street, Castlecrag	Sydney Harbour			5000835	REP

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Site of Cavill's Baths	Lavender Bay, NSW 2060	Sydney Harbour			12411	REP 00023
Site of Figtree Wharf and Boatshed	Joubert Street, Hunters Hill, NSW 2110	Sydney Harbour			7386	LEP 00014
Site of former Jeffrey Street Ferry Wharf	Jeffrey Street, Kirribilli, NSW 2061	Sydney Harbour			12424	REP 00023
Site of former Rose Bay Flying Boat Base	Lyne Park, Rose Bay, NSW 2029	Sydney Harbour			19753	REP 00023
Site of Garrick's Wharf	Crescent Street, Hunters Hill, NSW 2110	Sydney Harbour			7107	LEP 00014
Site of Ithaca Road ferry wharf	Ithaca Road, Elizabeth Bay, NSW 2011	Sydney Harbour			14757	REP 00023
Site of Manly Fun Pier (Manly Cargo Wharf)	East Esplanade, Manly, NSW 2095	Sydney Harbour		DEMOLISHED	10042	REP 00023; LEP 1988
Site of McMahons Point ferry wharf	McMahons Point, NSW 2060	Sydney Harbour			12429	REP 00023
Site of Mosman Ferry Wharf	Avenue Road, Mosman, NSW 2088	Sydney Harbour			10864	REP 00023
Site of Old Cremorne Wharf	Green Street, Cremorne, NSW 2090	Sydney Harbour			12412	REP 00023
Site of Public Baths, Lyne Park	Rose Bay, NSW 2029	Sydney Harbour			19757	REP 00023
Site of Public Wharf now occupied by new	Bay Street, Double Bay, NSW 2028	Sydney Harbour			19737	REP 00023
Site of Village Point Wharf	Wharf Road, Watsons Bay, NSW 2030	Sydney Harbour			19738	REP 00023
Site of wharf	Wingadal Place, Point Piper, NSW 2027	Sydney Harbour			19739	REP 00023
Site of Wharf	Margaret Street, Woolwich, NSW 2110	Sydney Harbour			7330	LEP 00014
Spurway Street Wharf	1 Spurway Street (end), Ermington, NSW 2115	Sydney Harbour	built c. 1877	Wharf constructed of stone walls and earth infill. The upper courses and the earthen infill are missing, and the remaining stones have been disturbed.	2240527	LEP 527
Stannard Bros. Launch Service Depot	19 Wharf Road, Balmain, NSW 2041	Sydney Harbour			8335	REP 00023
Stone Walls near wharf nos. 8,9,10,11	Ferry Street, Hunters Hill, NSW 2110	Sydney Harbour			7335	LEP 00014
Stone Wharf	Bradley's Head, Mosman	Sydney Harbour			5000826	REP
Stone wharf - National Park	Bradleys Head Road, Mosman, NSW 2088	Sydney Harbour			10862	REP 00023

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Sydney Amateur Sailing Club	Green Street, Cremorne, NSW 2090	Sydney Harbour			12433	REP 00023
Tambourine Bay Baths	Tambourine Bay Road, Riverview, NSW 2066	Sydney Harbour			8704	LEP 1987
Tarban Creek Dam	Hunters Hill, NSW 2110	Sydney Harbour			7286	LEP 00014
The Explosives Wharf	Spit Road, Mosman, NSW 2088	Sydney Harbour			10871	REP 00023
The Spit	Seaforth, NSW 2092	Sydney Harbour			10064	LEP 1988
The Spit Bridge	Seaforth, NSW 2092	Sydney Harbour			10065	LEP 1988
Tram loop at end by ferry wharf (former)	Bradleys Head Road, Mosman, NSW 2088	Sydney Harbour			10714	LEP 00022
Valentia Street Wharf & Waiting Shed	Valentia Street, Woolwich, NSW 2110	Sydney Harbour			7258	LEP 00014
Vaucluse Baths	68 Wentworth Road, Vaucluse, NSW 2030	Sydney Harbour			19745	REP 00023
Waterfront Industries	Berrys Bay	Sydney Harbour			12089	LEP 1989
Wharf	Ashton Park, Bradleys Head, NSW 2088	Sydney Harbour			10776	LEP 00022
Wharf	Wharf Road, Longueville, NSW 2066	Sydney Harbour			8707	LEP 1987
Wharf remains	Bradleys Head Road, Mosman, NSW 2088	Sydney Harbour			10867	REP 00023
Wharf remains	Ady Street Nth End, Hunters Hill, NSW 2110	Sydney Harbour			7141	LEP 00014
Wharf Site	De Milhau Road, Hunters Hill, NSW 2110	Sydney Harbour			7135	LEP 00014
Wharf Site	Princes Street, Hunters Hill, NSW 2110	Sydney Harbour			7302	LEP 00014
Wharf Site and Steps	Huntleys Point Road, Huntleys Point, NSW 2111	Sydney Harbour			7426	LEP 00014
Wharf Site north end	Mount Street, Hunters Hill, NSW 2110	Sydney Harbour			7204	LEP 00014

