Volume 3

Appendices

This is the third of four volumes in the Environmental Impact Statement on the Estuary General Fishery.

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APPENDIX A2 DUAP GUIDELINES

Department of
Urban Affairs and Planning

Guidelines for the
Environmental Impact Assessment
of
Draft Fishery Management Strategies
for
Commercial Designated Fishing Activities

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FOREWORD

The Environment Impact Assessment process under the Environmental Planning and Assessment Act 1979 provides a framework for assessing the ecologically sustainability of commercial fishery management strategies prepared for commercial fisheries under the Fishery Management Act 1994. The Environmental Impact Statement is an important tool as it informs proponents of likely impacts and allows for the consideration of alternative management and mitigation measures when formulating the fishery management strategy. It enables the community to review the proposed strategy, its objectives and management regimes and to provide for community input. It also informs decision makers of the likely sustainablity of the proposed strategy and of the need for mitigation measures.

These guidelines outline the issues to be addressed in environmental impact statements for commercial fishery management strategies. They have been developed with input from Environment Australia, relevant State agencies, Commercial Fishery Management Advisory Committees, Fishery Advisory Councils, endorsement holders and representatives of the scientific and community organisations.

These guidelines have been issued by the Director-General under clause 230 (1)(a) of the Environmental Planning and Assessment Regulation 2000 and must be considered by NSW Fisheries or those proponents responsible for preparing an EIS to assess the likely significance of impacts of implementing a Commercial Fishery Management Strategy. The guidelines replace the general requirements for the contents of an EIS under Schedule 2 of the EP&A Regulation 2000.

The guidelines only apply to commercial fisheries including Category 1 Share Management Fisheries and Category 2 Share Management Fisheries. Other guidelines will be developed to apply to charter boat fisheries, recreational fisheries, fish stocking and shark meshing.

In addition to reference to this guideline when preparing an EIS for a fishery management strategy, NSW Fisheries or the proponent responsible for preparing the EIS must also consult the Director-General as to whether there are any additional requirements (to those in these guidelines) to be considered in the preparation of the EIS.

These guidelines have included relevant matters to meet the Commonwealth "Benchmarks and Terms of Reference for Environmental Assessment of Fisheries" and to satisfy the Commonwealth Government "Guidelines for the Ecologically Sustainable Management of Fisheries" for the purposes of Schedule 4 of the Commonwealth Wildlife Protection (Regulation of Exports and Imports) Act 1982. The guideline has also highlighted the importance of identifying if the fishery activity is likely to affect the matters of national environmental significance set out in the Environmental Protection and Biodiversity Conservation Act 1999 (EPBC Act). Matters of national environmental significance includes World heritage areas, declared Ramsar wetlands, listed threatened species and ecological communities, listed migratory species, nuclear actions and the environment of the Commonwealth marine area. If fisheries are likely to affect matters of national environmental significance (including listed marine species), the Commonwealth will need to be consulted to determine whether approval is required under the EPBC Act.

I commend these guidelines to all those involved in developing or assessing commercial fishery management strategies.

Sue Holliday
Director-General

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A COMMERCIAL FISHERY MANAGEMENT STRATEGIES

Overview

The Fisheries Management (FM) Act 1994 requires a management strategy to be developed for all major commercial fisheries. These strategies are to set out the management objectives and goals of each fishery, the management rules, performance indicators and monitoring regimes to determine if the strategy's objectives are being achieved. Information on the current operation and status of the fisheries, and the vision for future management of the fishery will be considered. The strategy will include all controls affecting the operation of the fishery and will focus on achieving sustainable performance objectives.

Fishery management strategies are to be prepared for the following designated fishing activities:

- Commercial fisheries
  - Category 1 Share Management Fisheries - abalone fishery and the lobster fishery
  - Category 2 Share Management Fisheries - ocean prawn trawl fishery, ocean fish trawl fishery, ocean hauling fishery, ocean trap and line fishery, the estuary general fishery and the estuary prawn trawl fishery.
- Charter boat fisheries
- Recreational fisheries
- Fish stocking
- Shark meshing, and
- Other fishing activities proclaimed by the Governor on the recommendation of the Minister for Fisheries to be designated fishing activities.
  These provisions do not apply to aquaculture.

Prior to its finalisation, the draft strategy must undergo environmental assessment under the provisions of Part 5 of the Environmental Planning and Assessment (EP&A) Act 1979 to test its sustainability in terms of resource and environmental management. The environmental assessment is an examination of the environmental impacts of the fishing activities and considers biological, biophysical, economic and social issues. It must also consider the impact on the resource from other fisheries and non-fishing activities.

The environmental assessment will rely on best available information to predict impacts of the proposed activities on the environment. The assessment may highlight areas where further information should be gathered, where practices should be changed and where alternative management regimes may be required. The broader community as well as the endorsement holders, Management Advisory Committees (MACs), Advisory Councils and the Fisheries Resource Conservation and Assessment Council (FRCAC) will be given an opportunity to comment on the EIS and the draft management strategy.

Licences and authorisations issued in accordance with the strategy are exempted from having to undergo environmental assessment of the impacts of fishing under each individual licence. There is a transitional period until 1 July 2003 exempting individual licences from the need for environmental assessment to provide NSW Fisheries time to prepare fisheries management strategies for commercial fisheries. After that time, environmental assessment will be required prior to issuing each individual license or authorisation which are not consistent with the strategy or in all fisheries where a strategy is not in place.

Purpose of a Commercial Fishery Management Strategy

A commercial fishery management strategy is a document outlining the management goals, objectives, controls and other measures for achieving the objectives, performance indicators and monitoring programs applying to a particular commercial designated fishing activity. The strategy must contain the "management tools" applying to the commercial fishery, as well as data collection protocols and triggers for the review of the strategy.

The strategy should be an informative document detailing the future vision for the management of the particular designated fishing activity – including:

- short, mid and long term vision for the fishery
- regulatory controls, management arrangements and other measures for achieving the vision including setting target effort or fishing capacity of each fishery and any restructuring program
- the framework for providing fishers and other stakeholders with greater certainty about the rules and administrative arrangements applying to the fishery.
- An information resource for the endorsement holders as well as the broader community on a particular fishery

The strategy is to be prepared in accordance with section 7E of the Fisheries Management Act and this guideline. The Minister must consult with the Fisheries Resource Conservation and Assessment Council on the preparation or revision of a fishery management strategy.

Under section 7E of the FM Act, the Fishery Management Strategy is to:

1. Describe the objectives of the Strategy
2. Describe the designated fishing activity
3. Outline any likely interaction of the designated fishing activities with other fishing activities
4. Outline the fishing regulatory controls or proposed fishing regulatory controls which apply to the designated fishing activity including:
    (a) Provisions in the Fisheries Management Act or Regulations
    (b) Any management plan or draft management plan
    (c) Fishing closures under section 8 of the FM Act
    (d) Fishing approvals
    (e) Any determinations of the TAC Committee under Division 4 of Part 2 of the FM Act
    (f) Policies approved by the Fisheries Minister
    (g) Any relevant provisions in environmental planning instrument
5. Identify performance indicators to monitor whether the objectives of the strategy are being achieved
6. Describe how the designated fishery activity is to be monitored
7. Specify at what point a review of the strategy is required when a performance indicator is not

The fishery management plan should be described in the Fishery Management Strategy. It should outline the classes of shares and the "rights" of shareholders as set out in the FM Act. The first management plan in a Category 2 Share Management Fisheries cannot be approved until the Strategy as a whole has been assessed and a determination made under Part 5 of the Environmental Planning and Assessment (EP&A) Act 1997.

Managing a dynamic complex system with uncertainty and limited information

Those responsible for developing and implementing the strategy must deal cautiously with the risks and uncertainties associated with the exploitation of fishery resources. Estimating the level of catch that can be safely taken from a fish stock is not simple. Unlike many land-based natural resources, it is much more difficult to accurately assess how many fish there are in the estuarine and coastal waters. Moreover, a number of factors can influence the numbers of fish present, with fishing being only one.

The factors to consider in determining the size and resilience of fish stocks include:

- fecundity (the level of egg production), growth rates, rates of natural mortality and fishing mortality,
- oceanographic and climatic conditions (such as water temperature, current speed and direction, nutrient rich upwellings, rainfall, etc.), and
- habitat opportunities and constraints and the health of important habitats for the stock life cycle.

Such varying factors provide great challenges for the fishers who are trying to catch the fish, the scientists who are studying the fish, and the managers who are trying to achieve sustainable harvest levels.

Even if fishing did not take place, there can be natural variations in the abundance of some species from season to season and year to year. As a result there needs to be build into any management strategy, a monitoring program for fish stocks and triggers to adjust the level and nature of fishing activity when necessary. In addition, non-fishing activities such as disturbance of breeding areas from increasing urban development and poor water quality from poor land/catchment management including the unmanaged disturbance of acid sulfate soils, can put pressure on fisheries and their ecosystems which may reduce the ability of the natural environment to support the same level of aquatic life.

Fisheries research has traditionally focused on target species and their lifecycle with stock assessments based on the analysis of the relative abundance, the size and age of the catch, fish behaviour (eg migrations, aggregation for spawning) and reproductive cycles. However, with increasing emphasis on the conservation of biodiversity, research directions have been recently expanded to examine the effects of fishing on non-target species, ecosystem and habitat conservation issues based on bioregions.

Changing market demands, natural cycles in species abundance and availability and technological improvements mean that fishers are constantly changing the way they fish and perhaps even the species targeted. The result is a need for flexible management regimes and robust performance monitoring programs. The fisheries strategy must recognise and cater for the prospect that management rules may need to be changed from time to time in response to modify fishing activity or unpredictable conditions.

Management Tools

Fisheries management involves the implementation of policies and rules that affect fisher behaviour. A range of management tools are available under the FM Act or Regulation including provisions limiting who has access to the fishery, where and when fishing can occur, input controls such as gear and boats or output controls such as the size, number and type of fish which may be taken (see Table 1). Other controls may be specified in management plans developed under the provisions of the FM Act or Regulation for share management fisheries and any associated determination made by a relevant Total Allowable Catch (TAC) Committee.

Management tools may include provisions relating to aquatic and other reserves under the FM Act or National Parks and Wildlife (NPW) Act, to marine parks under the Marine Parks Act 1997 or to an environmental planning instruments under the EP&A Act. Other legislation and polices provide environmental protection measures relevant to the management of the fisheries. These include Wildlife Protection (Regulation of Export and Imports) Act, Environment Protection and Biodiversity Conservation (EPBC) Act, NPW Act and FM Act. International conventions relating to wetland, migratory birds and whale protection also are relevant. See Appendix 1 for a list of the relevant legislation and responsible authorities.

Table 1 Management Tools

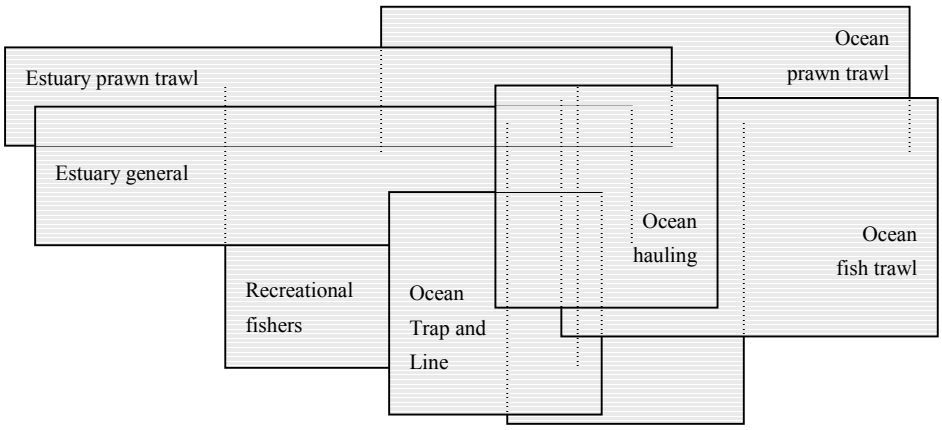
Limiting who has access	***Limited access regimes*** can be used to limit entry to participants in a particular fishery or part of a fishery. They usually include eligibility rules and rules relating to the transfer of entitlements.
	Restructuring programs can provide a concentrated or focused change in management procedures to achieve an accelerated change in expected outcomes[1]. These may include minimum entitlement holdings, buy back schemes and restructuring through transferability programs.
Limiting where and when the fishing can occur	***Fishing closures*** which restrict commercial and/or recreational fishing for a specified period of time, any fishing or fishing for certain classes of fish in any waters or from specified waters
	Recreational fishing areas which are a form of fishing closure may give preferential fishing rights to recreational fishers and may partly or totally restrict commercial fishers
	Recognised fishing grounds are areas used regularly or intermittently for net fishing by commercial fisheries and which have been mapped and approved by the Director and where commercial net fishers are given priority under clause 105 of the FM Regulation.
Input controls limiting the equipment used to take fish	***Gear restrictions*** limit the size and type of gear (in possession or that can be used to take fish) such as size and number of nets/traps/lines/etc, mesh or size configurations, gear design, and marking of gear
	Boat controls limit the size and engine capacity of boats
Output controls limiting the amount and type of fish able to be landed	***Total allowable catch*** (TAC's) is a specified total catch for a share management fishery determined by an independent Total Allowable Catch Committee fished on a competitive basis or by people holding individual quotas.
	Species size limits restricts the minimum size, maximum sizes or range of sizes specified for fish of a particular species that can be landed (by measurement or weight);
	Bag limit is the maximum quantity of fish of a specified species or of a specified class that a person may take on any one day. – daily limit.
	Possession limit is the maximum quantity of fish of a specified species or specified class that a person may have in possession in any specified circumstances
	Protected fish are certain species of fish completely prohibited from being in a person's possession.
	Protected fish from commercial fishing are certain species of fish completely prohibited from commercial fishing and from taking for sale.
	Quality assurance controls are the controls on the harvest of shellfish such as mussels and pipis to protect health
Protection of ecosystems	***Protected or threatened species, populations and ecological communities and their habitats*** (eg fish, aquatic vegetation, marine mammals, platypus, birds etc). listed under the FM Act, NPW Act or EPBC Acts.
	Marine protected areas in estuarine or oceanic areas managed to conserve biodiversity and habitat. These include aquatic reserves, marine parks and marine components of national parks and nature reserves (Note: fishing restrictions may only apply in certain zones in marine parks and aquatic reserves)
	Planning controls in Environmental Planning Instruments (eg LEPs, SEPPs) under the EP&A Act that could limit where fishing could occur and /or protect foreshore vegetation and wetlands from disturbance or destruction.

[1] Definition extracted from Metzner, R. & Rawlinson, P. (1998) Fisheries Structural Adjustment: towards a national framework. Commonwealth Department of Primary Industries and Energy, Canberra, p.2.

Interaction between fisheries

To understand the impacts on fish stock of a particular fishery, the interaction and cumulative impacts of other fisheries on the particular stock and habitats must also be considered. The nine major commercial fisheries have been defined principally on an historical basis in a manner convenient for management of the fishers and not the management of the fish stock. As the same fish stock may be fished by a number of fisheries, changing the controls in one fishery (say in the estuary prawn trawl) will affect the stock available to be caught in another (eg ocean prawn trawl). For some species, four or more commercial fisheries as well as recreational or charter boat fishers may be catching the same species often at different stages of their development.

Figure 1 Potential interrelationship between fisheries



Because of the level of interaction between fisheries (Table 2), the development of a strategy for a particular fishery as well as the associated environmental assessment must take into consideration the potential cumulative impacts of the management strategies on target species, by-product species (which may be the target species of another fishery) and bycatch as well as the potential social and economic effects as a result of any associated changes in resource allocation.

Table 2 Interaction between fisheries based on NSW Fisheries 1998/1999 Status of Fisheries Resources Report

Species	Exploitation status	No of fishers taking 90% of catch	Tonnes landed in 1997/8								
			Estuary Prawn Trawl	Ocean Prawn	Estuary General	Ocean Haul	Trap & line	Ocean Trawl	SEF C'wth	Purse Seine	Recreation *estimate*
Yellowfin bream	Fully fished	225	Significant	Significant	315	115					400
Sea mullet	Fully fished	101			1960	2442					minimal
Yellow tail	Moderately	15			Significant	Significant				473	24
Slimy Mackerel	Moderately	10			Significant	Significant				497	40
Snapper	Fully / over fished	118	Significant	Significant	Significant		271				180
King fish	Fully / over fished	50					73				50
Blue eye	Fully / over fished	25					105	100	400		10
Gem fish	Over fished /collapsed	15					105		200		10

Silver trevally	Fully / over fished	68			92		112	34	240		Very significant
Prawns	Fully fished		414	954	799						266

B THE EIA PROCESS AND PROCEDURES

Steps in the EIA Process

The four steps below summarise steps in preparing and assessing a Commercial Fishery Management Strategy and in its review and updating.

Step 1

- NSW Fisheries assembles information– stock issues, habitat issues, current fishing practices and environmental impacts, threats and other issues to provide the basis for developing a draft FMS and for consulting on the scope of the EIS
- NSW Fisheries consults with the endorsement holders and MAC and identifies alternative management regimes and develops the first draft of the FMS
- NSW Fisheries consults with MAC and Advisory Council and develops the second draft FMS.

Step 2

- NSW Fisheries consult DUAP for the Director-General Requirements to determine if there are additional matters to those in this Guideline for the assessment of the FMS. DUAP consults with EA, FRCAC, Government agencies, MAC and other stakeholders prior to issuing any additional requirements.
- NSW Fisheries assesses the impact on the environment of the draft FMS (and the fishing activities undertaken under it) within the terms of the Environmental Assessment Guidelines and any specific requirements issued by the Director General of DUAP. NSW Fisheries consults with FRCAC, EA and key stakeholders regarding the draft strategy and environmental assessment. NSW Fisheries organises for independent peer review of key components of the draft strategy and environmental assessment.
- NSW Fisheries exhibits nationally the EIS and the draft FMS for public comment. NSW Fisheries consults with FRCAC, and notifies and /or consults with endorsement holders, relevant Advisory Council and MAC, relevant Aboriginal Land Councils and other stakeholders. FRCAC may recommend modifications to the FMS as a result comments from stakeholders.

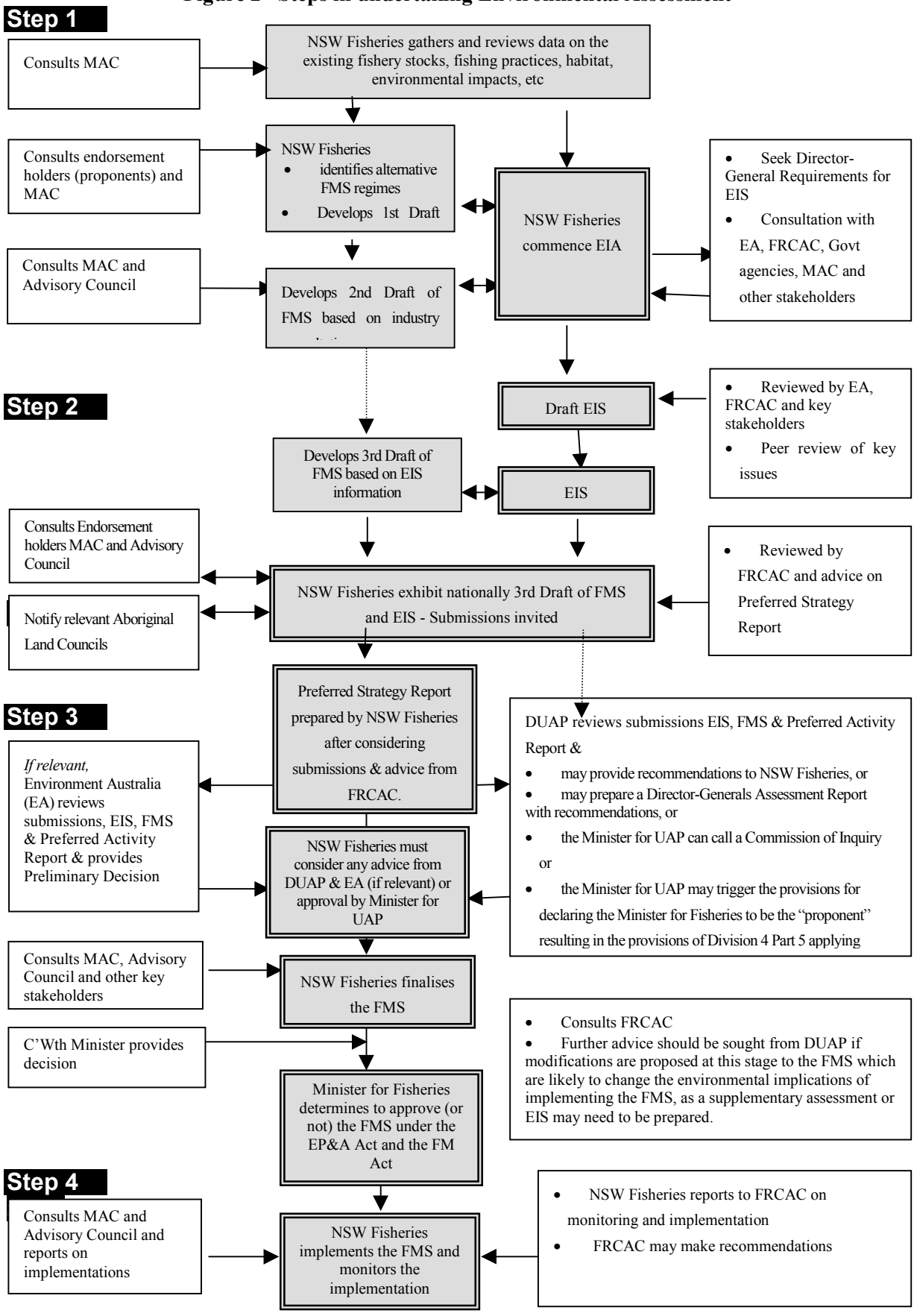
Step 3

- NSW Fisheries sends submissions received as a result of exhibition to DUAP and EA. NSW Fisheries reviews and if appropriate modifies the FMS in the light of the submissions and any advice from the FRCAC. NSW Fisheries prepares a Preferred Strategy Report outline the response to issues raised in submissions or by FRCAC and any proposed changes in the FMS as a result to improved the sustainability of the strategy
- DUAP reviews submissions, EIS, FMS and Preferred Strategy Report and may (i) provide recommendations to NSW Fisheries, (ii) prepare an Director-General's Assessment Report with recommendations or (iii) the Minister for UAP can call a Commission of Inquiry or (iv) the Minister for UAP may trigger the provisions for declaring the Minister for Fisheries to be the "proponent" resulting in the provisions of Division 4 Part 5 applying. In this case, the approval of the Minister for UAP is required for the FMS.
- If relevant, Environment Australia reviews the submissions, EIS, FMS and Preferred Strategy Report and provides a preliminary decision.
- NSW Fisheries reviews submissions and any advice received from DUAP or Environment Australia and determines whether the draft strategy should be recommended for approval. If an approval is required from the Minister for UAP or under C'wth legislation, the recommendation must be consistent with these approvals. If amendments to the FMS are proposed at this stage, NSW Fisheries may need to undertake a supplementary assessment (and approvals) if there are likely to be changes in the environmental impacts. If the changes are significant, the supplementary environmental assessment should be exhibited in accordance with Step 3.
- Commonwealth Minister makes a determination under Commonwealth legislation.
- Minister for Fisheries makes a determination under Part 5 of the EP&A Act and an approval of the finalised FMS under the Fisheries Management Act.

Step 4

- NSW Fisheries prepares relevant management plans and amends any existing management tools (eg regulations which are not consistent with the Strategy) necessary to give effect to the approved strategy. NSW Fisheries consults with FRCAC, relevant Advisory Councils, MACs and other stakeholders and if relevant the general community in finalising the management plans. Minister for Fisheries approves management plans.
- NSW Fisheries monitors the implementation of the Strategy and reports to FRCAC, relevant Advisory Councils, MACs and stakeholders on the resource and environmental management performance.
- NSW Fisheries reviews the Strategy or aspects of the strategy (based on triggers in the FMS).

Figure 2 Steps in undertaking Environmental Assessment



A Strategic Approach in the assessment of fisher activities

For each commercial fishery, the environmental impacts of issuing approvals under the provisions of the strategy are to be assessed in accordance with this guideline and the provisions of Division 5 Part 5 of the EP&A Act. The environmental assessment is to consider the impacts of the fishery as a whole rather than the impacts of individual fishers. However where there are regional/zone differences or peculiarities of particular systems such as lakes or estuaries, the impacts of the fishers within these areas should be identified and assessed.

The environmental assessment should test the sustainability of the proposed level of fishing activities authorised under the proposed fishery management strategy. This assessment must consider the cumulative implications of issuing approvals for the designated fishing activity along with interactions with the impacts of other fisheries on the fishery resources. The assessment must not only predict and consider the acceptability of the estimated impacts on target species, but must also consider effects on species taken incidentally, important habitat and the general environment. It must also consider the impact on the resource from other non-fishing related activities likely to affect the sustainability of the fishery.

The impact of commercial fishing on fish stocks (and in some cases the surrounding environment) to a lesser or greater extent depends on the management regime. The environmental assessment of the Strategy aims to identify the level of impact and the appropriate level of control of fishing activity that ensures the impact is acceptable and the fishery is sustainable. The EIS should consider the relative impact of different level and type of controls and justified the preferred approach on biophysical, social and economic grounds.

The environmental assessments must also consider along with other management rules in the strategy, the impacts of "responsive management" proposed to deal with situations when there is a need for changes in some of the "rules" in response to modified fishing activity or changed conditions eg when toxic blue green algae outbreaks in pipis. The assessment and approval of these responsive management components in the Strategy would provide for some flexibility without the need for further detailed assessment if management measures need to be changed during the life of the Strategy.

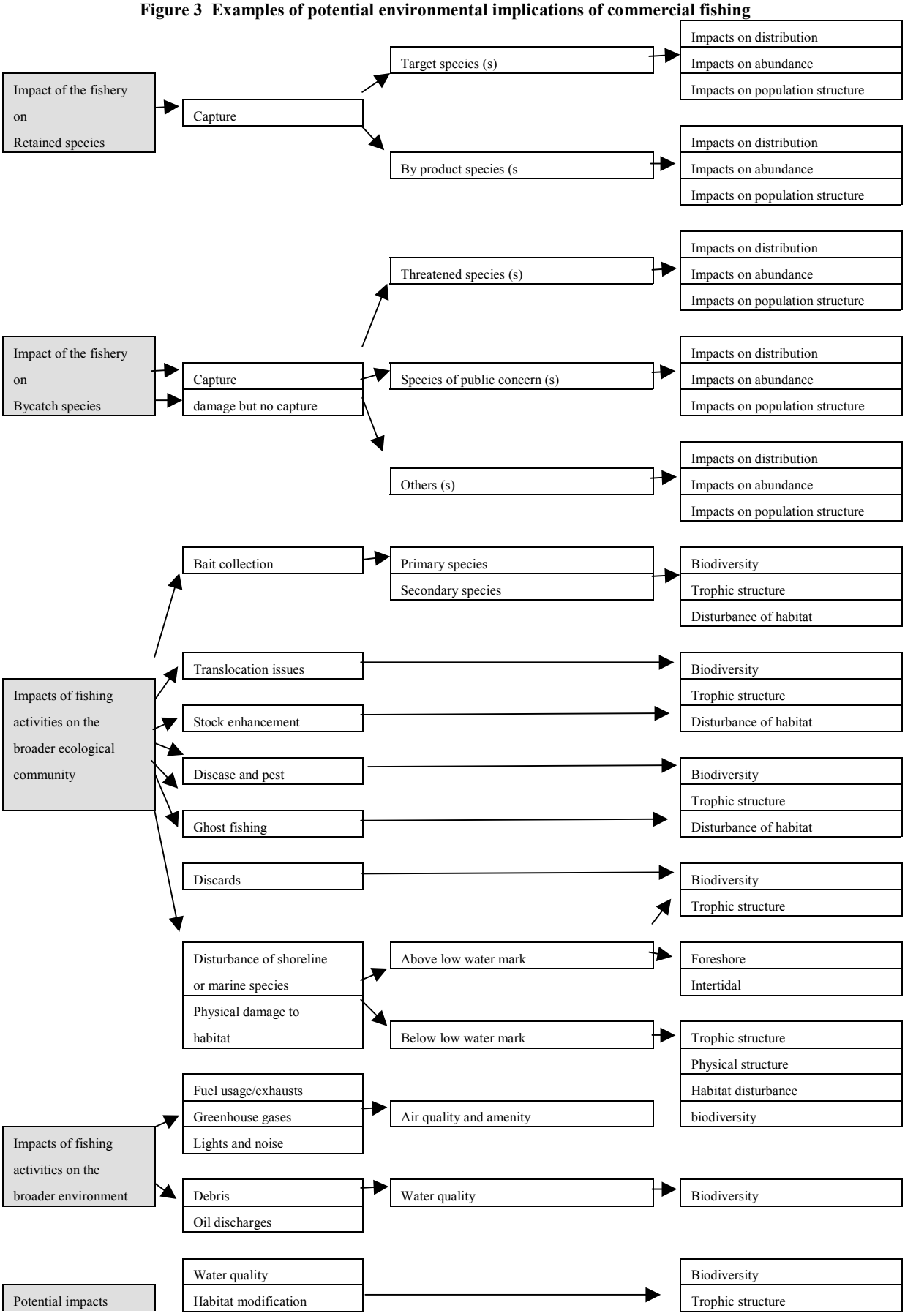
Factors to be considered when preparing an EIS

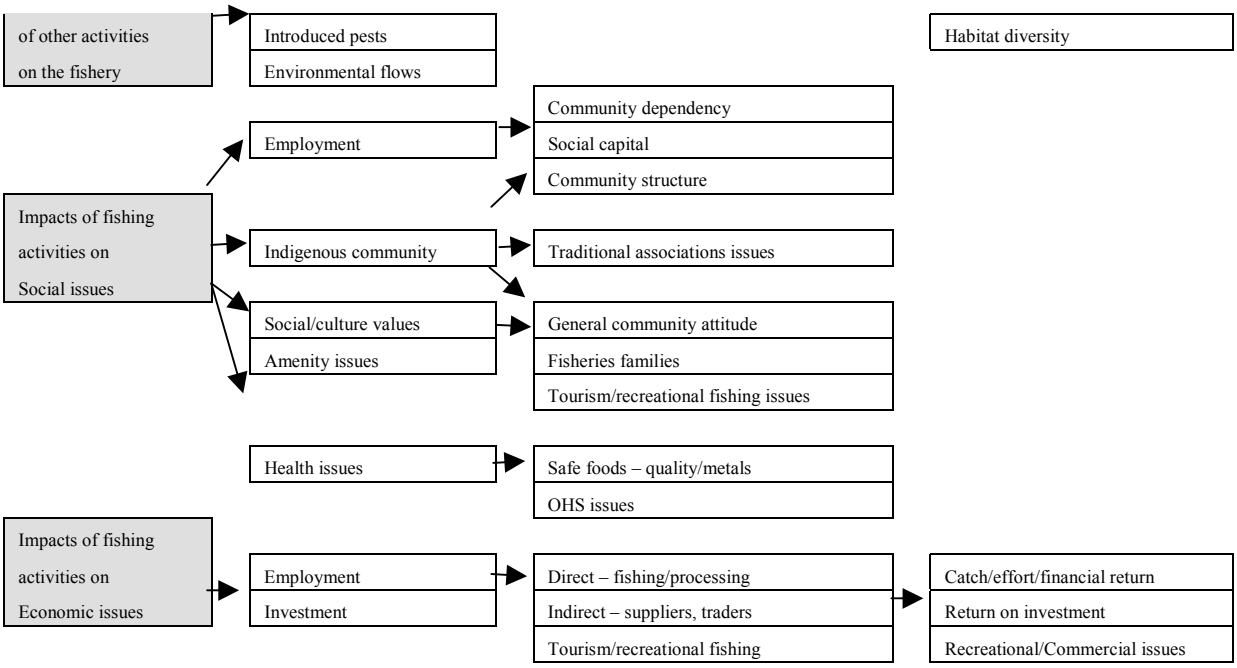
The Environmental Assessment Guidelines lists specific issues that are potentially important when assessing the impacts of the strategy and in fine-tuning management rules for the fishery. The issues listed are not exhaustive and the degree of relevance of each issue will vary with the type of commercial fishery.

The term environment includes biophysical, economic and social aspects and hence broader issues in addition to a stock assessment must be considered in the environmental assessment. There is a general duty to consider the level of potential impacts on economic and social aspects as well as biophysical issues. The environmental assessment should deal with those issues of key importance to the particular fishery but should generally consider:

- Impacts of activation of latent effort or from effort shifts
- Bycatch reduction
- Impacts on retained, bycatch and bait species
- Impacts on the broader aquatic ecology, habitat and the environment
- Protection of key habitats and protected or threatened species
- Influences of other activities on the fishery
- Social issues associated with the fishery
- Economic issues associated with the fishery.

Figure 3 Examples of potential environmental implications of commercial fishing




of other activities
on the fishery
Introduced pests
Environmental flows
Habitat diversity
Employment
Community dependency
Social capital
Community structure
Impacts of fishing
activities on
Social issues
Indigenous community
Traditional associations issues
Social/culture values
Amenity issues
General community attitude
Fisheries families
Tourism/recreational fishing issues
Health issues
Safe foods – quality/metals
OHS issues
Impacts of fishing
activities on
Economic issues
Employment
Investment
Direct – fishing/processing
Indirect – suppliers, traders
Tourism/recreational fishing
Catch/effort/financial return
Return on investment
Recreational/Commercial issues

The assessment should rely on the best available information to predict impacts. However where information is inadequate, the precautionary principle must be invoked and a cautious approach taken until such time as additional data collection, research and analysis can provide a sounder basis for management decision making. Nonetheless, when predicting the potential impacts, worst case scenarios should be considered as well as normal operational conditions.

General principles when undertaking assessment include:

- Available scientific information including catch and effort trends, information from any scientific study sites, estimates of the catch of user groups (where possible), and the life history, distribution and dynamics of the fished stock/s should be used in predicting likely impacts on stock/species and likely effectiveness of management tools/measures.
- Impact prediction should consider magnitude, duration, extent, direct and indirect effects, beneficial and adverse effects and whether impacts are reversible or permanent.
- The assessment should take into account regional/zone differences and seasonal effects.
- The assessment should take into consideration the potential impact on habitat, habitat fragmentation and broader biodiversity issues and any peculiarities of particular fished habitats, such as lakes or estuaries,
- Environmental risks and uncertainties in predicting impacts should be clearly stated including the levels of confidence in predictions and the likely resilience of the environment to recover form impacts
- In the absence of quantitative data, qualitative or delphic impact assessments (ie. categorisation into high, medium or low) based on best available information and uncodified expertise should be used.
- The proposed management measures for resource allocation and to mitigate impacts should be justified taking into consideration the ESD principles.

Overview of the environmental impact assessment

The following matters should be addressed in the environmental assessment of a Commercial Fishery Management Strategy (FMS) and the designated fishing activities described in the FMS:

1. Describe the existing fishery (including any existing "rules", current management plans, historical events, seasonal patterns and marketing factors likely to affect fisher behaviour)
2. Describe the proposed regime under the FMS including its aims, objectives and proposed management rules (including any draft management plan)
3. Consider alternative regimes (including alternative aims, objectives, management rules and interactions with other fisheries)
4. Assess the impacts of implementing the FMS taking into consideration past performance of the fishery, likely future performance, interactions with other fisheries, broader environmental issues and feasible alternative regimes. For each resource or environmental issue, the following should be provided
   - a description of the existing resource, habitat and environmental conditions (baseline conditions)
   - analysis of the potential impacts of implementing the strategy, indicating the level of confidence in the predicted outcomes and the resilience of the environment to change; indicate if the impacts are unknown, unpredictable, short term/long term or irreversible *Note: where the impacts are likely to be minor, qualitative analysis is adequate. With each issue, the level of detail should match the level of importance of the issue in decision-making.*
   - the measures available/proposed to mitigate impacts (eg responsive management options) and the level of confidence that the measures proposed would effectively mitigate/ manage the impacts.
   - the procedures to be used to monitor whether impacts occurring and if so, whether they are at the frequency and magnitude predicted.
5. Identify performance indicators, triggers for reviewing the FMS and the proposed monitoring regime for measuring the likelihood of the strategy meeting the objectives of the FMS, including an assessment of the adequacy or appropriateness of the indicators, triggers and monitoring regime.
6. Justify the draft commercial FMS and its management arrangements in terms of biophysical, economic and social factors and the principles of ecological sustainable development.

C THE CONTENTS OF THE EIS FOR A DRAFT COMMERCIAL FMS

(A) EXECUTIVE SUMMARY

An executive summary should be provided and should be available separately for public information. The summary should give a short overview of the draft fishery management strategy and the potential environmental impacts of fishing authorised by the strategy. It should be written in non-technical language to facilitate understanding of the proposal by the general public.

(B) REVIEW OF THE EXISTING OPERATION OF THE FISHERY

1. The Fish Stock

Identify current fish stock parameters of the fishery including:

(a) Identify fish stock harvested and affected by the fishery –including:

- target species and by-products species – retained species
- by catch (non-retained);
- bait species

(b) Review the status of the fish stock and identify the status of the species in terms of under-fished, fully fished, over-fished/depleted or uncertain – also consider whether by-product or bycatch species are protected or threatened species or species of public concern (eg blue groper). Discuss the trends in the health of the fish stock and the major influences on these trends

(c) Identify the species that are target species of other fisheries and any existing conflicts with other fisheries.

2. Existing operational area/regions

Outline the current locational parameters of the fishery including:

(a) Identify the principal areas including any "zones" within the areas and their importance for management purposes; identify any priority fishing areas (which may be identified as recognised fishing grounds)

(b) Identify ports or locations where fishers operate from:

- identify the existing level of capital investment in on-shore support, processing or distribution facilities in particular ports/regions and its importance for the fishery;

- identify any existing fishers organisational arrangements (eg co-operatives) and their importance
- identify any current hazard issues affecting the use of the ports or locations where fishers operate

(c) identify and discuss importance of any relevant jurisdictional issues (eg. Offshore Constitutional Settlement, interstate issues) or any areas where fishing has been restricted all or some of the time eg closures areas, reserves and marine parks (protected zones), navigation channels, naval waters, etc

(d) identify and discuss importance of any areas of important aquatic habitats for the fishery (life cycle related) and those vulnerable to impact by fishing methods authorised under the strategy or by land-based activities;

(e) identify any discrete fished habitats, such as lake systems, estuaries or specific reefs and identify any operations, environmental conditions or constraints that are peculiar to these areas.

3. Current fisher and harvest information

Outline current fisher information including:

a) identify the number of fishers and number and type of endorsements on a State, regional and/or sub-regional basis

b) identify the total employment within the fishery on a State, regional and/or sub-regional basis, including those involved in onshore handling/processing/value-adding arrangements

c) identify the gear, equipment or boats involved in the fishery including:

i) if relevant, identify the number, size, age and characteristics of boats and on-board handling/processing arrangements;

ii) identify the characteristics of fishing gear – including its use and management – cleaning, maintenance, waste management – and any innovations to minimise bycatch

iii) identify current trends in capital investment in boats, gear and equipment within the fishery including any which influence the efficiency of catch or to increase the reliability of monitoring the catch (GPS, echo-sounders, VMS etc)

d) outline information on the current harvest on a State, regional and/or sub-regional basis:

i) current catch, value and trends including:

- species information – target species as well as ~~major~~ species in the incidental catch which is retained (by-product) or discarded (bycatch), identify stages in the life cycle of target and incidental catch;
- recent trends in total fishing effort and total landed value of the catch;
- outline any processing of the catch (and benefits derived from activities)

ii) seasonal and other major factors that affect how the fishery currently operates and the trends in distribution of the catch within the region and between the fishers

iii) identify other commercial and recreational fisheries for which these species are target or incidental catch; outline characteristics of other fisheries and outline resource exploitation (eg. catch levels and participation of other sectors)

iv) indicated the information sources of the fishery and the reliability of data and what uncertainties (if any) are associated with the data

4. Current regulatory and management measures

a) Outline the range of management tools currently used to limit or regulate the impacts of the fishery; such as

i) Limits on who has access

ii) Limits on where and when the fishing can occur

iii) Input controls limiting the equipment used to take fish

iv) Output controls limiting the amount and type of fish able to be landed

b) Describe the provisions in any existing management plans and its objectives

c) Comment on the strengths and weaknesses of the current management regime

d) Describe the current administrative arrangements for the fishery and comment on the strengths and weaknesses of the current regime including:

i) enforcement and compliance

ii) cost recovery,

iii) community contribution payments (if a share management fishery),

iv) cross-fishery consultation

5. Factors outside the fishery affecting the fishery

a) Interaction with other fisheries under NSW jurisdiction

b) Interaction with other fisheries under other State or Commonwealth jurisdiction

c) Environmental factors – climatic/season changes; water quality; habitat degradation; etc

(C) THE DRAFT COMMERCIAL FISHERY MANAGEMENT STRATEGY

1. Objectives of the FMS

The objectives of the management strategy should be clearly stated and include the following issues:

i) Maintenance of ecologically viable stock levels with acceptable levels of probability. Where stocks are overfished, the fishery will be managed to rebuild stocks to viable levels within nominated timeframes.

ii) Conservation of biological diversity in the ecosystem and the protected or threatened species, populations or communities and their habitats

iii) Protection of the ecosystem in particular key habitat areas

iv) Fishing operations are not a threatening process to bycatch species

v) Responsible stewardship in the management and harvesting of fishing resources including the accountable management of latent effort and bycatch reduction

2. Designated fishing activity

2.1 Fish stock affected by the FMS

Outline the proposed fishing parameters for the FMS, including:

a) Identify the fish stock to be harvested and affected by the fishery –including:

i) target species and by-products species – retained species

ii) by catch (non-retained);

iii) bait species

Identify the status of the species in terms of under-fished, fully fished, over-fished/depleted or uncertain – also consider whether by-product or bycatch species are protected or threatened species or species of public concern.

b) Identify if species are target species of other fisheries.

c) Estimate future trends in harvest levels across all fisheries for key fish species based on stock trends.

2.2 Operational area/regions of the FMS

Identify the proposed operational area/regions of the FMS including:

a) Identify the principal areas including any "zones" within the areas and their importance for management purposes (including relevant maps); identify any priority fishing areas (and whether they are or are to be identified as recognised fishing grounds)

b) Identify ports or locations where fishers operate under the FMS will operate from

c) identify and discuss importance of any relevant jurisdictional issues for the FMS (eg. Offshore Constitutional Settlement)

d) identify any areas where fishing is to be restricted all or some of the time eg closures areas, reserves and marine parks (protected zones), navigation channels, naval waters, etc (including relevant maps).

e) identify and discuss the importance of any key aquatic habitat areas for the fishery (life cycle related); identify areas vulnerable to impact by fishing methods authorised under the strategy or by land-based activities; identify any measures in the FMS in relation to these areas

2.3 Proposed harvesting strategy – Resource allocation under the FMS

a) Describe the proposed sustainable harvest strategy including the allocation of resources within/between user groups to meet the FMS objectives, taking into consideration:

i) the proposed sustainable harvest levels based on stock trends and past catch and effort trends,

ii) the proposed number of endorsement holders and the proposed harvest strategy to limit catch

iii) the level of resource exploitation by other commercial and recreational fishers

b) Outline the entitlements that are proposed to be issued in the management strategy including any classes of shares and rules relating to those shares

3. Interaction between fisheries

a) Identify the interaction between fisheries/fishers and the extent of interaction in terms of :

i) fishers holding endorsements in more than one commercial fishery

ii) target and other species taken by more than one fishery

iii) key fishing areas common to more than one fishery – time and location issues

b) Describe any sources of conflict between fisher and outline any measures to reduce conflict between fisheries

c) Outline any potential for improving the management of the fishery and the sustainability of the stock by changes in arrangements between fisheries

d) Outline any potential for improving the management of the fishery and the sustainability of the stocks by changes in arrangements between fisheries and non-consumptive users

4. The regulatory controls and management measures to apply under the FMS

a) Outline management measures to be applied under the FMS relating to the following:

For *under fished* or *fully fished* stock: describe management measures required to ensure that the fishery remains sustainable

For *overfished or depleted* stock: describe the strategy proposed to promote recovery in overfished or depleted stock

For a stock of *uncertain status*: identify the management measures required to ensure that the fishery remains stable.

b) Outline the proposed management tools (see Table 1/Appendix 1) and measures to apply under the FMS to implement the harvesting strategy and achieve the objectives of the FMS. These measures may include all or some of the following:

i) Provisions in the Fisheries Management Act or Regulations including

- any eligibility or transfer rules; gear specifications – number and size of gear ; protected fish; species size limits on primary species; recognised fishing grounds
- Any management plan or draft management plan including catch limits or quotas
- Fishing closures including time and area closures and emergency response closures; aquatic reserves, recreational fishing areas or other protected areas
- Any determinations of the TAC Committee under Division 4 of Part 2 of the FM Act

ii) Any relevant bycatch or threatened/protected species action or recovery plans

iii) Any relevant provisions in environmental planning instrument

iv) Quality assurance program for the harvest and management of fish, shellfish etc

v) Any other State, National or International agreements relevant to the management of the fishery and its environmental impacts and the agencies responsible for administration

c) Outline the contingency measures, responsive management strategies or/and mitigation measures to be undertaken if:

i) "trigger for contingency action" are reached;

ii) health issues or adverse ecological or habitat issues arise; or

iii) new technology, methods or practices evolve so that some change to the management rules would be beneficial to the sustainability of the stock and associated ecosystem.

d) Describe the administrative mechanisms for the fishery including:

i) enforcement and compliance,

ii) cost recovery,

iii) community contribution payments (if a share management fishery),

iv) cross-fishery consultation.

e) Describe measures to improve the environmental and resource management performance of fishers including

i) the development of a code of practice, education/awareness programs and /or capacity building programs

ii) the strengthening of fisher reporting and monitoring

5. Monitoring and Responsive Management

a) Identify performance indicators to monitor whether the objectives of the strategy are being achieved and "triggers for review" of the strategy based on the performance indicators when the FMS requires review.

b) Identify "triggers for contingency action" (eg annual catch, size structure of catch, minimum key habitat available) for fish stock based on categories of under-fished, fully fished, over-fished/depleted or uncertain and bycatch to deal with situations when there are unusual events when additional contingency management intervention would be required to ensure that the fishery remains sustainable

c) Outline of monitoring programs (in place or planned) for the FMS. The monitoring program should be linked to performance indicators, triggers, management rules and the research program and include:

i) Monitoring program to monitor whether:

the objectives of the strategy are being achieved (ie. based on the performance indicators); and

environmental impacts are occurring and if so, whether they are at the frequency and magnitude predicted;

ii) Monitoring program specifically to monitor fish stock based on categories of under-fished, fully fished, over-fished/depleted or uncertain.

iii) For a stock of uncertain status, outline the program proposed to gather sufficient information to provide a scientific reliable assessment of the status of the stock

iv) Monitoring information required for research programs to provide information relevant for continuous improvement in fisheries management.