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Wharves and Sheds, Wharf 19, 20, 21	Jones Bay Road, Pyrmont, NSW 2009	Sydney Harbour			16669	REP 00099
Willis Road wharf	Willis Road, Castle Cove, NSW 2069	Sydney Harbour			17867 / 5000832	LEP 00023 / REP
Wollstonecraft Wharf	King Street, Wollstonecraft, NSW 2065	Sydney Harbour			12367	LEP 1989
Woodleys Slipway & Shipyard	Balls Head Road, Waverton, NSW 2060	Sydney Harbour			12410	REP 00023
Wreck of MSB Hopper Barge	Port Jackson	Sydney Harbour			16749	REP 00023
BOTANY BAY						
Botany Bay						
Bare Island Fort and Causeway	La Perouse Peninsula, NSW				2310297	Randwick Local Environmental Plan 1998 - Sch3
Bath walls	Gunnamatta Road (end of street), Woolooware, NSW 2230	Botany Bay		Category: Breakwater	2440043	LEP Gazette Dec 00
Boat shed	72-74 Ilma Avenue, Kangaroo Point, NSW 2224	Botany Bay			2440035	LEP Gazette Dec 00
Boat shed	1 Bermuda Place, Woolooware, NSW 2230	Botany Bay			2440041	LEP Gazette Dec 00
Boat shed	18 Rutherford Avenue, Woolooware, NSW 2230	Botany Bay			2440045	LEP Gazette Dec 00
Boat shed	22 Rutherford Avenue, Woolooware, NSW 2230	Botany Bay			2440046	LEP Gazette Dec 00
Boat shed	224 Woolooware Road South, Woolooware, NSW 2230	Botany Bay			2440047	LEP Gazette Dec 00
Boatshed	41 Mirral Road, Caringbah, NSW	Botany Bay			2440083	LEP Gazette Dec 00
Boatshed	359 Willarong Road South, Caringbah, NSW	Botany Bay			2440087	LEP Gazette Dec 00
Boatshed and Cottages	27 Carina Road, Oyster Bay, NSW 2225	Botany Bay			2440037	LEP Gazette Dec 00
Boatshed and House	9 Ilma Avenue, Kangaroo Point, NSW 2224	Botany Bay			2440031	LEP Gazette Dec 00

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Boatshed And Stone Walls	432 Willarong Road, Caringbah, NSW 2229	Botany Bay			2440005	LEP Gazette Dec 00
Boatshed and Wall	6-8 Ilma Avenue, Kangaroo Point, NSW 2224	Botany Bay			2440034	LEP Gazette Dec 00
Boatshed and Wall (Duplicate)	6-8 Ilma Avenue, Kangaroo Point, NSW 2224	Botany Bay			2440032	LEP Gazette Dec 00
Boatshed, house, wharf and stone waterfront	119-121 Fowler Road, Illawong, NSW 2234	Botany Bay			2440026	LEP Gazette Dec 00
Boatshed/ House (Attwells Boat Brokerage)	321-323 Woolooware Road South, Woolooware, NSW 2230	Botany Bay			2440050	LEP Gazette Dec 00
Boatshed/Dwelling and Swimming enclosure	541 Willarong Road, Caringbah, NSW 2229	Botany Bay			2440006	LEP Gazette Dec 00
Boatshed/house	255a Woolooware Road South, Woolooware, NSW 2230	Botany Bay			2440048	LEP Gazette Dec 00
Boatshed/House	295 Woolooware South Road, Woolooware, NSW 2230	Botany Bay			2440049	LEP Gazette Dec 00
Boatsheds (group)	2, 2c and 11 Hazel Place, Woolooware, NSW 2230	Botany Bay			2440044	LEP Gazette Dec 00
Botany Bay National Park Kurnell Historic Site	Kurnell Peninsula, NSW 2231	Botany Bay		The place of the first known landing by Europeans on the East Coast of Australia is within the site. It also has associations with early studies of Australia's flora and	14995	REP L015-S, Gazette Feb 98
Captain Cook Bridge (1965) and southern approach	Taren Point Road, Taren Point, NSW	Botany Bay			2440256	LEP Gazette Dec 00
Como Railway Bridge	Como, NSW			Railway Bridge/ Viaduct	2440090	LEP Gazette Dec 00
Cottage, Boatshed and Jetty	509 Willarong Road South, Caringbah, NSW	Botany Bay			2440088	LEP Gazette Dec 00
Derwent and Drake Oyster Farm	Wyong Street, Oatley (Neverfail Bay), NSW 2223				5000790	LEP
Foreshore House, Boatshed and Stone	4 Bignell Street, Illawong, NSW 2234				2440020	LEP Gazette Dec 00
House and Boatshed	69 Fowler Road, Illawong, NSW 2234				2440024 & 2440033	LEP Gazette Dec 00
House, Ferry House, Boatshed and Jetty	167 Murralin Lane, Sylvania, NSW	Botany Bay			2440249	LEP Gazette Dec 00

Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
Houses and Boatsheds	60, 64,66,68 &72 Bignell Street, Illawong, NSW 2234	Botany Bay			2440023	LEP Gazette Dec 00
Jetty and Walling	35 Harrow Street, Sylvania, NSW 2224	Botany Bay			2440040	LEP Gazette Dec 00
Sea wall	77-79 Fowler Road, Illawong, NSW 2234				2440025	LEP Gazette Dec 00
Stone Boatshed	7-13 Bignell Street, Illawong, NSW 2234				2440021	LEP Gazette Dec 00
Stone boatshed and Seawall	105 Prince Edward Park Road, Woronora, NSW 2232	Upper Botany Bay (Woronora R)			2440053	LEP Gazette Dec 00
Stone House, boatshed and carport	201 Prince Edward Park Road, Woronora, NSW 2232	Upper Botany Bay (Woronora R)			2440054	LEP Gazette Dec 00
Stone Jetty	Bignell Street, Illawong, NSW 2234				2440019	LEP Gazette Dec 00
Stone Wharf	Old Ferry Road, Illawong, NSW 2234				2440029	LEP Gazette Dec 00
Sylvania Waters Canal Development	Sylvania Waters, NSW			Category: Water Supply Canal	2440255	LEP Gazette Dec 00
Tom Ugly's Bridge	Georges River, Tom Ugly's Point, NSW 2221				5000748	LEP
Tom Ugly's Bridge (1987)	Princes Highway, Sylvania, NSW	Botany Bay			2440251	LEP Gazette Dec 00
Various Oyster workings remains	Off end of Sproule Road, Illawong, NSW				2440183	LEP Gazette Dec 00
Waterfront Houses / Boatsheds (group)	20, 24, 28, 30 & 32 Ward Crescent, Oyster Bay, NSW	Botany Bay			2440211	LEP Gazette Dec 00
Waterfront houses/boatsheds	24,28,30,32,40 Ward Crescent, Oyster Bay, NSW 2225	Botany Bay			2440039	LEP Gazette Dec 00
Waterfront housing/boatsheds	20-22 Bignell Street, Illawong, NSW 2234				2440022	LEP Gazette Dec 00
Wharf, boardwalk and steps	Gunnamatta Road, Woolooware, NSW 2230	Botany Bay			2440042	LEP Gazette Dec 00
PORT HACKING						
Ballast shoal	Port Hacking, NSW	Port Hacking			2440290	LEP Gazette Dec 00