6. Proposed Research Programs

A research program must be developed as part of the Management Strategy. The program must indicate strategies to enable appropriate research to be undertaken. The program must:

a) Identify areas where further information is needed including improving knowledge of the stock and ecosystems upon which the fishery depends. Indicate whether the information is fishery dependent or independent.

b) Specify short-term and long-term aims and objectives of the research

c) Identify links with monitoring and continuous improvement/responsive management programs.

(D) CONSIDERATION OF ALTERNATIVE MANAGEMENT REGIMES

1. Outline feasible alternative to those proposed in the Draft FMS

Include alternative:

a) characterisation of the fishery, including:

i) its methods of fishing,

ii) target species,

iii) relationship with other commercial fisheries

b) numbers of fishers/shares and licensing/ endorsement regimes

c) the objectives of the FMS

d) management measures proposed in the FMS

e) performance indicators and triggers for review

f) monitoring regimes

g) research programs

2. Assess the effectiveness of these alternatives compared to the proposal in the Draft FMS

Assess alternatives in terms of the following issues:

a) Maintenance of ecologically viable stock levels with acceptable levels of probability

b) Rebuild stocks to viable levels within nominated timeframes where stocks are overfished

c) Conservation of biological diversity in the ecosystem and the protected or threatened species, populations or communities and their habitats

d) Protection of the ecosystem in particular key habitat areas

e) Fishing operations not being a threatening process to bycatch species

f) Responsible stewardship in the management and harvesting of fishing resources including:

i) the accountable management of latent effort

ii) bycatch reduction

3. Justify the selection of the preferred options in the Draft FMS.

E IMPACT ON THE FISH RESOURCES

1. Retained species – Target and Byproduct species

a) Outline the current knowledge of the health of target and non-target species and dependent/associated species; identify the status of the fish stock in terms of under-fished, fully fished, over-fished/depleted or uncertain.

b) Provide a species stock assessment including an outline of the robustness of estimates for all parameters used in the analyses and of the reliability of the model used where possible including information on:

i) stock levels and dynamics – target species and by-product species

ii) population structure (eg. size and age structure) and life cycle behaviour

iii) spatial and temporal distribution – location in periods of vulnerability

c) Describe the effect of implementation of the strategy (including the proposed fishing rules and other management measures) on the species including an outline of the robustness and reliability of estimates for all parameters used in the analyses. Indicate the potential yields and resource status

i) Consider yields/resource status under the proposed harvesting strategy in the FMS compared with different harvesting strategies;

ii) Outline level of confidence in predictions regarding the health of the stock;

iii) Identify key factors affecting stock sustainability: Where possible include information on:

past management regimes for this fishery – including trends in fisher numbers and practices;
the cumulative historic and current catch rates by all relevant sectors: commercial, recreational and indigenous; consider the appropriateness of "catch rate" rules in achieving objectives compared with alternatives;
the cumulative historic and current fishing effort by all relevant sectors: commercial, recreational and indigenous; efficiency in achieving the catch rate given the rules relating to type of boat, gear and other rules; consider the appropriateness of "effort" rules in achieving objectives compared with alternatives;
historic and current locational restrictions by relevant sector; appropriateness of restricted areas or recognised fishing grounds in resource allocation and in achieving the objectives; consider the appropriateness of "locational" rules in achieving objectives compared with alternatives;
the resilience of the stock to fishing pressure from this fishery in particular the affect of the harvest regime (methods, timing, location) at the particular stage in the species life cycle;
other factors such as boating activities, aquaculture, shipping activities or other urban and tourist activities affecting stock numbers and resilience.

iv) Identify the likelihood of any species becoming "over exploited" under the proposed fisheries rules given the current level of fishing mortality from all commercial fisheries or recreational fishing sectors where the same species might

be harvested or affected and the likely implication for maintaining a sustainable harvest in this fishery

d) Assess the appropriateness of the proposed management rules or measures to allocate the resources within/between user groups in terms of achieving the strategy's objectives and in terms of ESD including:

i) outline eligibility criteria; transfer rules; gear specifications – number and size of gear; protected fish provisions; time and area closures - restricted fishing areas (plus closure contingencies); zoning/region arrangements; species size limits on primary species; catch limits or quotas; recognised fishing grounds.

ii) consider the effectiveness of the management rules or measures under the proposed harvesting strategy in the FMS compared with alternative management rules or measures;

e) If stocks are fully fished or over-fished/depleted or uncertain:

i) assess the adequacy of the proposed stock management strategies to maintain a sustainable harvest

ii) assess the adequacy of the proposed stock recovery strategies or relevant threat abatement plans or recovery plans

iii) consider the likelihood of "over exploited" species recovering under the proposed fisheries rules given the interaction with other fisheries.

iv) consider the adequacy of the proposed program to gather information to provide a scientifically reliable assessment of the status of the "uncertain status" stock; and to identify what triggers would be needed to specify when management intervention would be required to ensure that the fishery is sustainable.

f) provide a summary of the uncertainty associated with the management of target and byproduct species and analysis of the consequence

g) identify the precautionary management measures current/proposed to mitigate, rehabilitate and /or compensate for the ecological impacts (eg responsive management options) and the level of confidence that the measures proposed would effectively manage the impact and associated risks. In particular state any judgement about the significance and acceptability of that impact

h) indicate the level of confidence in achieving the predicted outcomes and the resilience of the environment to change; indicate if the impacts are unknown, unpredictable, short tem/long term or irreversible.

i) consider the adequacy and appropriateness (compared with feasible alternatives) of the proposed monitoring program (in particular for over exploited or fully exploited species)

j) consider the adequacy and appropriateness (compared with feasible alternatives) of research proposals to provide relevant information to improve the management of particular species or the fishery in general.

k) assess the acceptability of the proposed measures on the sustainability of the harvest stock. In reaching a conclusion, the cumulative impacts of other fishing and activities leading to the mortality of these species should be considered.

2. Bycatch (non retained) species

a) Describe by fishing gear/method type, the potential impact of the proposed fishing activity on bycatch species, in particular:

describe the impact of direct capture (discard species, including juveniles of primary species) including, species composition, catch level and mortality rates;
describe the impact of physical contact (not captured) including species potentially impacted and the extent of the impact and the predicted mortality rates of incidental contact;
describe the impact of lost gear (ghost fishing) including the level of occurrence and estimate of potential catch rates.

i) For each of the above, predict the likely mortality/injury rates on the species

ii) For each of the above, consider the level of likely mortality/injury rates on the above species from other commercial fisheries or fishing sectors (eg recreational fishing) where the same species might be harvested or affected

iii) For each of the above, nominate a indicator group of bycatch species to be monitored

b) Identify feasible alternatives likely to reduce impacts on bycatch. Consider relevant matters in the National Policy on Fisheries Bycatch and bycatch action strategies developed under that policy

c) If bycatch species are fully fished or over-fished/depleted or uncertain:

i) assess the adequacy of the proposed bycatch reduction strategies; assess the adequacy of the proposed threat abatement plans or recovery plans

ii) consider the likelihood of "over exploited" bycatch species recovering under the proposed fisheries rules given the interaction with other fisheries.

iii) consider the adequacy of information to provide a scientifically reliable assessment of the status of the "uncertain status" bycatch species

d) provide a summary of the uncertainty associated with the management of bycatch and non-retained species and analysis of the consequence

e) identify the precautionary management measures current/proposed to mitigate, rehabilitate and /or compensate for the ecological impacts (eg responsive management options) and the level of confidence that the measures proposed would effectively manage the impact and associated risks. In particular state any judgement about the significance and acceptability of that impact

f) indicate the level of confidence in achieving the predicted outcomes and the resilience of the environment to change; indicate if the impacts are unknown, unpredictable, short tem/long term or irreversible.

g) Consider the effectiveness of the proposed management measures in this fishery management strategy in reducing or eliminating adverse environmental impacts and assess the acceptability of the proposed measures. In reaching a conclusion, the cumulative impacts of other fishing and other activities leading to the mortality of these species should be considered.

3. Bait resources

Outline the use of bait species in the fishery, in particular:

a) Identify the species and volume of bait; identify source of bait –

i) for bait collected in NSW waters, assess the impact of the collection of those species on the respective stocks and the ecosystem2.

ii) for bait sourced from elsewhere, assess the impacts of the use of the species and the likely introduction of disease or pest species.

b) Identify feasible alternatives likely to reduce impacts. Consider the effectiveness of the proposed management measures in reducing or eliminating adverse impacts and assess the acceptability of the proposed measures.

4. Data requirements in relation to the assessment of the impacts on the fish resources

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

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

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

(F) IMPACT ON THE BIOPHYSICAL ENVIRONMENT

ECOLOGICAL ISSUES

1. Biodiversity and habitat Issues

Describe the effects of the implementation of the strategy on biodiversity and their habitats, in particular:

a) Identify the key habitat areas and characteristics within the fishing region or subregion including important areas/features such as reefs, seamounts, channels, major seagrass beds and major underwater landscape characteristics;

Consider the habitat importance to ecological communities and populations and aquatic flora and fauna species that may be directly or indirectly affected by the fishing activities; indicate the local and regional scarcity of these habitats. In particular identify any the habitat issues associated with marine mammals and migratory birds

identify areas of high marine biodiversity/conservation significance; if relevant identify the following, indicating their incidence in the area of the fishery:

[2] If bait is collected from a major commercial fishery that is also to be assessed under Part 5 of the EP&A Act, refer to that other assessment.

marine parks, aquatic reserves or closure areas protected under the Fisheries Management Act 1994, NPWS Act 1974 or Marine Parks Act 1997;
other areas such as RAMSAR wetlands, Japan Australia Migratory Bird Agreement (JAMBA), China Australia Migratory Bird Agreement (CAMBA), World Heritage Areas or areas registered in the National Estate or State Heritage Register.

consider the appropriateness of reserving certain additional areas of significance in the lifecycle of the fishery or of high conservation status for biodiversity conservation and identify any such areas and options for the management of these areas

b) identify at a regional level the degree of habitat damage from fishing methods, foreshore access and boating activities;

list and assess the likely impacts from particular fishery methods, techniques, effort levels etc on the substrate;

consider impacts as a result of habitat destruction or disturbance on the mortality of species, by affecting species in the food chain, by changes in water quantity, quality or regime, deposition of sediments or by introducing obstructions to the free movement of species

consider the impacts of habitat disturbance or damage in discrete fished habitats such as lake systems, estuaries or specific reefs

assess the potential impacts on species, populations or ecological communities by changing or disturbing habitats in terms of local impacts as well as the broader context relevant for particular species,

c) identify and describe the benthic, ecologically related, associated or dependent species and water column communities affected by fishing operations or loss of habitat including the relationship to fishing frequency; if impacts are likely to be significant on benthic and other communities, using the best available information, map and define the level of substrate disturbance for each fishing method. Consider

what percentage of the total habitat area is likely to be affected;

how important is the habitat to other species and why;

how vulnerable is the species when it is associated with the habitat. Where possible, quantify the proportion of the habitat type represented in marine protected areas.

assess the acceptability of the impacts in terms of ecologically sustainablity objectives.

d) provide a summary of the uncertainty associated with the management of biodiversity and habitat issues and analysis of the consequence

e) identify the precautionary management measures current/proposed to mitigate, rehabilitate and /or compensate for the ecological impacts (eg responsive management options) and the level of confidence that the measures proposed would effectively manage the impact and associated risks. In particular state any judgement about the significance and acceptability of that impact

f) indicate the level of confidence in achieving the predicted outcomes and the resilience of the environment to change; indicate if the impacts are unknown, unpredictable, short tem/long term or irreversible.

g) Consider alternate management measures including contingency measures if monitoring indicates that action should be triggered. Assess the appropriateness of the mitigation measures including:

timing of fishery activities to minimise disturbance;

location of fishing operations to minimise impacts on native species life-cycle, movement or migration.

permanent or temporary restrictions on fishing activities in key habitat areas.

h) Identify where there are gaps in knowledge important for the assessment of the impacts of the fishery and detail a timetable for developing the data sets important for understanding longer term biodiversity and habitat issues.

2. Threatened and Protected Species

a) Identify any protected and threatened species, populations and ecological communities and their habitats listed under Threatened Species Conservation Act, Fisheries Management Act, National Parks and Wildlife Act or Environment Protection and Biodiversity Conservation Act (this may include invertebrates, fish, reptiles, birds, mammals, plants, algae, etc) which may be affected by fishing activities. Provide information on the habitats of threatened or protected species.

b) Assess the impact of the proposed fishing activity on the protected or threatened species, populations and ecological communities and their habitats from direct captured or from disturbance. In particular:

provide information on incidental capture rates and mortality

provide information on habitat disturbance or loss

provide information on indirect impacts such as noise disturbance, boat strikes or disruption to behaviour

assess impacts of fishing on protected or threatened species, taking into account any relevant measures forming part of any recovery plan activities.

c) the following factors must be taken into account in deciding whether there is likely to be a significant effect on protected or threatened species, populations or ecological communities, or their habitats (The 8 Part Test)

in the case of a protected or threatened species, whether the life cycle of the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction,

in the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised,

in relation to the regional distribution of the habitat of a protected or threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed,

whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a protected or threatened species, population or ecological community,

whether critical habitat will be affected,

whether a protected or threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region,

whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process,

whether any protected or threatened species, population or ecological community is at the limit of its known distribution.

d) provide a summary of the uncertainty associated with the management of threatened and protected species, populations and ecological communities and analysis of the consequence.

e) identify the precautionary management measures current/proposed to mitigate, rehabilitate and /or compensate for the ecological impacts (eg responsive management options) and the level of confidence that the measures proposed would effectively manage the impact and associated risks. In particular, state any judgement about the significance and acceptability of that impact

f) indicate the level of confidence in achieving the predicted outcomes and the resilience of the environment to change; indicate if the impacts are unknown, unpredictable, short tem/long term or irreversible.

g) discuss the effectiveness of mitigation measures in particular of measures to protect species listed under Threatened Species Conservation Act , Fisheries Management Act or Environment Protection and Biodiversity Conservation Act (this may include invertebrates, fish, reptiles, birds, mammals, etc)

Note: The "8 Part Test" under s5A of the EP&A Act must be used by the determining authority in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities or their habitats. The 8 Part Test provides guidance on determining when a species impact statement (SIS) is required. An SIS must accompany any proposal where there is likely to be a significant effect on threatened species, populations or ecological communities or their habitats.

3. Trophic structure

Consider the effects of fishing on trophic structure (food webs) and where possible provide an ecological systems model, in particular:

a) identify the species that are likely to be affected directly or indirectly by the fishing activity,

b) identify likely productivity/flows and assess the impacts of removal of predators, prey or competitors

c) identify and assess food provisioning (from discards), especially for marine mammals, penguins and other birds

d) identify the risks and uncertainties of the fishery disrupting the trophic structure and identify the management measures to address these risks. Discuss the likely effectiveness of mitigation measures.

4. Translocation of organisms and stock enhancement

Outline any potential impacts on the environment from the translocation of organisms (transference of stock species, fouling organisms and other pests) in particular:

a) list the species likely to be translocated by the different gear types and associated with fishing boats – including algae

b) assess the risk associated with translocation

outline the likely implications of translocation on aquaculture, other water users and the environment

provide details of proposed mitigation methods including information from any available pest species threat abatement plan

outline a contingency plan for any pest/fouling species likely to be translocated by the fishery.

5. Fish Health and Disease

Assess the potential impacts on fish health and disease from the proposed activity, in particular

a) assess the impacts of all gear types and fishing methods on the health of wild fish including the available knowledge on stress, injury and susceptibility to disease; outline measures to minimise impacts on the health of wild fish resources.

b) assess the risk to the health of wild fish from the use of imported bait to the NSW; outline measures to minimise impacts on the health of wild fish resources.

c) Assess the risks to the health of wild fish from any stock enhancement programs associated with the fishery; outline measures to minimise impacts on the health of wild fish resources.

PHYSICAL ISSUES

6. Water quality issues

Assess the impacts on water quality and hydrological systems from the fishing and related activities, in particular:

a) identify potential sources of pollutants/contaminants from the fishing operations likely to affect the water quality, outline the characteristics, magnitude and probable frequency of these events, including:

the use of substrate treatments (antifouling agents),

accidental or deliberate discharge of chemicals, fuels or bilge water

discharge/dumping of debris (plastics, gear and general waste)

discharge/dumping of waste from processing on board

b) consider the risk to water quality from potential physical and chemical changes and the general condition or characteristics of the waterbody and the likely assimilation capacity of the receiving water under normal fishing operations and when there is an incident or abnormal conditions; in particular consider potential cumulative impacts in ports or estuaries where boats are moored, cleaned or maintained or on-shore processing is undertaken,

c) if impacts are likely to be significant in particular areas, a baseline study of the existing water quality and flow characteristics should be outlined and monitoring data analysed to provide the basis for changes in practices in the area.

7. Noise and light

Assess the impacts on the environment from noise made during the proposed fishing operation any likely affected residences and on bird colonies or aquatic species, in particular:

a) identify any potential fixed and mobile noise and light sources during operation of the fishing activity and proposed hours of operation.

identify nearby land uses likely to be affected by noise/light and separation distances; estimate whether noise/light is likely to be an issue.

identify any bird, mammals or aquatic species whose behaviour (roosting, feeding grounds, migration routes etc) is likely to be significantly or permanently modified in response to noise or light from the fishery activities.

b) Outline measures to manage impacts to an acceptable level; assess the adequacy of mitigation and management measures, for instance alternative location of noise generating activities, alternative lighting design, alternative trawl routes, other management strategies to reduce impacts at sources

8. Air Quality

Assess the impact of the proposed activity on air quality, in particular:

a) outline the likely sources of odours or other air impacts;

b) consider the likely impact of air emissions; if significant impacts are likely, consider the conditions under which nearby dwellings and sensitive land uses are likely to be affected.

c) outline measures to manage impacts to an acceptable level.

9. Energy and greenhouse issues

a) Consider the efficiency of energy use taking into consideration issues relating to:

boat/motor performance and energy efficiency,

method options and catch/effort issues.

potential for use of alternative power sources

b) Identify measures to maximise energy efficiency and minimise the emission of greenhouse gases

10. Potential impacts on the fishery

a) Outline potential land based activities likely to affect the environment on which the fishery relies such as

urban foreshore development including marinas, clearing of foreshore vegetation and wetlands, reclamation,

stormwater and sewage outfalls,

disturbance/drainage of acid sulphate soils,

pollution from point and diffuse sources,

b) Outline potential water based activities likely to affect the environment on which the fishery relies such as

vessel activities – commercial shipping, other commercial fishing activities, recreational boating,

dredging,

barriers to river flow and structural engineering works, groynes, training walls

c) identify dredging works necessary to maintain access necessary for the fishery activities under the strategy including the cycle of dredging necessary and the risk to boats if dredging or other works not undertaken.

d) outline the types of management measures necessary to limit the impacts of these external factors in terms of

landuse planning and development controls

measures in the fishery management strategy with regard to fishery practices.

11. Data requirements in relation to the assessment of the impacts on the biophysical environment

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

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

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

(G) ECONOMIC ISSUES

Assess the likely economic impacts of implementing the management strategy 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

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

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;

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

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

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

g) existing economic multiplier effects – costs and benefits

2. Likely economic implications of implementing the strategy

a) outline market development/ trends likely to affect the fishery – export/domestic/ import replacement – including strengths and weaknesses, threats and opportunities

b) outline the implication of implementing the strategy on access rights and the impacts on economic viability; consider the impact on the value of any shares/licences as a result of changes in the fishery management associated with implementing the strategy; consider the impact on this value as a result of any closures as a result of recreational fisheries.

c) outline any feasible options for changes in the resource allocations within the fishery including:

the likely economic impacts on particular sectors within the fishery if these options were implemented

any likely changes to the economic multiplier effects – costs and benefits

possible measures which could be taken to mitigate any impacts

d) outline any feasible options for changes in the resource allocations between fishery including between commercial fisheries and recreational fishing and non-fishing sectors including:

the likely economic impacts on particular sectors within the fishery if these options were implemented in terms of export replacement, unemployment and retraining, alternative investment, tourism related activities

outline the economic implications associated with the need to upgrade any infrastructure to support existing or any changes in the fishery – such as transport (water and road), berthing facilities, maintenance and repairs, cold stores is this relevant, distribution and/or processing facilities

any changes to the economic multiplier effects – costs and benefits

possible measures which could be taken to mitigate any impacts

e) predict the likely economic implications of maintaining the present resource allocation rules. Compare these with the likely economic implications of implementing the strategy or feasible options for changes in resource allocation.

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

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

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

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

(H) SOCIAL ISSUES

Assess the likely social impacts of the fishing activity proposed under the management strategy having regard to the following:

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

ii) indirect employment (cold stores, traders, suppliers);

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

ii) 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

iii) community views and perceptions

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

i) other recreational activities – fishing, 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;

ii) the visual and amenity issues

2. Likely social implications of implementing the strategy

2.1 Health and safety issues

Identify health issues associated with the handling and processing of fish. This should include contingency plans for known or potential risks to product safety.

a) identify the any health risks associated with environment (eg algal blooms, pollution/ contamination in the water/sediments, etc); identify measures for minimising the risks from these sources. eg the Biotoxin Management Plans for Pipis developed by NSW Fisheries and now managed by Safefood.

b) outline health risks associated with the handling and processing of fish and quality control measures to minimise risks from these sources. This is a Safefood NSW production requirement.

c) outline the health risks to fishers and related workers from current practices/methods and measures to minimise risks. This issue relates to Workcover requirements.

2.2 Social implication for fishers of any changes in resource allocations

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

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

c) Compare the social implications of implementing the strategy in the short, mid or longer term (if relevant, consider regional, sub-regional or fleet issues).

d) identify any existing or likely conflicts within or between communities

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

f) Identify the likely change in attitudes to compliance and the likely changes in the level of compliance

g) Justify the preferred approach in terms of ESD principles.

2.3 Heritage issues

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.

3. Indigenous issues

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:

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

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

Government policies on Indigenous fisheries issues, including the NSW Indigenous Fisheries Strategy.

c) Mitigation and management measures

4. 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

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

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

(I) JUSTIFICATION FOR PROPOSED COMMERCIAL FISHING ACTIVITY

a) Outline the need for undertaking the fishing activities as proposed under the FMS including the consequences of not undertaking the activity.

b) Undertake a sensitivity analysis in relation to biophysical, social and economic costs and benefits of implementing the proposed regulatory and management measures in the FMS

alternative harvest strategies (ie. different management options, such as input vs output controls)

alternative resource allocation mixes within the fishery

alternative resource allocation mixes

between commercial fisheries,

between commercial fisheries, recreational fisheries, indigenous fisheries and conservation

alternative resource allocation on a regional basis, consider the resource allocation mix within a region as well as between the regions

c) Within the constraints of the carrying capacity of the aquatic environment, justify in terms of the principles of ESD the selection of:

the preferred resource allocation mix; and

the preferred suite of "rules" in the strategy.

DUAP GUIDELINES: APPENDIX

Act	Relevant Authority	Regulatory provisions
NSW Legislation		
Fishery Management Act 1994	NSW Fisheries	Fishing authorisations, fishing closures, declaration and management of aquatic reserves, protection of certain fish including threatened and protected species.
Environmental Planning and Assessment Act 1979	Department of Urban Affairs and Planning (DUAP) and Local Councils	Administration of the environmental impact assessment and project approval system. Development of environmental planning instruments which may protect wetlands or certain other areas.
Marine Parks Act 1997	Marine Parks Authority	Declaration and management of marine parks
National Parks and Wildlife Act 1974 and Threatened Species Conservation Act 1995	National Parks and Wildlife Service	Declaration and management of nature reserves and national parks, protection of certain mammals, birds and foreshore species including threatened and protected species
Port Corporation and Waterways Management Act 1995	Waterways Authority or relevant Port Corporation	Use of ports, wharfs, berths, moorings etc, licensing of vessels and maintenance of safe navigation in waterways
Crown Lands Act 1989 and Rivers and Water Act 2000/ Foreshores Protection Act 1948	Department of Land and Water Conservation	Use of Crown land for wharfs, berths or moorings and protection of river, estuary and coastal foreshores.
Food Production (safety) Act 1998	Safefood	Fish products safe for human consumption
Commonwealth Legislation		
Wildlife Protection (Regulation of Export and Imports) Act 1982	Agriculture, Forestry and Fisheries Australia and Environment Australia	Licence to export protected wildlife
Environment Protection and Biodiversity Conservation (EPBC) Act 1999	Environment Australia	Environmental assessment of matters of national significance including those affecting protected or threatened species, Ramsar wetlands, bird and mammal species protected under international agreements

GLOSSARY

Associated and/or dependent species	species associated with or dependent upon harvested species, for example species which are predator or prey of the harvested species.
Biological diversity, biodiversity	the variability among living organisms from all sources (including marine and other aquatic ecosystems and the ecological complexes of which they are part). Includes 1) diversity within species and between species; and 2) diversity of ecosystems.
Bycatch	species that are discarded from the catch or retained for scientific purposes, and that part of the "catch" that is not landed but is killed as a result of interaction with fishing gear. This includes discards of commercially valuable species.
By-product	Are not target species but are species that are retained because they are commercially valuable
Designated fishing activities	As defined in the Fishery Management Act, are: • Category 1 Share Management Fisheries including abalone fishery and the lobster fishery • Category 2 Share Management Fisheries including ocean prawn trawl fishery, ocean fish trawl fishery, ocean hauling fishery, ocean trap and line fishery, the estuary general fishery and the estuary prawn trawl fishery. • Charter boat fisheries • Recreational fisheries • Fish stocking • Shark meshing, and • Other fishing activities proclaimed by the Governor on the recommendation of the Minister for Fisheries to be designated fishing activities.
Discards	Are those components of a fish stock thrown back after capture. Normally, most of the discards can be assumed not to survive
Ecologically sustainable development, ESD	Ecologically sustainable development, ESD, is using, conserving and enhancing the community's resources so that the ecological processes, on which life depends, are maintained and the total quality of life now and in the future, can be increased (National Strategy for ESD, Council of Australian Governments 1992). Ecologically sustainable use of natural resources means the use of components of biological diversity in a way and at a rate that does not lead to the long term decline of biological diversity and to sustain natural processes within their capacity while maintaining the life-support systems of nature thereby maintaining their potential to meet the needs and aspirations of future generations. A sustainable fishery is consistent with ESD if that fishery conserves and enhances the community's resources so that the ecological processes, on which life depends, are maintained and the total quality of life now and in the future, can be increased Principles of Ecologically Sustainable Development (Intergovernmental Agreement on the Environment) 1 The precautionary principle— Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by: (a) careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment, and (b) an assessment of the risk-weighted consequences of various options. 2 Intergenerational equity— the present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of future generations 3 Conservation of biological diversity and ecological integrity— conservation of biological diversity and ecological integrity should be a fundamental consideration. 4 Improved valuation, pricing and incentive mechanisms— (a) environmental factors should be included in the valuation of assets and services, (b) polluter pays— those who generate pollution and waste should bear the cost of containment, avoidance or abatement,

(c) the users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste,

(d) environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problems.

Ecologically related species	species which, while not associated with or dependent upon a harvested species, nevertheless are affected by the fishing operation.
Ecologically viable stock	ecological viable stock has a general rather than a specific meaning. It refers to the maintenance of the exploited population at high levels of abundance designed to maintain productivity, provide margins of safety for error and uncertainty and maintain yields over the long term in a way that conserves the stocks role and function in the ecosystem.
Ecosystem	the biotic (living) community and its abiotic (non-living) environment.
Fish	Fish are marine, estuarine or freshwater fish or other aquatic animal life at any stage of their life history (whether alive or dead) and include oysters and other aquatic molluscs, crustaceans, endinoderms, and beach works and other aquatic polychaetes. Fish does not include whales, mammals, reptiles, birds or amphibians.
Fish stock/resources	Means the living resources in the community or population from which catches are taken in a fishery. Fish stock may include one or several species of fish but may also include commercial invertebrates and plants. Recruits to a stock are the young fish entering the exploited component of the stock for the first time.
Fishery	A unit determined by an authority or other entity that is engaged in raising and /or harvesting fish. Under the Fisheries Management Act 1994, fishery is a class of fishing activity identified by reference to any one or more of the following: species or class of fish, area of water or seabed, method of fishing, class of boats, class of persons and purpose of activities.
Management Advisory Committee (MAC)	MACs have been established for each share management or restricted fishery. Members are elected by the commercial fishers of the fishery or appointed by the Minister. The MAC advises the Minister on the fishery matters including the preparation of regulations or management strategy, monitors their implementation and assists in reviewing the regulations or strategy.
Fishing activity	Fishing activity is the activity of taking fish and includes: searching for fish, any activity likely to result in locating, aggregating or taking of fish or carrying fish by boat from the places where they are taken to the place where they are to be landed.
Fishing effort	Represents the amount of fishing gear of the specific type used on the fishing grounds over a given unit of time eg hours trawled per day, number of hooks set per day or number of hauls of a beach seine per day
FRCAC	The Fisheries Resource Conservation and Assessment Council is a statutory body appointed by the Minister for Fisheries that will advise on the preparation, review and assessment of fishery management strategies.
Management regime	In this document, refers to the policies, plans, action plans, strategic research plans, and all documentation that relates to the operations and management of the fishery.
Ministerial Advisory Council	Ministerial Advisory Councils for commercial, recreational, research and aquaculture sectors are appointed by the Minister to advise him on any matter relating to the sector for which the council has been established.
Overfishing	can be defined in two ways which can act independently or concurrently: "recruitment overfishing", where fishing activities are causing a reduction in recruitment in succeeding years and cause the mortality of too many fish in total, too many pre-productive fish, or too many fish that have only spawned a few times. The end result is that the stock can no longer replenish itself adequately. "growth overfishing": where fishing activities lead to a reduction in the size of the individuals of a species, as a consequence of which few specimens grow to the size for optimum yield.
Precautionary recovery strategy	management and operational strategy, designed to increase numbers within the stock, that incorporates the precautionary approach and includes mechanisms to avoid or mitigate adverse ecosystem effects.

Protected species	are species protected under the NSW legislation (FM Act or NPW Act) or Commonwealth legislation (Wildlife Protection (Regulation of Export and Imports) Act or Environment Protection and Biodiversity Conservation (EPBC) Act)
Productivity	when applied to fish stocks the term productivity gives an indication of the birth, growth and death rates of a stock.
Stock	In the strict sense, a distinct, reproductively isolated population. In practice, a group of individuals of a species in a defined spatial range that is regarded as having a relatively low rate of exchange with others of the species.
Threatened species, populations or ecological communities	Are listed as vulnerable, endangered or presumed extinct under the FM Act 1993 or Threatened Species Conservation Act 1995 or Environment Protection and Biodiversity Conservation (EPBC) Act).

APPENDIX A3 DUAP GUIDELINES / EIS CHECKLIST

Section			DUAP Guideline	Applicable EIS Section	Guideline Addressed ?	Comment
A			**EXECUTIVE SUMMARY**	**Chapter A**	Yes	
B			**REVIEW OF EXISTING OPERATION OF FISHERY**	**Chapter B**		
	1		Fish stock			
		a	Identify harvested stocks	B1a, B1b, B1c	yes	
		b	Status of fish stock	E1,C6e	yes	
		c	Interactions with other fisheries	B6e	partial	Adjoining jurisdictions with significant catches only
	2		Existing operational			
		a	Fishing areas	B2a, C6(I)xiii & xvii	yes	
		b	Operational areas	B2a, G, B6(e)vi	yes	
		c	Jurisdictional issues	App.C1, C6c	yes	
		d	Important habitats	F1a, B6d(i)	yes	
		e	Fished habitats	F1a	yes	
	3		Current fisher and harvest information			
		a	Fishers and endorsements	B5b(iii), C6(I)xiii	yes	
		b	Total employment	G	yes	
		c	Fishing gear and boats	B3a, B3b, B3c, G	yes	
		d	Catch, value and effort trends	B4a, App.B1	yes	
	4		Current regulatory and management measures			
		a	Management tools	B5b, B5f	yes	
		b	Existing management plans	C1d, C6a(ii)	yes	
		c	Strengths and weaknesses	B7	yes	
		d	Administrative arrangements	B5c, B5e	yes	
	5		Factors outside the fishery affecting the fishery			
		a	Other NSW fisheries	B6a, B6b(i), B6c	yes	
		b	Commonwealth or other state fisheries	C6e(iv)	yes	
		c	Environmental factors	B6d, App.B1	yes	
C			**DRAFT COMMERCIAL**	**Chapter C**		
	1		Objectives	C4	yes	
	2		Designated fishing activity			
	2.1		Affected fish stock			
		a	Identify species	C6e, E2	yes	
		b	Target species of other fisheries	B6c	partial	Adjoining jurisdictions with significant catches only
		c	Estimate future harvest levels	C5	partial	Acceptable estimates presented through trigger points
	2.2		Operational areas of FMS			
		a	Principal areas	C6c, C6(I)xiii	yes	
		b	Operational areas	C6c, App. B1	yes	
		c	Jurisdictional issues	C6c	yes	
		d	Restricted areas	C6c, App. B1	yes	
		e	Important habitats	F1a, B6d(i)	yes	
	2.3		Resource allocation under the FMS			
		a	Harvest strategy	C5, C6(i)	yes	

Section			DUAP Guideline	Applicable EIS Section	Guideline Addressed ?	Comment
C	***2.3***	b	Entitlements and shares	C6b, C6(i)	yes	
	3		Interaction between fisheries			
		a	Common factors between fisheries	B6	yes	
		b	Conflict	B6b, C4	yes	In particular, goal 4 in C4
		c	Improving arrangements between fisheries	C4b		In particular, goal 4 in C4
		d	Improving arrangements between fisheries and non-consumptive users	C4b		In particular, goal 4 in C4
	4		Regulatory controls and management measures			
		a	Stocks	C6e, C4b, C5	yes	
		b	Harvesting strategy	C6	yes	
		c	Contingency measures	C5,	yes	
		d	Administrative mechanisms	C6h, C6(i)	yes	
		e	Fisher improvements	C4	yes	In particular, goals 1 & 7 in C4
	5		Monitoring and responsive management			
		a	Performance indicators	C5f	yes	
		b	Triggers for contingency action	C5f	yes	
		c	Monitoring programs	C5h	yes	
	6		Proposed research programs			
		a	Research needs	C3h, C6g	yes	
		b	Short and long-term objectives	C6g, C4	yes	
		c	Links with monitoring management programs	C5 (a to e)	yes	
D			**ALTERNATIVE MANAGEMENT REGIMES**	**Chapter D**		
	1		Feasible alternatives			
		a	Fishery characterisation	D1b	yes	
		b	Fisher/share numbers and regimes	D1b	partial	Only to a point that is considered feasible
		c	Objectives	D1a	partial	Discussion is presented on why this is not feasible
		d	Management measures	D1a(i)	yes	
		e	Performance indicators and triggers	D1a	partial	Discussion is presented on why this is not feasible
		f	Monitoring regimes	D1h	yes	
		g	Research programs	D1h	yes	
	2		Effectiveness of alternatives			
		a	Viable stock levels	Db(i)	yes	
		b	Rebuild overfished stocks	D1b(iii)	yes	
		c	Conservation of ecosystem	D1c	yes	
		d	Key habitat protection	D1f	yes	
		e	Threat to bycatch species	D1e	yes	
		f	Responsible stewardship	D1	yes	
	3		Justify preferred FMS options	D3		

Section			DUAP Guideline	Applicable EIS Section	Guideline Addressed ?	Comment
E			**IMPACT ON FISH RESOURCES**	**Chapter E**		
	1		Retained Species			
		a	Status of target and non-target species	E1a	Partial	Provided for the 29 principle retained species (representing 97% of species caught by weight)
		b	Species stock assessment	E1a, App. E1, App. B1	Partial	Provided for those 10 species when information exists
		c	Resource status and sustainability	E1a,b	yes	
		d	Allocation of resources	B3, B5, C3, Chap. D	Partial	Detailed alternatives not assessed
		e	Adequacy of stock management/recovery	E1b	yes	
		f	Management of target and by-product species	E1b	yes	
		g	Precautionary management measures	E1b(ii)	yes	
		h	Confidence in predicted outcomes	E1b(i)	yes	
		i	Adequacy of proposed monitoring program	E4b	yes	
		j	Adequacy of research proposals	E4a, E4c	yes	
		k	Acceptability of proposed sustainability measures	E4a, E4b, E4c	yes	
	2		Bycatch species			
		a	Impact on bycatch species	E2a	yes	
		b	Alternatives to reduce bycatch	E2b	yes	
		c	Adequacy of bycatch management/recovery	E2c(i)	yes	
		d	Uncertainty of management of bycatch and non-retained species	E2c(ii)	yes	
		e	Precautionary management measures	E2c(iii)	yes	
		f	Confidence in predicted outcomes	E2c(iv)	yes	
		g	Reduction of adverse environmental impacts	E2a(ii), E2a(iii)	yes	
	3		Bait resources			
		a	Source, species and volume of bait	E3a	Partial	Only limited data available
		b	Alternatives to reduce impacts	E3b	Partial	Only limited data available
	4		Data requirements for assessment			
		a	Reliability of technical data	E4a	yes	
		b	Gaps in knowledge	E4a	yes	
		c	Research timeframes	C6g, E4d	yes	

Section			DUAP Guideline	Applicable EIS Section	Guideline Addressed ?	Comment
F			**IMPACT ON THE BIOPHYSICAL ENVIRONMENT**	**Chapter F**		
	1		Biodiversity and habitat			
		a	Key habitat areas	F1a	Partial	Habitat type and distribution described but data not available on the importance to ecological communities
		b	Habitat disturbance	F1b	Partial	Data does not exist to provide a complete regional assessment
		c	Impact of fishing	F1b	yes	
		d	Uncertainty associated with management	F1a	yes	
		e	Precautionary management measures	F1a	yes	
		f	Confidence in predicted outcomes	F1c	yes	
		g	Alternate management	F1d	yes	
		h	Gaps in knowledge	F1e, F11	yes	
	2		Threatened and protected species			
		a	Identify species and habitats	F2a	yes	
		b	Impact of fishing	F2b	yes	
		c	8 part test'	F2b, App. F5	yes	
		d	Uncertainty associated with management	F2c	yes	
		e	Precautionary management measures	F2d	yes	
		f	Confidence in predicted outcomes	F2e	yes	
		g	Effectiveness of mitigation measures	F2f	yes	
	3		Trophic structure	F3	yes	Within the framework of available world literature
		a	Identify species likely to be affected	F3a	yes	
		b	Productivity flows	F3b	yes	
		c	Provision of food	F3c	yes	
		d	Effectiveness of mitigation measures	F3d	yes	
	4		Translocation and stock enhancement	F4a	yes	
		a	Species likely to be translocated	F4b	yes	
		b	Associated risk and contingency plan	F4c	yes	
	5		Fish Health and Disease			
		a	Impacts of gear type and fishing methods	F5a	yes	
		b	Risk from imported bait	F5b	yes	
		c	Stock enhancement risks	F5c	yes	
	6		Water quality issues			
		a	Pollutants/contaminants from fishing operations	F6a	yes	

Section			DUAP Guideline	Applicable EIS Section	Guideline Addressed ?	Comment
F	***6***	b	Risk to water quality under normal/abnormal conditions	F6b	yes	
		c	Baseline study	F6c	yes	
	7		Noise and light			
		a	Affect of noise/light on land uses and species	F7a, F7b, F7d, F7e	yes	
		b	Adequacy of management measures	F7c, F7f	yes	
	8		Air quality			
		a	Sources of air impacts	F8	yes	
		b	Impact of air emissions	F8	yes	
		c	Acceptable management measures	F8	yes	
	9		Energy and greenhouse issues			
		a	Energy efficiency issues	F9a	yes	
		b	Measures to minimise greenhouse gas emissions	F9b	yes	
	10		Potential impacts on the fishery			
		a	Land based activities	F10a	yes	
		b	Water based activities	F10b	yes	
		c	Necessary dredging works	F10c	yes	
		d	Necessary management measures	F10d	yes	
	11		Data requirements for assessment			
		a	Reliability of technical data	F11a	yes	
		b	Gaps in knowledge	F11a,b	yes	
		c	Research timeframes	F11c,d	yes	
G			**ECONOMIC ISSUES**	**Chapter G**		
	1		Existing situation	G1	yes	
		a	Fishing fleet	App. CG1	yes	
		b	Infrastructure	App. CG1	yes	
		c	Employment and income	App. CG1	yes	
		d	Effort levels	App. CG1	yes	
		e	Markets	App. CG1	yes	
		f	Economic return	App. CG1	yes	
		g	Costs and benefits	App. CG1	yes	
	2		Likely economic implications	G2	yes	
		a	Market trends	App. CG1	yes	
		b	Economic viability	App. CG1	yes	
		c	Resource allocation options within the fishery	App. CG1	yes	
		d	Resource allocation options between fisheries	App. CG1	yes	
		e	Implications of maintaining present resource allocation	App. CG1	yes	
		f	Justification of preferred approach	G3	yes	
	3		Data requirements for assessment	G4	yes	
		a	Reliability of technical data	G4a	yes	

Section			DUAP Guideline	Applicable EIS Section	Guideline Addressed ?	Comment
G	*3*	b	Gaps in knowledge	G4b	yes	
		c	Research timeframes	G4c	yes	
H			**SOCIAL ISSUES**	**Chapter H**		
	1		Existing situation	H1	yes	
		a	Demographic profile of employees	App. CH1	yes	
		b	Community values	App. CH1	yes	
		c	Interaction between commercial fishing and	App. CH1	yes	
	2		Likely social implications	H2	yes	
	2.1		Health and safety	H4	yes	
		a	Environmental health risks	H4a	yes	
		b	Quality control measures	H4b	yes	
		c	Health risks to fishers	H4c	yes	
	2.2		Changes in resource allocation	App. CH1	yes	
		a	Implications of maintaining present resource allocation	App. CH1	yes	
		b	Implications of any changes on local community	App. CH1	yes	
		c	Existing or likely conflicts	App. CH1	yes	
		d	Compliance	App. CH1	yes	
		e	Justification of preferred approach	H3	yes	
	2.3		Heritage issues	H5	yes	
		a	Historic sites	H5a	yes	
		b	Aboriginal sites	H5b	yes	
	3		Indigenous issues			
		a	Interests in harvested resources and habitats	App. CH2	yes	
		b	Impacts on Indigenous interests	H6a, App. CH2	yes	
		c	Mitigation and management measures	H6b	yes	
	4		Data requirements for assessment			
		a	Reliability of technical data	H7a	yes	
		b	Gaps in knowledge	H7b	yes	
		c	Research timeframes	H7c	yes	
I			**JUSTIFICATION FOR PROPOSED FISHING ACTIVITY**	**Chapter I**		
		a	Need for proposed activities	I1	yes	
		b	Sensitivity analysis	I2	yes	
		c	Preferences in terms of ESD principles	F3	yes	

APPENDIX B

APPENDIX B1 THE TEN MOST PROMINENT SPECIES IN THE ESTUARY GENERAL FISHERY

This section provides an overview of the selected primary and secondary species, which constitute in excess of 80% of the total landed weight taken in the estuary general fishery. This categorisation differs from the often known "target species versus byproduct species" categorisation because the fishery uses a range of relatively non-selective fishing gear to take many different species that are retained for sale. It follows that all saleable fish that are caught in the fishery would otherwise be considered "target" species.

The following descriptions of each of these species includes four graphs showing catch trends, seasonal trends, catch between other commercial fisheries and the main gear types used in harvesting each of these species. For a full description of the species and historic catch and effort trends, refer to NSW Fisheries' *1998/99 Status of Fisheries Resources* by Fletcher and McVea (2000), which can be found on the NSW Fisheries website: www.fisheries.nsw.gov.au. Information relating to prices for the species was obtained from Sydney Fish Market records, and other marketing information was obtained from fish wholesalers or exporters in NSW.

Primary species

These are the species of major importance to the fishery, and consequently they receive a higher management and research priority within the draft FMS. Individual trigger points have been determined for these species to provide for a review of the fishery if annual catch rates fall outside the average landings for a benchmark period (see Table 4.2 in Part 4 of the draft fisheries management strategy for the estuary general fishery for further information). Section 4 of the draft fisheries management strategy also proposes monitoring of the length age and sex of primary species, and preparing formal stock assessments for these species within 5 years.

Secondary species

Secondary species can be categorised as those that are retained by the fishery but which do not fall under the primary species category described above. A number of secondary species have been selected as key secondary species because they are subject to more rigorous performance monitoring requirements.

Sea mullet (*Mugil cephalus*)

The following overview is based on information provided in Pease *et al.,* (1981c), Kailola *et al.,* (1993), Pollard and Growns (1993), Pease and Grinberg (1995), Virgona (1995) Gibbs (1997), Yearsley *et al.,* (1999), Fletcher and McVea (2000), and the NSW Fisheries catch statistics database.

The sea, bully or striped mullet (*Mugil cephalus*) occurs around much of the Australian coastline, as well as in many temperate and subtropical areas worldwide. In NSW waters, sea mullet are found primarily within estuaries and inshore waters, although they also occur within the freshwater reaches of coastal rivers. Within estuaries, sea mullet are found in association with shallow weed beds and bare substrates. They mostly eat microscopic plants (e.g. blue-green algae, filamentous green algae and diatoms), macroalgae (e.g. the green sea lettuce *Ulva* spp.) and detritus, and often ingest large amounts of substrate in the process.

Spawning occurs at sea, from autumn to early winter. The larvae enter estuaries and the small juveniles subsequently live in sheltered shallow water habitats. Many sea mullet travel into freshwaters, where they may reside for long periods, particularly if denied passage back to the estuary. Sea mullet grow quite quickly, taking about 4 years to reach 440 mm in length. Maximum length is approximately 750 mm. Between late summer and early winter, adult sea mullet (two or more years of age) leave estuaries in large schools that then travel northward along the open coastline on their way to spawning grounds. This behaviour appears to be triggered by strong westerly winds and falling water temperatures. Shorter migrations by so-called 'hard-gut' (sub-adult) also occur periodically, possibly in response to heavy flooding.

Sea mullet comprise the largest catch by weight of all species taken in commercial fisheries in NSW. Mesh nets are the principal gear type used to catch sea mullet in this fishery.

Annual landings progressively increased after 1984/85 and peaked at 5560 tonnes in 1993/94. Landings remained relatively high, between 4500 and 5000 tonnes until 1997/98. These trends reflected an increase in ocean landings, which occurred in response to the development of an export market for roe. Throughout this period, estuary landings were relatively stable. After 1997/98, landings declined significantly. This decline has been most dramatic in the ocean fishery, but estuary landings have also declined slightly. The recent decline in landings almost certainly reflects a decrease in abundance of stock, although the cause in unclear. The decline in abundance may be an effect of over-harvesting by the ocean hauling fishery, but could also be a natural fluctuation due to recruitment variability.