Item	Location	Estuary	Date	Comments / References	Heritage Database no.	Heritage Listing
Beckton Boatsheds	20-24 Beckton Place, Lilli Pilli, NSW	Port Hacking			2440194	LEP Gazette Dec 00
Boat shed	47 Taloombi Street, Cronulla, NSW 2230	Port Hacking			2440009	LEP Gazette Dec 00
Boat shed	53 Talloombi, Cronulla, NSW 2230	Port Hacking			2440010	LEP Gazette Dec 00
Boat shed	34 Shiprock Road, Dolans Bay, NSW 2229	Port Hacking			2440015	LEP Gazette Dec 00
Boat shed	1C Nottingham Place, Yowie Bay, NSW 2228	Port Hacking			2440066	LEP Gazette Dec 00
Boat shed	359 Willarong Road, Caringbah, NSW 2229				2440004	LEP Gazette Dec 00
Boat shed (Duplicate)	102 Attunga Road, Yowie Bay, NSW 2228	Port Hacking			244057	LEP Gazette Dec 00
Boatshed	296-298 Attunga Road, Yowie Bay, NSW 2228	Port Hacking			2440059	LEP Gazette Dec 00
Boatshed	39-41 Baliga Avenue, Yowie Bay, NSW 2228	Port Hacking			2440060	LEP Gazette Dec 00
Boatshed	4 Glen Ayr Avenue, Yowie Bay, NSW 2228	Port Hacking			2440061	LEP Gazette Dec 00
Boatshed	5-6 Kalang Lane, Yowie Bay, NSW 2228	Port Hacking			2440062	LEP Gazette Dec 00
Boatshed	6 Sherwood Avenue, Yowie Bay, NSW 2228	Port Hacking			2440067	LEP Gazette Dec 00
Boatshed	1 Wonga Road, Yowie Bay, NSW 2228	Port Hacking			2440070	LEP Gazette Dec 00
Boatshed	38 Coopernook Avenue, Gymea bay, NSW	Port Hacking			2440168	LEP Gazette Dec 00
Boatshed	135 Attunga Road, Yowie Bay, NSW	Port Hacking			2440282	LEP Gazette Dec 00
Boatshed	5 Kalang Lane, Yowie Bay, NSW	Port Hacking			2440283	LEP Gazette Dec 00
Boatshed and Baths	102 Attunga Road, Yowie Bay, NSW 2228	Port Hacking			2440056	LEP Gazette Dec 00
Boatshed and House	255 Attunga Road, Yowie Bay, NSW 2228	Port Hacking			2440058	LEP Gazette Dec 00

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Boatshed and Seawall	23A Yellambie Road, Yowie Bay, NSW	Port Hacking			2440287	LEP Gazette Dec 00
Boatshed and Seawall (Duplicate)	23A Yellambie Road, Yowie Bay, NSW 2228	Port Hacking			2440069	LEP Gazette Dec 00
Boatshed, Garage and Walling	9 Darook Park Road, Cronulla, NSW 2230	Port Hacking			2440008	LEP Gazette Dec 00
Boatsheds	Warumbul Road (Gogerlys Point), Gundamaian (Royal National Park), NSW	Port Hacking			2440158	LEP Gazette Dec 00
Boatsheds and boatshed/dwellings	42,46,50-56,60 & 62 Matson Crescent, Yowie Bay, NSW 2228	Port Hacking			2440064	LEP Gazette Dec 00
Bundeena Wharf	Brighton Street, Bundeena, NSW	Port Hacking			2440078	LEP Gazette Dec 00
Gardens and Foreshore	Warumbul Road, Warumbul, NSW	Port Hacking			2440164	LEP Gazette Dec 00
Gymea Baths	Gymea Bay, NSW	Port Hacking			2440167	LEP Gazette Dec 00
Horderns Beach	B/W Crammond Avenue and Brighton Street, Bundeena, NSW	Port Hacking			244077	LEP Gazette Dec 00
House and Boatshed Elanora	21 Bayside Place, Caringbah, NSW 2229				2440003	LEP Gazette Dec 00
House, boatshed and sea wall	129 Peninsula Road, Grays Point, NSW 2232	Port Hacking			2440017	LEP Gazette Dec 00
Stone Steps	Waratah Street (Cronulla Wharf), Engadine, NSW 2233				2440013	LEP Gazette Dec 00
Two Storey stone boatshed	4 Munella Place, Yowie Bay, NSW 2228	Port Hacking			2440065	LEP Gazette Dec 00
SHOALHAVEN RIVER						
Old Nowra Road Bridge, Shoalhaven River Road Bridge	Princes Highway, Nowra, NSW 2541	Shoalhaven River			14236	REP Gazette Jan 86; Register of the National Estate Gazette Apr 89
DURRAS LAKE						
Benandarah Area-Coal bunker wharf	Benandarah, NSW 2536	Eurobodalla area closest to Durras Lake			4181	LEP 1987
Benandarah Area-Loading ramp, wharf	Benandarah, NSW 2536	Durras lake			4182	LEP 1987

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Benandarah Area-Paddle Wheel punt remains	Benandarah, NSW 2536	Durras Lake			4184	LEP 1987
BATEMANS BAY / CLYDE RIVER						
Shipbuilding site, Clyde River	Nelligen, NSW 2536	Batemans Bay			4194	LEP 1987
Wrays Wharf site	Nelligen, NSW 2536	Batemans Bay			4197	LEP 1987
Wreck of sand barge c1905 GR	388228	Eurobodalla area			4200	LEP 1987
TOMAGA RIVER						
John Penn Shipwreck-boat harbour	Broulee, NSW 2537	Tomaga River			4186	LEP 1987