The majority of the sea mullet harvest from NSW estuaries is sold as whole fish and a significant quantity of the female roe (eggs) is exported. When sold as whole fish through the Sydney Fish Market, sea mullet attracted an average wholesale price of $1.78/kg for the period 1995/96 to 1999/2000. A much higher return however, is achieved by exporting the roe to markets in South-East Asia and the Middle East.

Sea mullet (*Mugil cephalus*)

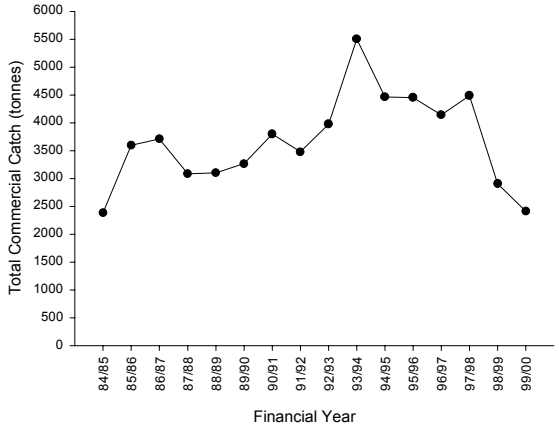


Figure AB1. The total reported commercial catch of sea mullet in NSW for the period 1984/85 to 1999/2000

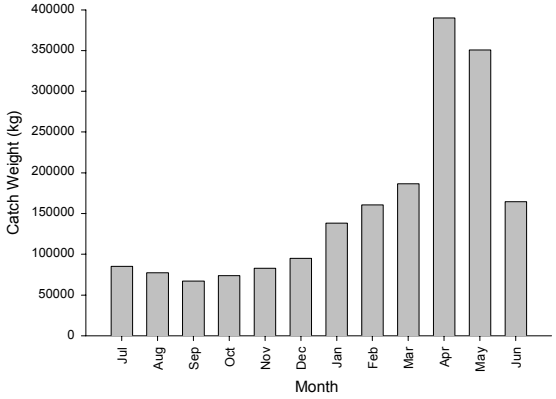


Figure AB2. The average reported catch per month of sea mullet in the estuary general fishery for the period 1997/98 and 1998/99.

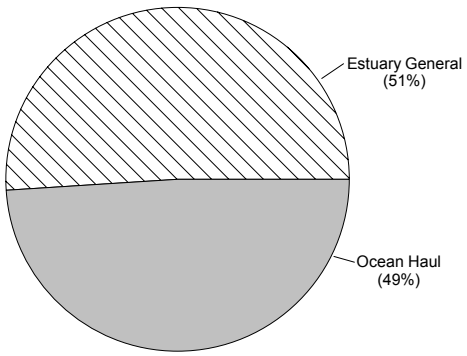


Figure AB3. The average percentage of reported catch of sea mullet between commercial fisheries for the period 1997/98 and 1998/99

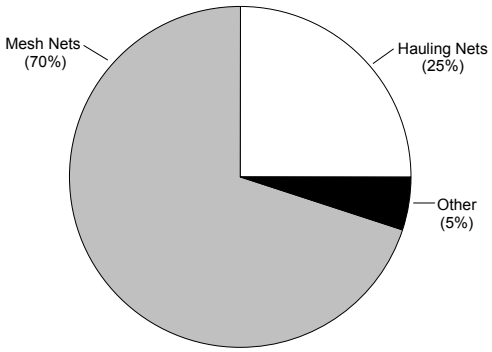


Figure AB4. The average percentage of reported catch of sea mullet by gear types in the estuary general fishery for the period 1997/98 and 1998/99.

Luderick (*Girella tricuspidata*)

The following overview is based on information provided in Pease *et al.,* (1981c), Kailola *et al.,* (1993), Pollard and Growns (1993), Pease and Grinberg (1995), Gibbs (1997), Yearsley *et al.,* (1999), Fletcher and McVea (2000), and the NSW Fisheries catch statistics database.

The luderick (*Girella tricuspidata*) occurs from Noosa in Queensland to Tasmania and South Australia and is also found in New Zealand. In NSW Waters, luderick are found primarily within estuaries and around nearshore rocky reefs. Within estuaries, luderick are mainly found in association with 'weedy' habitats such as seagrass beds and rocky reefs. They are primarily herbivorous, preferring certain species of green macroalgae; although other foods (particularly small invertebrates) also form part of their diet.

Spawning occurs in surf zones near estuary entrances, typically during winter. The larvae enter estuaries and the small juveniles subsequently live in sheltered shallow water habitats (particularly seagrass beds and mangrove channels). Larger juveniles occur in slightly deeper waters, and are particularly common around estuarine reefs. Luderick grow fairly slowly, taking approximately 5 years to reach 270 mm (fork length). They mature at around 250 mm and undertake a northerly migration along the NSW coast prior to spawning. Maximum length is approximately 700 mm (total length). Adults usually return to estuarine waters after spawning.

Luderick in the estuary general fishery are primarily caught in mesh nets and hauling nets during autumn and winter.

When sold as whole fish through the Sydney Fish Market, luderick attracted an average wholesale price of $1.42/kg for the period 1995/96 to 1999/2000. A higher price is generally obtained in the Melbourne Fish Market, so many fishers on the south coast send luderick to markets in Melbourne rather than to Sydney. A proportion of luderick is salted and used for bait in the commercial rock lobster fishery, although estimates of this amount are not recorded.

Luderick (*Girella tricuspidata*)

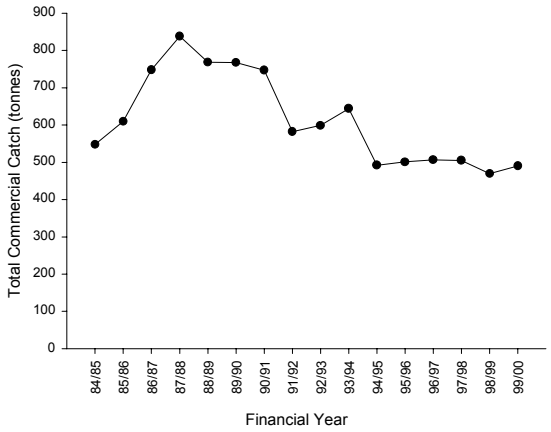


Figure AB5. The total reported commercial catch of luderick in NSW for the period 1984/85 to 1999/2000.

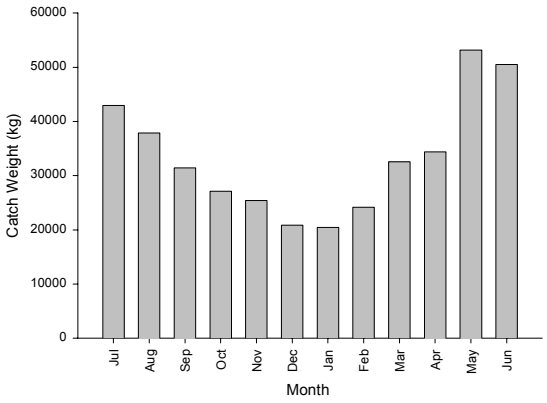


Figure AB6. The average reported catch per month of luderick in the estuary general fishery for the period 1997/98 and 1998/99.

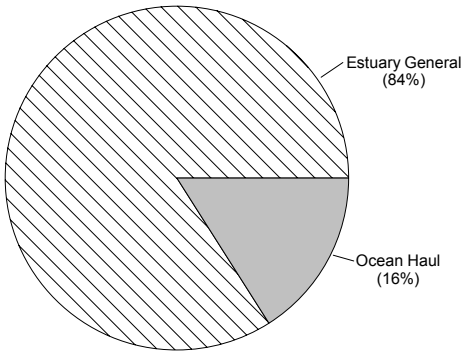


Figure AB7. The average percentage of reported catch of luderick between commercial fisheries for the period 1997/98 and 1998/99.

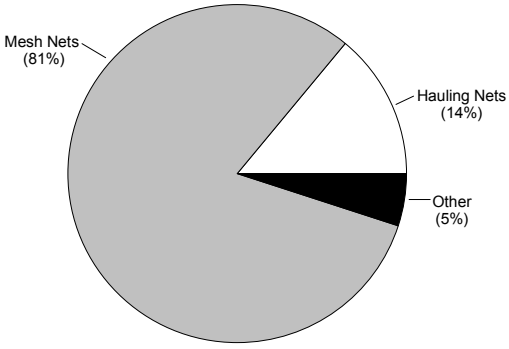


Figure AB8. The average percentage of reported catch of luderick by gear types in the estuary general fishery for the period 1997/98 and 1998/99.

Yellowfin bream (*Acanthopagrus australis*)

The following overview is based on information provided in Pease *et al.,* (1981c), Kailola *et al.,* (1993), Pollard and Growns (1993), West (1993) Pease and Grinberg (1995), Gibbs (1997), Yearsley *et al.,* (1999), Fletcher and McVea (2000), Gray *et al.,* (2000) and the NSW Fisheries catch statistics database.

The yellowfin bream (*Acanthopagrus australis*) is endemic to Australia and occurs from Townsville in Queensland to the Gippsland lakes in Victoria. In NSW Waters, yellowfin bream are found primarily within estuaries and along nearshore beaches and rocky reefs, although they also occur within the lower freshwater reaches of coastal rivers. Within estuaries, yellowfin bream are found in association with all types of habitat, including seagrass beds, mangroves, bare substrates and rocky reefs. They eat a wide variety of foods, including small fish, molluscs, crustaceans and worms.

Spawning occurs in surf zones near estuary entrances, typically during winter. The larvae enter estuaries and the small juveniles subsequently live in sheltered shallow water habitats (particularly seagrass beds and mangrove channels). Larger juveniles occur in slightly deeper waters, and are particularly common around estuarine reefs. Yellowfin bream grow slowly, taking about 5 years to reach 230 mm (fork length). They mature at around 220 mm and appear to undertake extensive pre-spawning migrations. Maximum length is about 660 mm (total length). Adults usually return to estuarine waters after spawning.

The majority of bream taken in the estuary general fishery are caught in meshing and hauling nets with a smaller number taken in fish traps. The highest commercial catches of bream occur in winter and autumn. Yellowfin bream are also taken in large quantities by recreational fishers.

Reported landings of bream have declined over the past seven years. Reductions in past three years may be partly attributed to phasing out the use of pound (figure 6) nets in Port Stephens and adjoining coastal waters, but could also be attributable to general declines in reported estuarine fishing effort. Declines in landings could also be attributed to environmental conditions and the availability of fish in the ocean hauling fishery. Despite the recent reductions in reported landings, the age compositions of catches have remained relatively stable, indicating no declines in older fish. The absence of a reliable index of stock abundance casts much uncertainty over the status of the bream stock.

Bream are a popular table fish with the majority sold fresh on the domestic market. When sold as whole fish through the Sydney Fish Market, bream attracted an average wholesale price of $8.68/kg for the period 1995/96 to 1999/2000. Yellowfin bream should not be confused with blue morwong, which are often sold under the marketing name of ‘bream’ or ‘sea bream’. Luderick are also often sold as ‘sea bream’.

Black bream are a similar species to yellowfin bream and are found in estuarine waters on the NSW coast south of Myall Lakes. They are almost exclusively found in estuarine waters, and generally only enter ocean waters after periods of flood. Black bream are often reported as yellowfin bream during catch reporting, as distinguishing the difference between the species by visual examination can be very difficult. The differentiation between the species is made more difficult through a percentage of hybrids that exist as a result of the two species interbreeding. Black bream only constitute a small component (less than 5%) of overall estuarine bream catches.

Yellowfin bream (*Acanthopagrus australis*)

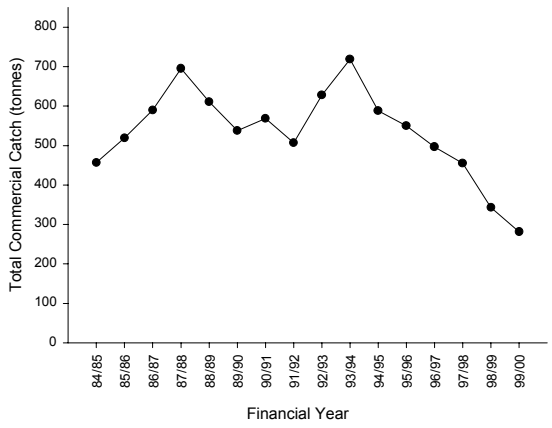


Figure AB9. The total reported commercial catch of bream (yellowfin & black) in NSW for the period 1984/85 to 1999/2000.

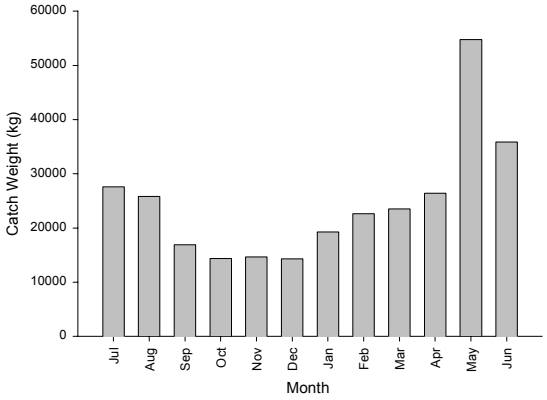


Figure AB10. The average reported catch per month of bream (yellowfin & black) in the estuary general fishery for the period 1997/98 and 1998/99.

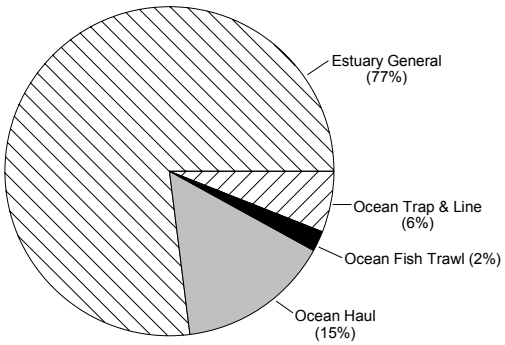


Figure AB11. The average percentage of reported catch of bream (yellowfin & black) between commercial fisheries for the period 1997/98 and 1998/99

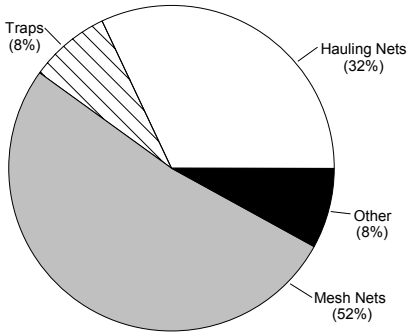


Figure AB12. The average percentage of reported catch of bream (yellowfin & black) by gear types in the estuary general fishery for the period 1997/98 and 1998/99.

School prawns (*Metapenaeus macleayi*)

The following overview is based on information provided in Grey *et al.,* (1983), Kailola *et al.,* (1993), Pollard and Growns (1993), Pease and Grinberg (1995), Yearsley *et al.,* (1999), Fletcher and McVea (2000), and the NSW Fisheries catch statistics database.

The school prawn (*Metapenaeus macleayi*) occurs along the east coast of Australia, between southern Queensland and eastern Victoria. Throughout this range, school prawns inhabit both estuaries (mostly as juveniles and sub-adults) and inshore ocean waters (as adults). Within estuaries, they prefer soft muddy substrates and areas of seagrass, and can be found well upstream into brackish to fresh waters. School prawns eat a variety of small invertebrates and detritus.

School prawns spawn in the ocean off NSW between February and May. After a larval stage of about 2 to 3 weeks, the postlarval prawns enter estuaries and move upstream. By the following spring, the now adolescent prawns return downstream in preparation for the next spawning. School prawns grow to 130 mm (males) and 160 mm (females) and generally live for 12 to 18 months, spawning only once. Rainfall and the associated river discharge are thought to be important cues in the life cycle of school prawns, in that it appears to facilitate downstream migration, gonad maturation, spawning success and larval return. School prawns may undertake oceanic migrations of up to approximately 100 km.

School prawns are taken in hauling nets, running nets, set pockets nets and seine nets in this fishery. They are also heavily targeted by the estuary prawn trawl fishery, and by the ocean prawn trawl fleet after periods of high rainfall or flooding. Part 3 of the draft FMS proposes that a Prawn Resource Forum be established that will include representation from commercial fisheries targeting prawn stocks, as well as other key stakeholders. Under the proposal, the Total Allowable Catch Committee would be requested to determine the maximum level of fishing effort to be applied to the stocks by this fishery. Further information relating to the Prawn Resource Forum can be found in section 2.18.5 of the draft FMS.

There is a large domestic market for larger school prawns for human consumption, and substantial quantities, especially from the Clarence and Hawkesbury Rivers, are sold elsewhere for recreational fishing bait. When sold for consumption through the Sydney Fish Market, school prawns attracted an average wholesale price of $6.87/kg for the period 1995/96 to 1999/2000.

School prawns (*Metapenaeus macleayi*)

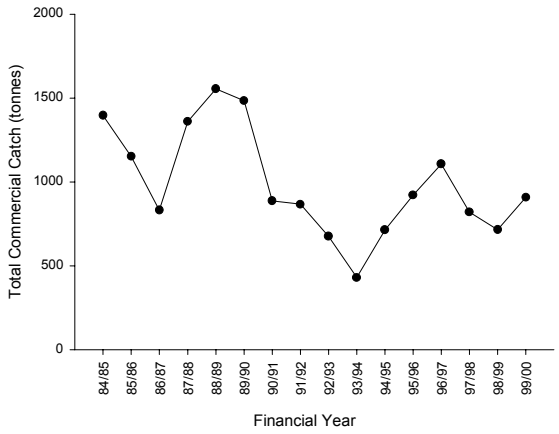


Figure AB13. The total reported commercial catch of school prawn in NSW for the period 1984/85 to 1999/2000.

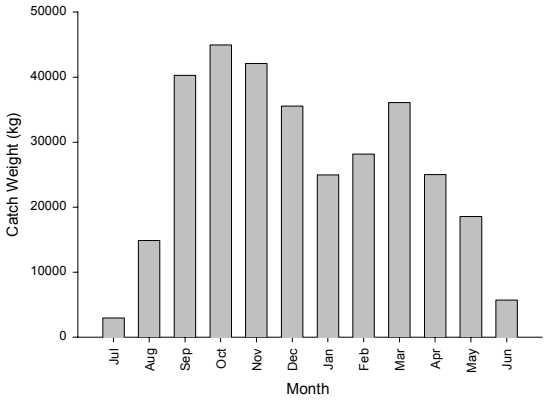


Figure AB14. The average reported catch per month of school prawn in the estuary general fishery for the period 1997/98 and 1998/99.

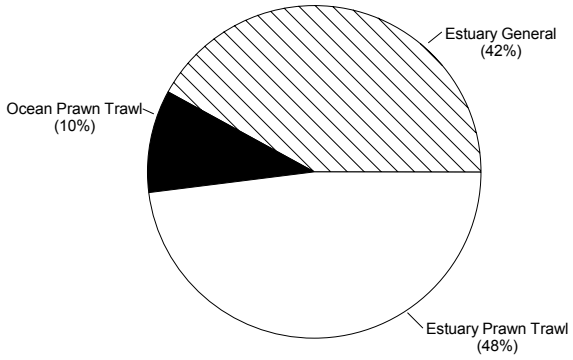


Figure AB15. The average percentage of reported catch of school prawn between commercial fisheries for the period 1997/98 and 1998/99.

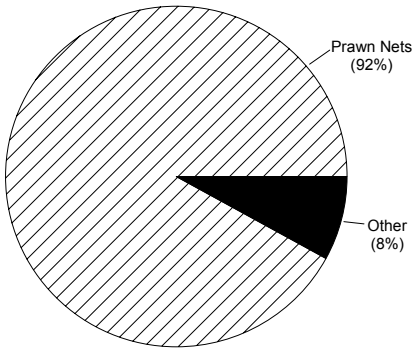


Figure AB16. The average percentage of reported catch of school prawn by gear types in the estuary general fishery for the period 1997/98 and 1998/99.

Dusky flathead (*Platycephalus fuscus*)

The following overview is based on information provided in Pease *et al.,* (1981c), Kailola *et al.,* (1993), Pollard and Growns (1993), West (1993), Pease and Grinberg (1995), Gibbs (1997), Yearsley *et al.,* (1999), Fletcher and McVea (2000), and the NSW Fisheries catch statistics database.

The dusky flathead (*Platycephalus fuscus*) is endemic to Australia and occurs from Cairns in Queensland to South Australia. In NSW Waters, dusky flathead are found primarily within estuaries, but also occur in inshore ocean waters. They are a bottom dwelling fish and are normally found on soft substrates, including mud, sand and seagrass. Dusky flathead eat small fish and a variety of invertebrates including prawns, crabs and squid. They are essentially ambush predators that lie and wait (often partly buried) for passing prey.

Spawning appears to occur both in the lower reaches of estuaries and in the sea, typically during summer. The larvae enter estuaries and the small juveniles subsequently live in the same habitats as the adults. Dusky flathead grow quickly, reaching 400 mm (Fork Length) after 3 years. They mature at around 320 mm (males) to 360 mm (females). They are reported to reach 1.5 metres in length.

Commercial catch of dusky flathead is almost exclusively limited to the estuary general fishery with large numbers also taken by recreational fishers. The highest levels of commercial catches occur during the winter months. From 1 July 2001, the minimum legal length for this species will increase from 33 to 36 cm.

Dusky flathead are sold mostly as fillets or whole fish. When sold as whole fish through the Sydney Fish Market, dusky flathead attracted an average wholesale price of $4.08/kg for the period 1995/96 to 1999/2000.

Dusky flathead (*Platycephalus fuscus*)

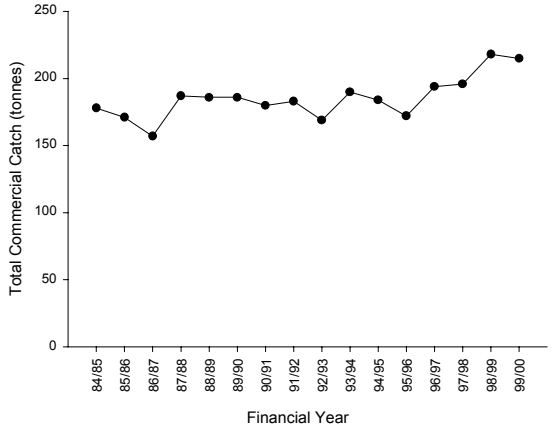


Figure AB17. The total reported commercial catch of dusky flathead in NSW for the period 1984/85 to 1999/2000

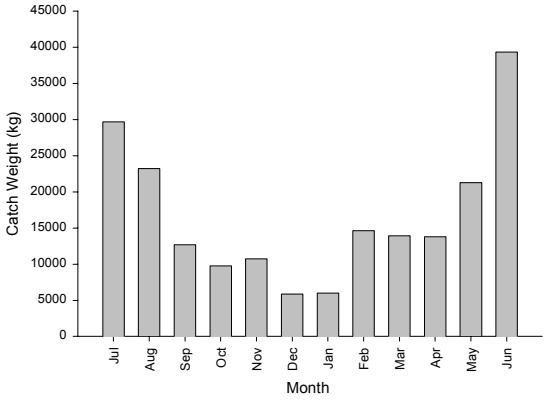


Figure AB18. The average reported catch per month of dusky flathead in the estuary general fishery for the period 1997/98 and 1998/99.

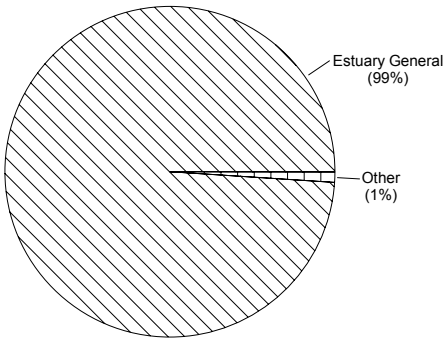


Figure AB19. The average percentage of reported catch of dusky flathead between commercial fisheries for the period 1997/98 and 1998/99.

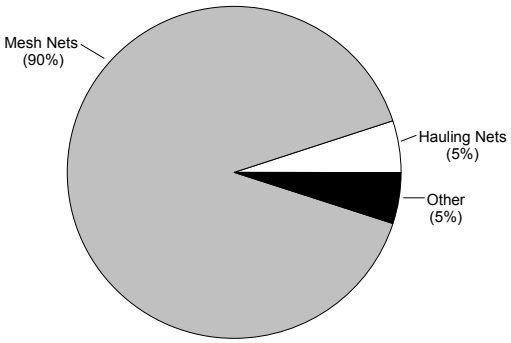


Figure AB20. The average percentage of reported catch of dusky flathead by gear types in the estuary general fishery for the period 1997/98 and 1998/99.

Blue swimmer crab (*Portunus pelagicus*)

The following overview is based on information provided in Kailola *et al.,* (1993), Pollard and Growns (1993), Pease and Grinberg (1995), Yearsley *et al.,* (1999), Fletcher and McVea (2000), and the NSW Fisheries catch statistics database.

The blue swimmer crab (*Portunus pelagicus*) inhabits coastal waters in all Australian states except Tasmania and Victoria, and is also widely distributed throughout the Indo-Pacific region. In NSW Waters, blue swimmer crabs are found primarily within lower estuaries and inshore coastal waters. Within estuaries, they are found in association with mud, sand and seagrass, and are often buried in the sediment. Blue swimmer crabs mostly prey on slow-moving invertebrates such as bivalve molluscs, crustaceans and worms, but also scavenge on material including dead fish and squid.

Based on reports from South Australia and Western Australia, blue swimmer crabs in NSW are likely to spawn in both lower estuarine and ocean waters, with peak spawning expected in spring or summer. The larvae may drift well out to sea before settling in shallow estuarine or inshore waters, in areas similar to those inhabited by adults. Blue swimmer crabs grow in excess of 200 mm (carapace width) and live for up to 3 years. Size at maturity is variable, but based on studies from other states, is likely to be around 90 mm in NSW (i.e. at about 1 year of age).

Reported landings of blue simmer crab increased dramatically from <50 to >200 tonnes between 1990 and 1992, after which it stabilised to around 200 tonnes per-annum. This increase in landings is possibly related to expansions in the market for blue swimmer crab and the associated value of the product.

Blue swimmer crabs are caught in fish traps, hoop nets and mesh nets in the estuary general fishery, and are also caught as an incidental catch in the estuary prawn trawl fishery.

There is a small export market for blue swimmer crabs, but the majority of crabs are sold whole cooked or uncooked in local markets. When sold as whole fish through the Sydney Fish Market, blue swimmer crabs attracted an average wholesale price of $6.46 per kilogram for the period 1995/96 to 1999/2000.

Blue swimmer crab (*Portunus pelagicus*)

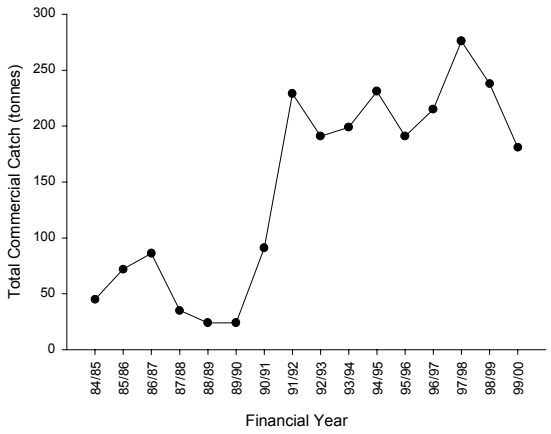


Figure AB21. The total reported commercial catch of blue swimmer crab in NSW for the period 1984/85 to 1999/2000.

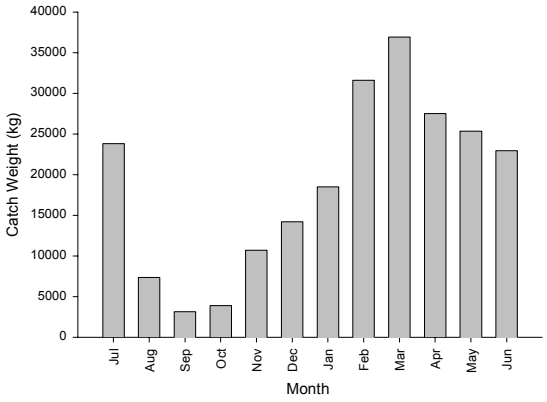


Figure AB22. The average reported catch per month of blue swimmer crab in the estuary general fishery for the period 1997/98 and 1998/99.

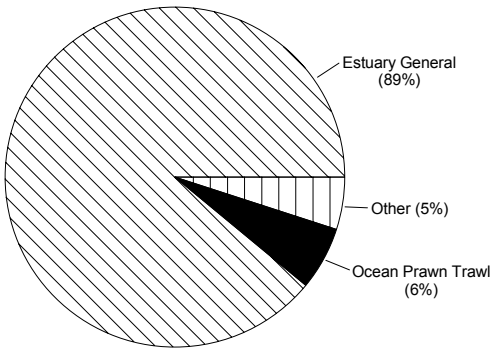


Figure AB23. The average percentage of reported catch of blue swimmer crab between commercial fisheries for the period 1997/98 and 1998/99.

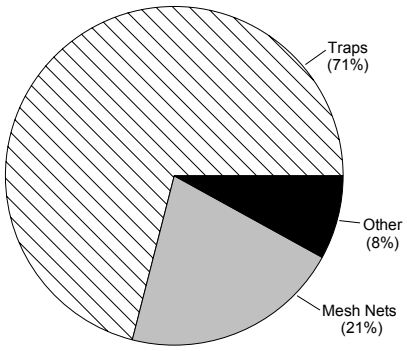


Figure AB24. The average percentage of reported catch of blue swimmer crab by gear types in the estuary general fishery for the period 1997/98 and 1998/99.

Sand whiting (*Sillago ciliata*)

The following overview is based on information provided in Pease *et al.,* (1981b), Hutchins and Swainston (1986), Kailola *et al.,* (1993), Pollard and Growns (1993), West (1993) Pease and Grinberg (1995), Gibbs (1997), Yearsley *et al.,* (1999), Fletcher and McVea (2000), and the NSW Fisheries catch statistics database.

The sand whiting (*Sillago ciliata*) occurs along the entire eastern coastline of Australia, from Cape York (Queensland) down to eastern Tasmania. It is also found in New Caledonia and Papua New Guinea. In NSW waters, sand whiting are found within estuaries and in coastal waters off ocean beaches. Within estuaries, the favoured habitat is bare sandy substrate. Sand whiting eat bottom-dwelling invertebrates, particularly polychaete worms, crustaceans and molluscs taken by fossicking though the sand.

Spawning occurs near river mouths, typically during summer. Many of the larvae enter estuaries, with the small juveniles preferring shallow water (particularly along sandy shores, but also in and around seagrasses and mangroves). Sand whiting grow fairly slowly, taking about 5 years to reach 290 mm (fork length). They mature at around 240 mm (males) to 260 mm (females). Maximum length is about 500 mm (total length). After spawning, adults may either enter estuarine waters or remain along ocean beaches.

The majority of sand whiting taken in the estuary general fishery are caught in hauling nets and the catch is reasonably well spread throughout the year.

They are generally sold as whole fish or fillets and when sold whole fish through the Sydney Fish Market, sand whiting attracted an average wholesale price of $9.27/kg for the period 1995/96 to 1999/2000.

Sand whiting (*Sillago ciliata*)

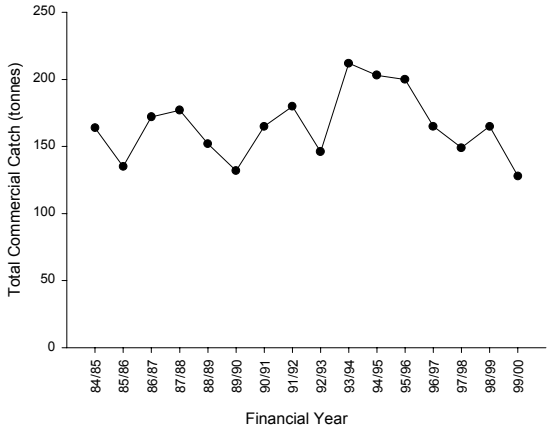


Figure AB25. The total reported commercial catch of sand whiting in NSW for the period 1984/85 to 1999/2000.

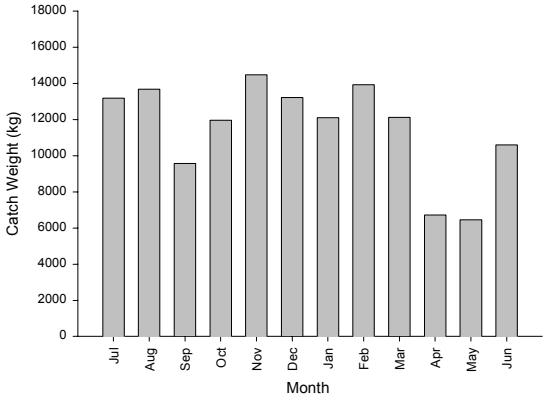


Figure AB26. The average reported catch per month of sand whiting in the estuary general fishery for the period 1997/98 and 1998/99.

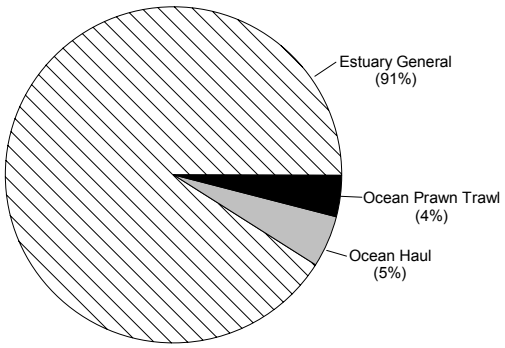


Figure AB27. The average percentage of reported catch of sand whiting between commercial fisheries for the period 1997/98 and 1998/99

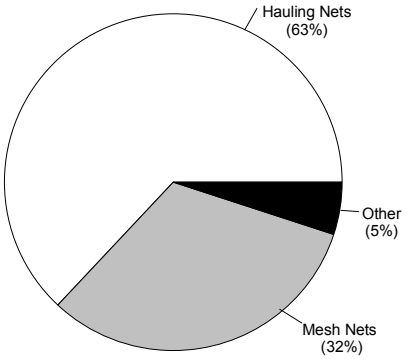


Figure AB28. The average percentage of reported catch of sand whiting by gear types in the estuary general fishery for the period 1997/98 and 1998/99.

Silver biddy (*Gerres subfasciatus*)

The following overview is based on information provided in Pease *et al.,* (1981b), Kailola *et al.,* (1993), Pollard and Growns (1993), Pease and Grinberg (1995), Gibbs (1997), Hannan and Williams (1998), Yearsley *et al.,* (1999), Fletcher and McVea (2000), and the NSW Fisheries catch statistics database.

The silver biddy (*Gerres subfasciatus*) is widely distributed, occurring on both the east and west coasts of Australia. In NSW Waters, silver biddies are found in both estuaries and inshore waters. Within estuaries, they are generally found over sand and mud bottoms. Their diet consists of small invertebrates, particularly polychaetes.

Spawning appears to occur within both inshore waters and marine-dominated estuaries, primarily during summer and early autumn. The larvae enter estuaries and the small juveniles subsequently live in sheltered shallow water habitats (particularly where cover such as seagrass or algae are available). Larger juveniles are appear to be less dependent on such cover, and are found over open bare substrate. Silver biddies are thought to mature at around 200 mm in length. Maximum length is only about 230 mm (total length). Little is known about growth rates or migration patterns.

Silver biddies are one of the smallest finfish commercially harvested in NSW. Silver biddies are similar in appearance to small bream, and this often causes mistaken concern amongst people viewing commercial fishing operations or browsing at fish in retail outlets. Prior to the 1980s silver biddies were landed in small quantities and sold as an incidental catch in hauling operations as their relative value was low.

As prices began to rise for silver biddies, quantities of this previously discarded species started to be more readily retained and sold, leading to a significant expansion in recorded catch. For instance, the average annual recorded catch of silver biddies from 1970/71 to 1980/81 was 51.4 tonnes compared with recent annual catches of more than 130 tonnes. This species is taken mainly by hauling nets year round.

When sold as whole fish through the Sydney Fish Market, silver biddies attracted an average wholesale price of $2.18/kg for the period 1995/96 to 1999/2000.

Silver biddy (*Gerres subfasciatus*)

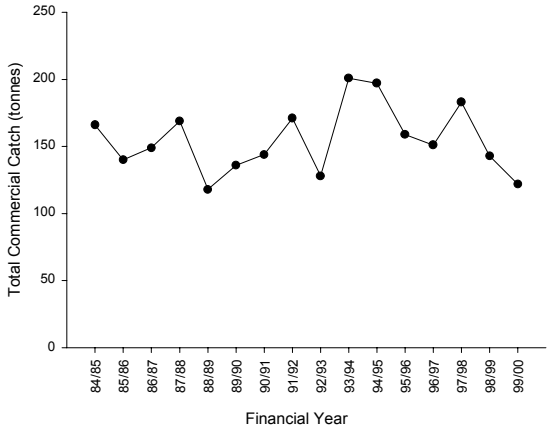


Figure AB29. The total reported commercial catch of silver biddy in NSW for the period 1984/85 to 1999/2000.

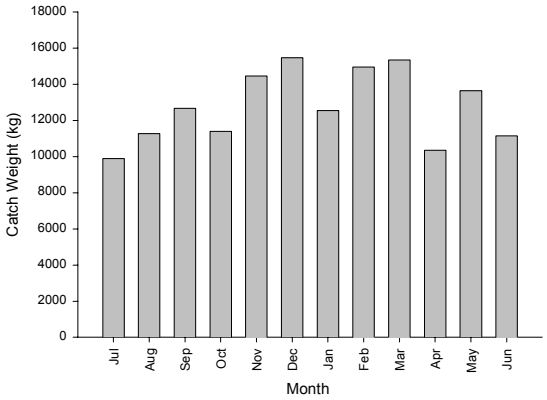


Figure AB30. The average reported catch per month of silver biddy in the estuary general fishery for the period 1997/98 and 1998/99.

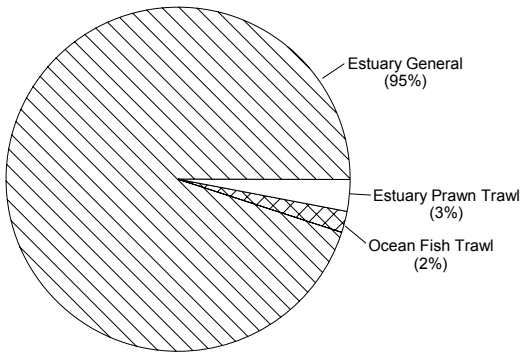


Figure AB31. The average percentage of reported catch of silver biddy between commercial fisheries for the period 1997/98 and 1998/99.

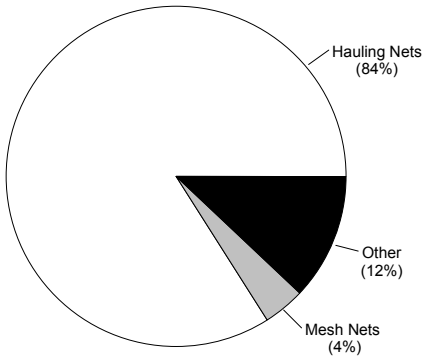


Figure AB32. The average percentage of reported catch of silver biddy by gear types in the estuary general fishery for the period 1997/98 and 1998/99.

River (longfinned) eels (*Anguilla reinhardtii*)

The following overview is based on information provided in Kailola *et al.,* (1993), Pollard and Growns (1993), Pease and Grinberg (1995), Beumer (1996), Yearsley *et al.,* (1999), Fletcher and McVea (2000), Pease (pers. comm.) and the NSW Fisheries catch statistics database.

There are two species of 'river eels': the long-finned river eel (*Anguilla reinhardtii*) and the short-finned river eel (*A. australis*). Both species occur along the entire NSW coast, but longfinned eels are the primary target of the commercial fishery. Within Australia, the short-finned river eel has a more southerly distribution (approximately between Brisbane and Tasmania) than the long-finned river eel (between Cape York and Tasmania). Both species are also found at Lord Howe Island and Norfolk Island as well as in New Caledonia and New Zealand. Longfinned eels are also found in New Guinea and the Solomon Islands. In NSW waters, both species occur within estuaries and in most freshwaters east of the Great Dividing Range, with the long-finned river eel preferring riverine and estuarine habitats while the short-finned river eel is more likely to be found in still or slow flowing fresh waters. River eels are the top carnivores in upper catchment waters, feeding on crustaceans, molluscs, terrestrial and aquatic insects, and in the case of larger individuals, fish (including other eels) and small waterfowl.

Spawning occurs in deep ocean waters (believed to be the Coral Sea), typically during winter. River eels pass through two distinct larval stages: the leaf-like 'leptocephali' larva and the unpigmented, eel-shaped postlarvae known as 'glass eel' or 'elver'. After a long larval period (almost one year) the elvers enter estuaries and freshwaters. In the process, they quickly develop into fully pigmented sub-adults or 'yellow eels', which are the focus of the commercial fishery. River eels are less affected by instream barriers than are most finfish, and are able to ascend most dams and weirs provided suitably damp conditions are available. River eels appear to grow slowly, taking about 10 to 50 years to reach sexual maturity. In general, females grow to a much larger size than males. Mature eels migrate downstream (with the assistance of floodwaters) before swimming up to 3000 km to reach the spawning area. Maximum length is about 1650 mm for long-finned river eels and about 1100 mm for short-finned river eels. Adults are presumed to die after spawning.

River eel landings were first recorded separately in 1969. Recorded landings remained low (less than 100 tonnes per year) until 1991. During this period most of the landings were recorded from the Clarence River. The primary market was for locally smoked eel meat or frozen fillets exported to Europe. Prices for both markets were relatively low. In the early 1990s, a high value market developed for live eels for export to China. Fishing effort in the estuaries increased substantially and permits were issued for harvesting from farm dams and impoundments in 1991. Landings quickly increased to a peak of over 400 tonnes in the fiscal year 1992/93. Fishing effort levelled off and landings declined to around 300 tonnes in the mid-1990s. Since 1997, annual landings have stabilised to around 200 tonnes

Peaks in eel fishing activity vary between catchments. In the Clarence River eel trapping is generally a winter activity. Commercial eel fishing in the Hawkesbury River, however, peaks earlier in the year, and is possibly market driven to supply the high export demand for the Chinese New Year.

Eels are taken almost exclusively in eel traps. Most of the catch is exported live to China and a very small proportion of the catch is sold as whole fish through the Sydney Fish Market where they attracted an average wholesale price of $2.83 kg for the period 1995/96 to 1999/2000. The export value to fishers was as high as $12 kg during this period.

River (longfinned) eels (*Anguilla reinhardtii*)

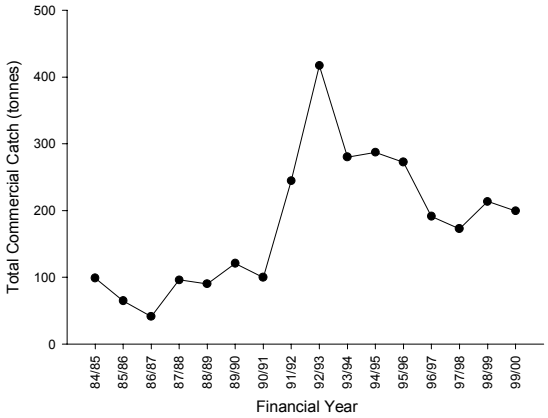


Figure AB33. The total reported commercial catch of longfinned river eel in NSW for the period 1984/85 to 1999/2000.

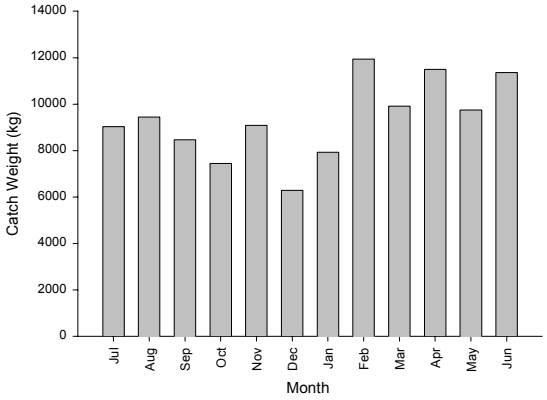


Figure AB34. The average reported catch per month of longfinned river eel in the estuary general fishery for the period 1997/98 and 1998/99.

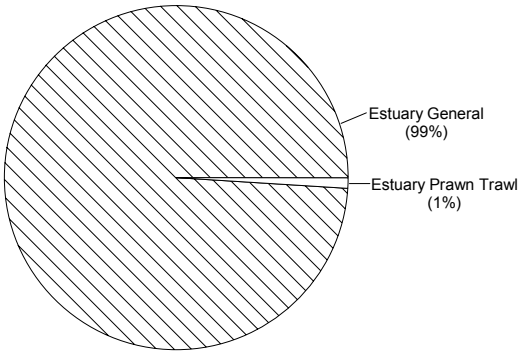


Figure AB35. The average percentage of reported catch of longfinned river eel between commercial fisheries for the period 1997/98 and 1998/99

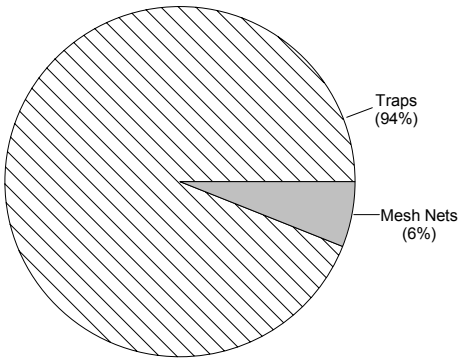


Figure AB36. The average percentage of reported catch of longfinned river eel by gear types in the estuary general fishery for the period 1997/98 and 1998/99

Pipis (*Plebidonax deltoides*)

The following overview is based on information provided in Robinson and Gibbs (1982) and Kailola *et al.,* (1993), Pease and Grinberg (1995), Yearsley *et al*., (1999), Fletcher and McVea (2000), the NSW Fisheries catch statistics database and on Philip Gibbs (pers. comm.).

The pipi (*Plebidonax deltoides*) occurs on surf beaches from southern Queensland to Eyre Peninsula in South Australia. They are found within the surf zone, i.e. within intertidal and shallow subtidal waters along high energy coastlines. Whilst pipis are harvested under the estuary general fishery, they are not normally found within estuaries proper. Like most bivalve molluscs, pipis filter feed by extracting microscopic matter (particularly phytoplankton) from the water.

Based on studies in South Australia, pipis probably spawn in spring, with the juveniles recruiting to the same habitat as that occupied by adults. Maturity is likely to be reached at around 36 mm shell length and 13 months of age. Pipis grow to more than 60 mm shell length and are believed to live for up to 4 or 5 years.

There was a considerable peak in landings of pipis in 1996/97 before several events of human sickness following consumption of pipis caused this part of the fishery to be closed periodically during 1997 and 1998. The pipis were contaminated by algal blooms occurring off some beaches in summer. Access to this part of the fishery has subsequently been limited to fishers who operate in accordance with an approved biotoxin management program. Under the program, fishers test the water regularly for the presence of algae and cease harvesting if concentrations are above established levels.

Reported landings of pipis have increased from around 50 tonnes per annum in 1984/85 to over 600 tonnes per annum in 1999/00. Increased landing throughout this period probably arose due to increased market and product value. It is envisaged that the value of pipis will continue to rise.

Pipis are collected exclusively by hand gathering endorsement holders in the estuary general fishery, by the method of hand picking. Apart from human consumption in soups and chowders, pipis are often used sold as recreational fishing bait. When sold through the Sydney Fish Market, pipis attracted an average wholesale price of $2.50 kg for the period 1995/96 to 1999/2000, although this average is probably affected by public confidence during the food poisoning events. The average price appears now to be rising and it is likely to continue to do so over the coming years.

Pipis (*Plebidonax deltoides*)

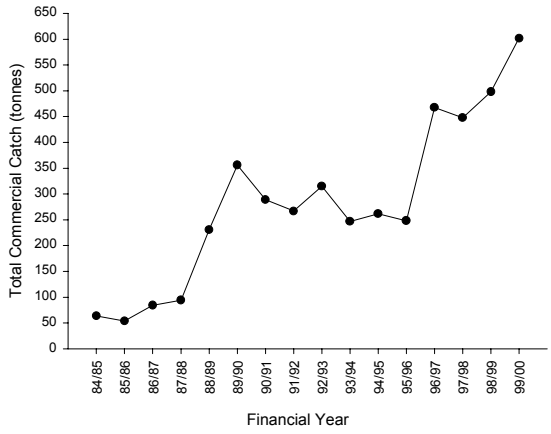


Figure AB37. The total reported commercial catch of pipis in NSW for the period 1984/85 to 1999/2000.

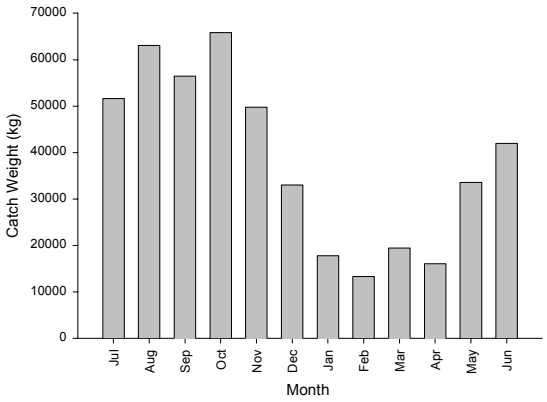


Figure AB38. The average reported catch per month of pipis in the estuary general fishery for the period 1997/98 and 1998/99.

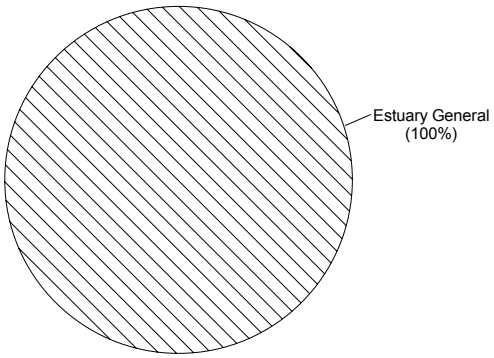


Figure AB39. The average percentage of reported catch of pipis between commercial fisheries for the period 1997/98 and 1998/99.

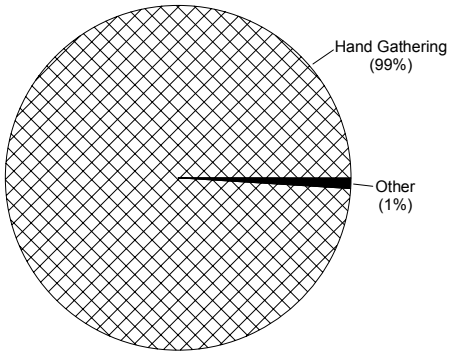


Figure AB40. The average percentage of reported catch of pipis by gear types in the estuary general fishery for the period 1997/98 and 1998/99.

APPENDIX B2 CURRENT REGULATIONS RELATED TO FISHING METHODS PERMITTED IN THE ESTUARY GENERAL FISHERY

METHOD	*REGULATION*	*REGULATION Text*
Fish trap	**c58**	**58 Fish trap** (1)It is lawful for a commercial fisher to use a trap for taking fish (other than rock lobsters) in the waters specified in the Table to this clause if the trap complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The fish trap is not set or used unless its position is indicated by a buoy which: (i) is moored so as to be positioned above the trap, and (ii) has a diameter above the water of not less than 150 mm, and (iii) has a weight of not less than 500 gm suspended not less than 5 metres under the float so that no rope is floating on the surface of the water, and (iv) displays ``LFB'' followed by the licence number of the boat used to set the trap and ``F'' at the end of that number, in clearly visible letters and figures which are not less than 50 mm in height and are of a colour which contrasts with that of the buoy. (b) The trap is not set or used in such a manner as to impede the free passage of fish on either or any side of the trap or in such a manner that any 2 traps are closer than 5 metres apart. (c) The commercial fisher does not set or use in any waters (other than ocean waters and sea beaches) more than 10 fish traps at any one time. (d) The trap is not set or used unless it is secured or weighted so that the trap rests on the seabed. This condition has effect on and from 1 April 1996. (2)For the purposes of this Regulation or any other instrument under the Act, a trap referred to in this clause may be referred to as a fish trap. **Table Fish trap** 1 (a) *Waters*—Any waters (other than inland waters or ocean waters). (b) *Description of trap*—Not exceeding 2 metres in length, 1.5 metres in width and 1 metre in depth; consisting of mesh (having a measurement from one plain wire to the opposite plain wire of not less than 50 mm); having an entrance funnel or funnels other than in the top; having at least 1 panel in a side or top of not less than 30 cm long by 30 cm wide consisting of galvanised wire.
Eel Trap	**c64**	**64 Eel trap**

		(1)It is lawful for a commercial fisher to use a trap for taking eels in the waters specified in the Table to this clause if the trap complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The eel trap is not set or used unless its position is indicated by a buoy which: (i) is moored so as to be positioned above the trap, and (ii) has a diameter above the water of not less than 100 mm, and (iii) has a weight of not less than 50 gm suspended not less than 1 metre under the float so that no rope is floating on the surface of the water, and (iv) displays ``LFB'' followed by the licence number of the boat used to set the trap and ``E'' at the end of that number, in clearly visible letters and figures which are not less than 50 mm in height and are of a colour which contrasts with that of the buoy. (b) The commercial fisher does not set or use more than 10 eel traps at any one time. (2)For the purposes of this Regulation or any other instrument under the Act, a trap referred to in this clause may be referred to as an eel trap. **Table Eel trap** 1 (a) *Waters*—Any waters (other than inland waters, ocean waters or sea beaches). (b) *Description of trap*—Not exceeding 2 metres in length, 0.5 metre in width and 0.5 metre in depth or not exceeding 1 metre in length, 1 metre in width and 0.5 metre in depth; consists of mesh not less than 20 mm diagonal nor more than 40 mm diagonal; has an entrance funnel not exceeding 100 mm.
Crab Trap	**c60**	**60 Crab trap** (1)It is lawful to use a trap for taking crabs in the waters specified in the Table to this clause if the trap complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The crab trap is not set or used unless its position is indicated by a buoy which: (i) is moored so as to be positioned above the trap, and (ii) has a diameter above the water of not less than 100 mm, and (iii) has a weight of not less than 50 gm suspended not less than 1 metre under the float so that no rope is floating on the surface of the water, and (iv) in the case of a trap used by a commercial fisher—displays ``LFB'' followed by the licence number of the boat used to set the trap and ``C'' at the end of that number, in clearly visible letters and figures which are not less than 50 mm in height and are of a colour which contrasts with that of the buoy, and (v) in the case of any other trap—displays the words ``CRAB TRAP'' followed by the name of the person who set the trap, in clearly visible letters which are not less than 50 mm in height and are of a colour which contrasts with that of the buoy.

(b) The trap is not set or used in such a manner as to impede the free passage of fish on either or any side of the trap or in such a manner that any 2 traps are closer than 3 metres apart.

(c) A commercial fisher does not set or use in any waters (other than the waters of Wallis Lake and Port Stephens Broadwater specified in the Table to this clause) more than 10 crab traps at any one time.

(d) A commercial fisher does not set or use in the waters of Wallis Lake and Port Stephens Broadwater specified in the Table to this clause more than 20 crab traps at any one time.

(e) A person (other than a commercial fisher) does not set or use more than 1 crab trap at any one time.

(f) The crab trap is not made of entanglement material.

(2)For the purposes of this Regulation or any other instrument under the Act, a trap described in this clause may be referred to as a crab trap.

Table Crab trap

1 (a) *Waters*—That part of Wallis Lake included within the following boundaries: commencing at a post marked ``FD'' situated at the high water mark of Pipers Bay (located by a line bearing 186 degrees from an electricity pole numbered 14808 situated at the eastern end of Pipers Bay Drive Forster) then bounded by a line bearing 217 degrees to a second post marked ``FD'' situated at the high water mark on the southern side of Big Island, then to a third post marked ``FD'' situated at the high water mark of Wallis Island, bearing 245 degrees from the second post, then southerly, westerly and northerly along the high water mark of Wallis Island to a jetty located on the western side of Wallis Island, then westerly along the length of the jetty to its end, then to a fourth post marked ``FD'', situated at the high water mark on the foreshore of Coomba Park, bearing 246 degrees and 30 minutes from the end of the jetty, then generally southerly, easterly and northerly by the high water mark of Wallis Lake to the point of commencement.

(b) *Description of trap*—Not exceeding 1.2 metres in length, 1 metre in width and 0.5 metre in depth (or has a diameter not exceeding 1.6 metres at the top or bottom); consisting of mesh not less than 50 mm; having not more than 4 entrance funnels none of which are on the top of the trap (excluding any access doors for removing crabs from the trap or baiting the trap).

2 (a) *Waters*—That part of Port Stephens Broadwater commencing at Nelson Head then along the high water mark to Mud Point then by a line drawn south west intersecting the northern extremity of Bull Island to the high water mark at Lemon Tree Passage then along the high water mark to Tanilba Point then by a line drawn in a north westerly direction to Cockleshell Point then along the high water mark to Carcair Point then by a line drawn to the eastern most point of Wirrung Island then to Tahlee Point then along the high water mark to Baromee Point then by a line drawn in an easterly direction to Fame Point then by a line drawn in an easterly direction to Oringall Point then in an easterly direction to the southern most point of Corrie Island then in an easterly direction to Barnes Rocks then by a line drawn in a south easterly direction to the point of commencement.

		(b) *Description of trap*—Not exceeding 1.2 metres in length, 1 metre in width and 0.5 metre in depth (or has a diameter not exceeding 1.6 metres at the top or bottom); consisting of mesh not less than 50 mm; having not more than 4 entrance funnels none of which are on the top of the trap (excluding any access doors for removing crabs from the trap or baiting the trap). 3 (a) *Waters*—Any other waters (except inland and ocean waters). (b) *Description of trap*—Not exceeding 1.2 metres in length, 1 metre in width and 0.5 metre in depth (or has a diameter not exceeding 1.6 metres at the top or bottom); consisting of mesh not less than 50 mm; having not more than 4 entrance funnels none of which are on the top of the trap (excluding any access doors for removing crabs from the trap or baiting the trap).
Hoop or Lift Net	**c47**	**47 Hoop or lift net** (1)It is lawful to use a hoop or lift net for taking fish (including crabs and freshwater spiny crayfish, but excluding rock lobster in tidal waters or a prohibited size class of fish) in the waters specified in the Table to this clause if the net complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only as a hand implement and only by the method of lowering the net into the water and then drawing the net vertically to the surface. (b) Not more than 10 nets are used by a commercial fisher at any one time. (c) Not more than 5 nets are used by any person (other than a commercial fisher) at any one time. (2)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a hoop or lift net. **Table Hoop or lift net** 1 (a) *Waters*—Any waters (other than ocean waters). (b) *Description of net*—Net attached to not more than 2 hoops, rings or frames not exceeding 1.25 metres in their greatest diameter (or at their greatest diagonal); hoops, rings or frames not attached to each other by means of any rigid frame; total length from the centre of the plane of the hoop, ring or frame to the extremity of the net, or between the 2 hoops, rings or frames, not exceeding 1 metre; mesh not less than 13 mm.
Mesh Net	**c37**	**37 Meshing net** (1)It is lawful to use a meshing net for taking fish in the waters specified in the Table to this clause if the net complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only by the method of splashing (that is, shooting the net, splashing and retrieving it as a

		continuous operation) during December and January in any year, or from sunrise to sunset each day during February, March, October and November in any year. (b) The net is not set (that is, used by any method other than splashing) during January and December in any year, or from sunrise to sunset on any day during February, March, October and November in any year. (c) The net is not set for more than 3 hours. (2)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a meshing net. **Table Meshing net** 1 (a) *Waters*—The tributaries of the Clarence River known as Lake Woolooweyah and the Broadwater. (b) *Description of net*—Total length not exceeding 1,450 metres; mesh throughout not less than 80 mm. 2 (a) *Waters*—Port Jackson (including the Parramatta and Lane Cove Rivers) above a line drawn between Little Sirius Point and Point Piper; Middle Harbour above The Spit. (b) *Description of net*—Total length not exceeding 225 metres; mesh throughout not less than 80 mm. 3 (a) *Waters*—Womboyn River, Durras Water and that part of Wallaga Lake, together with all its inlets and tributaries extending seawards from the bridge and embankment on the Narooma–Bermagui Road to the Pacific Ocean. (b) *Description of net*—Total length not exceeding 375 metres; mesh throughout not less than 80 mm. 4 (a) *Waters*—All other waters (except inland waters and ocean waters). (b) *Description of net*—Total length not exceeding 725 metres; mesh throughout not less than 80 mm.
Flathead Net	**c38**	**38 Flathead net** (1)It is lawful to use a flathead net for taking flathead in the waters specified in the Table to this clause if the net complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only by the method of meshing. (b) The net is not used, set or left in Lake Illawarra for any period from 1 September to 31 May in any year or for a period exceeding 6 hours between sunrise and sunset from 1 June to 31 August in any year. (c) The net is not used, set or left in any other waters: (i) from 1 December to 31 January in any year, or (ii) between sunrise and sunset from 1 February to 31 March and from 1 October to 30 November in any year, or (iii) for a period exceeding 6 hours between sunrise and sunset from 1 April to 30 September in any year. (d) Any cork or float forming part of the net must not exceed 40 mm in length or 25 mm in width and must not be nearer than 3.5 metres to any other cork or float when measured along the cork line of the net.

		(e) The net is not used, set or left in such a manner as causes: (i) the lead line to be raised from the bottom of the waters, or (ii) the corks, floats, cork line or float line to be raised above the lead line for a distance greater than 0.5 metre, or (iii) the corks, floats, cork line or float line not to be completely submerged. (2)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a flathead net. **Table Flathead net** 1 (a) *Waters*—Tuggerah Lakes, Lake Illawarra and St Georges Basin, and those parts of Wallis Lake included within the following boundaries: the whole of the tidal waters of that part of Wallis Lake, its creeks, tributaries and rivers, including the Wang Wauk, Wallingat and Coolongolok Rivers, south of lines drawn from Fisheries Division Mark 21 to the westernmost southwestern foreshore corner of Oyster Farm No 56.144, from the foreshore or western end of the airport wharf on the northeastern corner of Wallis Island to Fisheries Division Mark 4 and from Fisheries Division Mark 4 to the eastern entrance to Tony's Creek on Hadley Island. (b) *Description of net*—Total length not exceeding 725 metres; depth of net not exceeding 25 meshes; mesh throughout not less than 70 mm nor more than 80 mm. 2 (a) *Waters*—Smith's Lake. (b) *Description of net*—Total length not exceeding 375 metres; depth of net not exceeding 25 meshes; mesh throughout not less than 70 mm nor more than 80 mm.
Hauling Nets: **General Purpose**	**c23**	**23 Hauling net (general purpose)** (1)It is lawful to use a hauling net for taking fish in the waters specified in the Table to this clause if the net (including hauling lines) complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only by the method of hauling. (b) The net has a bunt. (c) In waters (other than ocean waters and sea beaches): (i) the bunt of the net is in the centre of the net, and (ii) the net has 2 wings of equal length. (e) Except as provided by paragraph (f), the length of each hauling line attached to the net does not exceed the total length of the net to which it is attached. (f) The length of each hauling line attached to the net does not exceed:

(i) 2,100 metres in length in the waters of St Georges Basin between 1 July and 30 September in any year, or

(ii) 190 metres in length in the waters of that part of the entrance to Wallaga Lake (together with all its inlets and tributaries) extending seawards from the bridge and embankment on the Narooma–Bermagui Road to the Pacific Ocean.

(g) In the waters of the Wonboyn River or any other coastal lake or lagoon, the net is not landed by any method other than against a stake or back net (the total length of which does not exceed 50 metres with a mesh throughout of not less than 25 mm).

(h) The hauling of the net once commenced (that is, when any part of the net other than the hauling line has been shot or cast) is continued without any interruption or delay until completed.

(i) Any fish contained in any part of the net are immediately removed on completion of the haul, or on removal of that part of the net from the water, whichever occurs first.

(j) The net is not used for taking garfish in waters other than ocean waters.

(k) The net is operated by at least 2 commercial fishers.

(2)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a hauling net (general purpose).

Table Hauling net (general purpose)

1 (a) *Waters*—St Georges Basin; Lake Macquarie; Watson Taylor's Lake; Queen's Lake; Tuggerah Lakes; Wallis Lake (excluding Wollomba, Wallingat, Cooloongolok and Wang Wauk Rivers).

(b) *Description of net*—Total length not exceeding 1,000 metres; length of bunt not exceeding 90 metres or one-quarter of the total length of the net (whichever is the lesser) made up as follows: centre piece not exceeding 50 metres nor less than 25 metres in length, of mesh not less than 30 mm nor more than 50 mm; remainder of bunt not exceeding 50 metres in length, of mesh not less than 50 mm; mesh of wings not less than 80 mm.

2 (a) *Waters*—That part of Wallaga Lake extending upwards from the bridge and embankment on the Narooma–Bermagui Road; the Broadwater of the Clarence River; Lake Innes; Smiths Lake; Myall Lake; Booloombayt Lake; the Broadwater of Myall Lakes; Lake Illawarra.

(b) *Description of net*—Total length not exceeding 725 metres; length of bunt not exceeding 90 metres or one-quarter of the total length of the net (whichever is the lesser) made up as follows: centre piece not exceeding 50 metres nor less than 25 metres in length, of mesh not less than 30 mm nor more than 50 mm; remainder of bunt not exceeding 50 metres in length, of mesh not less than 50 mm; mesh of wings not less than 80 mm.

3 (a) *Waters*—Terranora and Cobaki Broadwaters (Tweed River); Clarence River; those parts of the Hastings River and Limeburner's Creek lying between a line drawn northeast from the northernmost extremity of King's Point to the point where the southerly prolongation of the western boundary of Portion 3, Parish of Torrens, County of Macquarie meets the northern bank of the

		river, and a line drawn south from the southwestern corner of Portion 72, Parish of Torrens to the southern bank of Limeburner's Creek; that part of the Ana-Branch of Hastings River lying between the westerly prolongation of the northern boundary of Portion 31, Parish of Redbank, County of Macquarie and a line drawn from the northeastern corner of Portion 54, Parish of Redbank to the southwestern corner of Portion 14, Parish of Redbank; Wollumboola Lake; Conjurong or Conjola Lake (including Berringer Lake); Coila Lake; Tuross Lake; Mummuga or Dalmeny Lake; Cuttagee Lake; Murrah Lake; Wapengo Lake; Nelson Lake; Curola Lake; Merimbula Lake; Wallagoot Lake. (b) *Description of net*—Total length not exceeding 450 metres; length of bunt not exceeding 90 metres or one-quarter of the total length of the net (whichever is the lesser) made up as follows: centre piece not exceeding 50 metres nor less than 25 metres in length, of mesh not less than 30 mm nor more than 50 mm; remainder of bunt not exceeding 50 metres in length, of mesh of not less than 50 mm; mesh of wings not less than 80 mm. 4 (a) *Waters*—Durras Water. (b) *Description of net*—Total length not exceeding 375 metres; mesh throughout not less than 80 mm. 5 (a) *Waters*—That part of the entrance to Wallaga Lake, together with all its inlets and tributaries extending seawards from the bridge and embankment on the Narooma–Bermagui Road to the Pacific Ocean. (b) *Description of net*—Total length not exceeding 375 metres; mesh throughout not less than 80 mm. 6 (a) *Waters*—That part of the Wagonga River and its tributaries westward of a line drawn northwest across the entrance from the northernmost extremity of Wagonga Head. (b) *Description of net*—Total length not exceeding 375 metres; mesh throughout not less than 80 mm (this net must be used only for the taking of Australian salmon (*Arripis trutta*) or of species of mullet included in the family mugilidae). 8 (a) *Waters*—All other waters (except inland waters). (b) *Description of net*—Total length not exceeding 375 metres; length of bunt not exceeding 90 metres or one-quarter of the total length of the net (whichever is the lesser) made up as follows: centre piece not exceeding 50 metres nor less than 25 metres in length, of mesh not less than 30 mm nor more than 50 mm; remainder of bunt not exceeding 50 metres in length, of mesh not less than 50 mm; mesh of wings not less than 80 mm.
Prawn	**c29,30,30A**	**29 Prawn net (hauling)** (1)It is lawful to use a hauling net for taking prawns in the waters specified in the Table to this clause if the net (including hauling lines) complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only by the method of hauling.

(b) The net is not set or staked at any time.
(c) The net is landed on the tray of a boat or in sufficient depth of water to enable prohibited size fish that are taken in the net to escape.
(d) There is no seine net (prawns) on the boat from which the net is used.

(2)It is also lawful to use a try net in the waters specified in the Table to this clause to facilitate the taking of prawns by the means of a prawn net (hauling) if the try net complies with the following description:
The net is attached to a frame not exceeding 0.6 metre in width and 0.5 metre in height, with a total length from the centre of the plane to the extremity of the net not exceeding 2 metres; mesh not less than 30 mm nor more than 36 mm.

(3)It is also lawful to use a hauling net to take other fish (other than a prohibited size class of fish) which are taken by the net when it is being lawfully used for taking prawns.

(4)For the purposes of this Regulation or any other instrument under the Act, a net described:
(a) in subclause (1) or in the Table to this clause may be referred to as a prawn net (hauling), and
(b) in subclause (2) may be referred to as a try net (prawns).

Table Prawn net (hauling)

1 (a) *Waters*—Tuggerah Lakes (other than that part described in Schedule 2).
(b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 140 metres.
2 (a) *Waters*—Lake Illawarra (other than that part described in Schedule 2).
(b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 220 metres.
3 (a) *Waters*—Botany Bay, Georges River, Shoalhaven River and St Georges Basin.
(b) *Description of net*—Total length not exceeding 90 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 220 metres.
4 (a) *Waters*—Lake Macquarie, together with all its inlets, bays, creeks and tributaries within the following boundaries: commencing at the southernmost extremity of Wangi Wangi Point, and bounded then by a straight line to the northernmost extremity of Galgabba or Stony Point, by the foreshore generally northerly to a point distant about 1,000 metres southerly from the southern point of the junction of the waters of the entrance with those of the lake, then by a line drawn west about 800 metres, then by a line drawn northerly to a point about 800 metres west of the western extremity of Marks Point and then by that line to Marks Point, and then by the eastern, northern and western shore of Lake Macquarie and its tributaries to the point of commencement.
(b) *Description of net*—Total length not exceeding 20 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 65 metres.
5 (a) *Waters*—Myall Lakes, Booloombayte Lakes, the Broadwater (Myall Lakes) and Smith's Lake.
(b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more

than 36 mm; length of each hauling line not exceeding 130 metres.

6 (a) *Waters*—That part of Wallis Lake included within the following boundaries: commencing at a post marked ``FD'' situated at the high water mark of Pipers Bay (the post being located by a line bearing 186 degrees from an electricity pole numbered 14808, situated at the eastern end of Pipers Bay Drive Forster), then bounded by a line bearing 217 degrees to a second post marked ``FD'' situated at the high water mark on the southern side of Big Island, then to a third post marked ``FD'' situated at the high water mark of Wallis Island, bearing 245 degrees from the second post, then southerly, westerly and northerly along the high water mark of Wallis Island to a jetty located on the western side of Wallis Island, then westerly along the length of the jetty to its end, then to a fourth post marked ``FD'', situated at the high water mark on the foreshore of Coomba Park, bearing 246 degrees and 30 minutes from the end of the jetty, then generally southerly, easterly and northerly by the high water mark of Wallis Lake to the point of commencement.

(b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 140 metres.

7 (a) *Waters*—Port Jackson (including the Parramatta and Lane Cove Rivers and Middle Harbour).

(b) *Description of net*—Total length not exceeding 60 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 130 metres.

8 (a) *Waters*—Wallagoot Lake and Blackfellows Lake.

(b) *Description of net*—Total length not exceeding 90 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 190 metres.

9 (a) *Waters*—Coila Lake and Wallaga Lake.

(b) *Description of net*—Total length not exceeding 75 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 130 metres.

10 (a) *Waters*—Tweed River and Terranora Inlet.

(b) *Description of net*—Total length not exceeding 40 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 220 metres.

11 (a) *Waters*—Any other waters (except inland waters, the Manning River and the waters described in the Table to clause 30A).

(b) *Description of net*—Total length not exceeding 40 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 130 metres.

30 Prawn net (hauling): Manning River

(1)It is lawful to use a hauling net for taking prawns in the Manning River if the net (including hauling lines) complies with the description set out in subclause (2) and the conditions set out in subclauses (3), (4) and (5) are complied with.

(2)The net must comply with the following description:

(a) The total length of the net must not exceed 40 metres.

(b) The mesh throughout must not be less than 30 mm nor more than 36 mm.

(c) The net must have no attachments except spreader poles and hauling lines.
(d) The hauling line run on the first leg to the net must not be longer than 220 metres.
(e) The hauling line running from the net to the motor boat used to assist in shooting the net must not be longer than 90 metres, and not be shorter than 60 metres.

(3)The net must be used only by the method of hauling, and must not be set or staked at any time.

(4)The net must be shot and hauled as follows:

(a) One end of the hauling line run on the first leg to the net must be:
(i) attached to a fixed point on shore, or
(ii) anchored ashore, or
(iii) attached to an unpowered boat which itself is secured on shore.
(b) The line must then be cast from a motor boat, and the net then shot.
(c) The second hauling line must then be cast (or laid out) from the motor boat as the boat moves in a circular path so as to return to a landing-up point near the shore end of the first hauling line.
(d) The second hauling line must be attached to a point on the motor boat by the line's extremity only (that is, one end must be attached to the net, and the other end secured to the boat to prevent loss of the line overboard).
(e) The second hauling line must not be towed until all of it has been shot away free of tangles, knots or anything else which would effectively shorten it.
(f) Once the shooting and hauling of the net have commenced, they must continue until the hauling lines have been removed from the water and the net landed in such depth of water, or onto the tray of the boat in such a way, as to enable any prohibited size fish taken in the net to escape.
(g) Once any prohibited size fish have been allowed to escape, the net must be fully removed from the water.

(5)The net must be operated in accordance with the determination (if any) by the fisheries officer for the time being charged with the supervision of the Manning River as to the number of commercial fishers to constitute the crew operating the net.

(6)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a prawn net (hauling).

30A Prawn net (hauling): Wallis Lake

(1)It is lawful to use a hauling net for taking prawns in the waters described in the Table to this clause if the net (including hauling lines) complies with the description set out in relation to those waters in that Table and the conditions set out in this clause are complied with.

(2)The net must be used only by the method of hauling, and must not be set or staked at any time.

(3)The net must be shot and hauled as follows:

(a) The end of the hauling line first shot (or laid out) must be attached to a stationary boat that is secured by an anchor or post during the entire haul operation. There must be no motor in or on the boat. The boat must not contain any rope other than the mooring line and a maximum of 200 metres of hauling rope.
(b) The line must then be shot (or laid out) from a motor boat, and the net then shot.
(c) The second hauling line must then be shot (or laid out) from the motor boat as the boat moves in a circular

path so as to return to the stationary boat from where the first hauling line was shot.

(d) The second hauling line must be attached to a point on the motor boat by the line's extremity only (that is, one end must be attached to the net, and the other end secured to the boat to prevent loss of the line overboard).

(e) The second hauling line must not be towed until all of it has been shot away free of tangles, knots or anything else that would effectively shorten it.

(f) Once the shooting and hauling of the net have commenced, the operation must continue until the hauling lines have been removed from the water and the net landed in such depth of water, or onto the tray of the boat in such a way, as to enable any prohibited size fish taken in the net to escape.

(g) Once any prohibited size fish have been allowed to escape, the net must be fully removed from the water.

(4)The net must be operated in accordance with the determination (if any) by the fisheries officer for the time being charged with the supervision of the waters in which the net is being used as to the number of commercial fishers to constitute the crew operating the net.

(5)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a prawn net (hauling).

Table Prawn net (hauling): Wallis Lake

1 (a) *Waters*—That part of the Coolongolook and Wallingat Rivers upstream from a line across the river from a post marked FD8 due north of the eastern extremity of Junction Point, then due south to Junction Point, then generally south by the western foreshore of the Wallingat River to a post marked FD9, then extending across the Wallingat River on a bearing of 87 degrees to a jetty situated on the north-western foreshore of Lot 1, DP 589944.

(b) *Description of net*—Total length not exceeding 40 metres; mesh throughout not less than 30 mm nor more than 36 mm; no attachments except spreader poles and hauling lines; hauling line run on the first leg to the net must not be longer than 200 metres; a marker buoy must be affixed to the hauling line every 50 metres along the line; the hauling line running from the net to the motor boat used to assist in shooting the net must not be longer than 50 metres.

2 (a) *Waters*—That part of the Wallamba River from a line drawn from the northern foreshore of the entrance of Muddy Creek to the eastern extremity of Hardy's Point upstream to the Pacific Highway Road Bridge at Nabiac.

(b) *Description of net*—Total length not exceeding 40 metres; mesh throughout not less than 30 mm nor more than 36 mm; no attachments except spreader poles and hauling lines; hauling line run on the first leg to the net must not be longer than 200 metres; a marker buoy must be affixed to the hauling line every 50 metres along the line; the hauling line running from the net to the motor boat used to assist in shooting the net must not be longer than 50 metres.

Pilchard, Anchovy & Bait	**c27**	**27 Pilchard, anchovy and bait net (hauling)** (1)It is lawful to use a hauling net for taking pilchards, anchovies, common or slimey mackerel or other fish (but not including garfish, prawns or a prohibited size class of fish) in the waters specified in the Table to this clause if the net (including hauling lines) complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only by the method of hauling. (b) The net, if used in Port Jackson, is not landed in any manner other than on to the tray of a boat. (2)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a pilchard, anchovy and bait net (hauling). **Table Pilchard, anchovy and bait net (hauling)** 2 (a) *Waters*—Port Jackson. (b) *Description of net*—Total length not exceeding 250 metres; length of each wing not exceeding 90 metres, mesh throughout not less than 80 mm; length of bunt not exceeding 60 metres, mesh throughout not less than 50 mm nor more than 65 mm; length of bag not exceeding 12 metres, mesh throughout not more than 30 mm; length of cod-end not exceeding 6 metres, mesh throughout not more than 25 mm; length of each hauling line not exceeding 125 metres.
Trumpeter Whiting	**c24**	**24 Trumpeter whiting net (hauling)** (1)It is lawful to use a hauling net for taking trumpeter whiting in the waters specified in the Table to this clause if the net (including hauling lines) complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only as a sunk net. (b) The net is used only by the method of hauling, that is, by casting and shooting the net and picking up and landing the whole of the net, including both hauling lines, without delay or interruption, or in the following manner: (i) the net and hauling lines attached to both ends of the net must be completely cast or shot from a boat, (ii) the net and hauling lines may be towed to the point of landing if the distance of the tow does not exceed the difference between the length of the hauling lines and 225 metres. (c) Any fish contained in a part of the net are immediately removed from the net on completion of the haul, or on removal of that part of the net from the water, whichever occurs first. (2)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a trumpeter whiting net (hauling). **Table Trumpeter whiting net**

		1 (a) *Waters*—That part of Port Stephens east of a line drawn from Fame Point to Soldier's Point, but excluding that part of Port Stephens and the Myall River north of a line drawn from the southern extremity of Orungall Point to the southern extremity of Myall Point. (b) *Description of net*—Total length not exceeding 275 metres; mesh of wings not less than 50 mm nor more than 65 mm, having a depth of not more than 50 meshes, bunt 50 metres of mesh not less than 30 mm nor more than 40 mm; length of each hauling line not less than 100 metres nor more than 225 metres.
Garfish	**c26**	**26 Garfish net (hauling)** (1)It is lawful to use a hauling net for taking garfish in the waters specified in the Table to this clause if the net complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only by the method of hauling. (2)It is also lawful to use a hauling net for taking any other fish (other than a prohibited size class of fish) that are taken by the net when it is being lawfully used for taking garfish. (3)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a garfish net (hauling). **Table Garfish net (hauling)** 1 (a) *Waters*—That part of Port Jackson bounded by a line westerly from Green or Laings Point to Georges Head, by a line northwesterly from the northern extremity of Middle Head to Grotto Point and by a line northeasterly from Dobroyd Point to Manly Point; that part of Broken Bay bounded by a line westerly from Box or Hawk Head to Green Point, by a line from the most eastern extremity of Middle Head to the most northern extremity of West Head and by a line northeasterly from Soldier's Point to Sand Point; that part of Botany Bay eastward of a line drawn from the western extremity of Bonna Point to the eastern extremity to the southern break wall of the Cooks River entrance; that part of Port Stephens east of a line northerly from Corlett Point to Orungall Point (excluding those parts which include Wobbegong Bay, Wobbegong Creek, Pindimar Bay, Corrie Creek, Paddy Marr's Bay and Myall River and its tributaries), generally north and northeast of a line from Orungall Point to a point being the southwestern corner of Oyster Farm No 83–361, and a line from the last mentioned point to Myall Point; that part of Jervis Bay within New South Wales, together with all the bays and beaches of that part, generally westerly from a line drawn between Point Perpendicular and Bowen Island. (b) *Description of net*—Mesh of not less than 28 mm nor more than 36 mm.

Garfish Bullring	**c25**	**25 Garfish net (bullringing)** (1)It is lawful to use a net for taking garfish in the waters specified in the Table to this clause if the net complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only between 1 February and 30 November in any year. (b) The net is used only by the method of bullringing (that is, casting the net in a circle, immediately splashing the water in the vicinity, then picking up the net, all of which is to be completed as a continuous operation). (2)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a garfish net (bullringing). **Table Garfish net (bullringing)** 1 (a) *Waters*—Clarence River (excluding inland waters). (b) *Description of net*—Total length not exceeding 375 metres; mesh throughout not less than 28 mm nor more than 45 mm. 2 (a) *Waters*—Tuggerah Lakes (excluding inland waters). (b) *Description of net*—Total length not exceeding 550 metres; mesh throughout not less than 28 mm nor more than 36 mm. 3 (a) *Waters*—All other waters (except inland waters). (b) *Description of net*—Total length not exceeding 275 metres; mesh throughout not less than 28 mm nor more than 36 mm.

Prawn seine	**c33**	**33 Seine net (prawns)** (1)It is lawful to use a seine net for taking prawns in the waters specified in the Table to this clause if the net (including hauling lines) complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is cast or shot in the following manner: (i) a hauling line (to the end of which is attached a float or basket with a marker buoy affixed) is cast or shot from a boat, (ii) that hauling line, the net and a second hauling line is then cast or shot from the boat as it moves in a circular direction resulting in the boat returning to the marker buoy. (b) The net is hauled back on to a boat in such a way that both hauling lines are hauled to the same spot on the boat so as to avoid any trawling action. (c) The hauling in of the net, once commenced, is to continue uninterrupted until all portions of the net, including the hauling lines, have been removed from the water. (d) The net, if used in Borang Lake, is used with a boat having no engine or powered by an engine having no more than 12 kilowatts of motive power. (e) There is no prawn net (hauling) on the boat from which the net is used. (2)It is also lawful to use a try net in the waters specified in the Table to this clause to facilitate the taking of prawns by the means of a seine net (prawns) if the try net complies with the following description: The net is attached to a frame not exceeding 0.6 metre in width and 0.5 metre in height, with a total length from the centre of the frame to the extremity of the net not exceeding 2 metres; mesh not less than 30 mm nor more than 36 mm. (3)For the purposes of this Regulation or any other instrument under the Act, a net described: (a) in subclause (1) or in the Table to this clause may be referred to as a seine net (prawns), and (b) in subclause (2) may be referred to as a try net (prawns). **Table Seine net (prawns)** 1 (a) *Waters*—The whole of Lake Illawarra, including its bays, inlets and creeks (but excluding that part described in Schedule 2). (b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 220 metres. 2 (a) *Waters*—The whole of Tuggerah Lakes, including its bays, inlets and creeks (but excluding that part described in Schedule 2). (b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 140 metres. 3 (a) *Waters*—The whole of Lake Macquarie south of a line drawn between Wangi Wangi Point and Galgabba Point, including its bays, inlets and creeks. (b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more

		than 36 mm; length of each hauling line not exceeding 280 metres. 4 (a) *Waters*—The whole of St Georges Basin, including all its bays, inlets and creeks. (b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 220 metres. 5 (a) *Waters*—The whole of Queen's Lake and Watson Taylors Lake, including all their respective bays, inlets and creeks. (b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 140 metres. 6 (a) *Waters*—That part of Wallis Lake and Coolongolook and Wallingat Rivers covering an area south and east of the following boundaries: commencing at the southeastern corner of Portion 71, Parish of Forster, then by a line southwesterly to the most southeastern point of Wallis Island, then along the western foreshore of Wallis Island to a point directly east of the most easterly point of Regatta Island, then west to that point (Fisheries Division BM 18), then by the eastern foreshore of Regatta Island to the most northeasterly point of that island, then north to the most easterly point of Bandicoot Island (Fisheries Division BM 23), then west along Bandicoot Island to the most northwestern point on that island, then north by a line drawn to the northern bank of Wallis Lake (Fisheries Division BM 24), then west along the northern bank of Wallis Lake to the entrance of the Coolongolook River, then west along the northern foreshore of the Coolongolook River, excluding the whole of the waters of Minimbah and Duck Gully Creeks, to a point marked by a white post due north of the eastern extremity of Junction Point, then due south from that post to the eastern extremity of Junction Point, then extending across the Wallingat River on a bearing of 175 degrees to the northern foreshore corner of the jetty situated on the northwestern foreshore of Portion 66, Parish of Wallingat (and excluding all other waters of the Wallingat River). (b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 140 metres. 7 (a) *Waters*—The whole of the Macleay River extending from the Jerseyville Bridge upstream to the Kempsey Railway Bridge. (b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 140 metres. 8 (a) *Waters*—The whole of Borang Lake. (b) *Description of net*—Total length not exceeding 80 metres; mesh throughout not less than 30 mm nor more than 36 mm; length of each hauling line not exceeding 80 metres.
Prawn net (set	**c31**	**31 Prawn net (set pocket)** (1)It is lawful to use a set pocket net for taking prawns in the waters specified in the Table to this clause if the net complies

pocket)		with the description as set out in relation to those waters in that Table and the following conditions (in addition to those in subclause (2), if applicable) are complied with: (a) The net is used only by the method of setting. (b) Hauling lines are not attached to the net. (c) The net must not be left unattended during the period it is set. (2)If the net is used in the waters of the Clarence River, the following additional conditions must be complied with: (a) The net must not be used in conjunction with a moored boat with the engine running unless the boat is licensed and is owned by a commercial fisher, or by a member of the crew of a commercial fisher, by whom or by which the net is being used. (b) A person must not use a prawn net except during the following periods: (i) on weekends during the dark (that is, the period commencing 3 days after a full moon and ending 3 days after the next new moon), (ii) from sunset to sunrise on week days between 1 August in any year and 31 May in the next year, (iii) from sunrise to sunset on week days between 1 December in any year and 31 May in the next year. (c) Except in the area known as the South Arm Rocks: (i) the inside peg of the net must not be set further than 5 metres from low-water mark, and (ii) all pegs used in connection with the net must be painted white and show at least 1 metre above high-water mark. (d) The net must be kept clear of the water when it is not in use. (3)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a prawn net (set pocket). **Table Prawn net (set pocket)** 1 (a) *Waters*—That part of the Myall River from the junction of the Myall River with the Broadwater downstream to the road bridge between Tea Gardens and Hawk's Nest. (b) *Description of net*—Total length not exceeding 20 metres; mesh throughout not less than 30 mm nor more than 36 mm. 2 (a) *Waters*—Those parts of Wallis Lake included within the following boundaries: (i) the whole of that part of Wollomba Channel in Wallis Lake within the following boundaries: commencing at the line of high-water mark at the southern point of the entrance to Wollomba River, and bounded then by a straight line southerly to the northern shore of First Island at the southeastern foreshore corner of Oyster Farm No 77–3, by the northern shore of that island easterly to its extremity, and by a straight line southeasterly to the high-water mark of the northern shore of Cockatoo Island (being a point about 180 metres southwesterly from the southeastern foreshore corner of Oyster Farm No 78–44), by the northern shore of that island generally easterly to the eastern foreshore corner of Oyster Farm No 74–138, then by a straight line northeasterly to the

			northern shore of Grassy Island at the most northerly southeastern foreshore boundary of Oyster Lease No 59–361, by the northern shore of that island easterly to its most eastern point, by a straight line north-northwesterly to the eastern extremity of Long Island, by the southern shore of that island generally westerly to its western extremity, by a straight line southwesterly to the eastern extremity of Sandy Island (such point being the most easterly foreshore corner of Oyster Farm No 74–24), by the southern shore of that island generally westerly to its most western point, and then by a straight line westerly to the point of commencement; (ii) the whole of that part of Bulmer's Channel in Wallis Lake within the following boundaries: commencing at the northeastern corner of Oyster Lease No 77–270 at the western end of Godwin Island, and bounded then by a straight line drawn west-northwesterly to the northeastern corner of Oyster Farm No 72–11 on Cockatoo Island, by the southern shore of that island generally westerly to its most western point, by a line southeasterly to the most eastern point of Northern Twin Island, by a line south-southwesterly to the most eastern foreshore corner of Oyster Farm No 76–112, by the southeastern shore of that island generally southwesterly to the most eastern foreshore corner of Oyster Farm No 68–31, by a straight line south-southwesterly to the high-water mark of Wallis Island at the westerly prolongation of the northern boundary of Portion 206, Parish of Forster, by the high-water mark of that island generally northeasterly and southeasterly to the southeastern foreshore corner of Oyster Farm No 71–360, section 1, and then by a line northeasterly to the point of commencement; (iii) the whole of that part of Stockyard Channel in Wallis Lake within the following boundaries: commencing at the northeastern corner of Oyster Lease No 77–270 at the western end of Godwin Island, and bounded then by a straight line drawn southwesterly to the southeastern foreshore corner of Oyster Farm No 71–360, section 1, on Wallis Island, by the high-water mark of that island generally southeasterly and southerly to the easterly prolongation of the southern boundary of Portion 221, Parish of Forster, by a straight line easterly to the most southerly corner of Oyster Farm No 73–253, by a straight line northeasterly to the southeastern foreshore corner of Oyster Farm No 73–216 on the southern end of Hadley Island, by the high-water mark of that island generally northwesterly and northeasterly to its northern extremity, by a line northerly to the northeastern foreshore corner of Oyster Farm No 70–245 on the southern shore of Godwin Island, by the high-water mark of that island generally westerly, northwesterly, southwesterly and northerly to the northeastern corner of Oyster Farm No 67–203, by a straight line westerly to the most western northeastern foreshore corner of Oyster Lease No 81–43, and again by the high-water mark of Godwin Island generally southerly, westerly, northerly, southwesterly and northwesterly to the point of commencement.
			(b) *Description of net*—Total length not exceeding 20 metres; mesh throughout not less than 30 mm nor more than 36 mm.
			3 (a) *Waters*—The whole of Queen's Lake Entrance within the following boundaries: commencing at the northeastern corner of Oyster Farm No 81–179, and bounded then by a line northerly to the

			western bank of Queen's Lake Entrance, by the western bank generally northwesterly to the western foreshore corner of Oyster Farm No 83–95, by a line southwesterly to the eastern foreshore corner of Oyster Farm No 67–6, by the foreshore generally southwesterly to the eastern foreshore corner of Oyster Farm No 70–198, by a line drawn northeasterly through the most westerly point of an island at the western entrance to Queen's Lake Entrance, to the northern bank of Queen's Lake Entrance, then easterly and southerly, following the eastern bank of Queen's Lake Entrance generally southeasterly to a point east of the northeastern corner of Oyster Farm No 81–179, and then by a line to the point of commencement.
		(b)	*Description of net*—Total length not exceeding 20 metres; mesh throughout not less than 30 mm nor more than 36 mm.
		4 (a)	*Waters*—That part of Watson Taylor Lake within the following boundaries: commencing at the northern point of Benson Inlet, then north along the eastern shore of Watson Taylor Lake to the northwestern corner of Portion 150, Parish of Camden Haven, County of Macquarie, then westerly to the northeast corner of Portion 70, Parish of Camden Haven, County of Macquarie, then southwest along the shore of Camden Haven Inlet and Moore's Island to the southwest tip of Moore's Island, then southwest to the northern corner of Grassy Island to the island's most southerly point, and then to the point of commencement.
		(b)	*Description of net*—Total length not exceeding 20 metres; mesh throughout not less than 30 mm nor more than 36 mm.
		5 (a)	*Waters*—Those parts of Tuggerah Lakes and Lake Illawarra described in Schedule 3.
		(b)	*Description of net*—Total length not exceeding 5 metres; mesh throughout not less than 30 mm nor more than 36 mm.
		6 (a)	*Waters*—That part of Cathie Creek within the following boundaries: the whole of that part of Cathie Creek north of a line bearing 110 degrees across the creek from a post (marked F^D) on the western bank of the creek to a Ti-tree (marked F^D) on the eastern bank of the creek, situated about 500 metres upstream from the Pacific Ocean.
		(b)	*Description of net*—Total length not exceeding 10 metres; length of pocket, from cod-end to cork line, not exceeding 10 metres; mesh throughout not less than 30 mm nor more than 36 mm.
		7 (a)	*Waters*—That part of Sussex Inlet within the following boundaries: the whole of the waters of that part of Sussex Haven and the adjacent waters of the Pacific Ocean within the following boundaries: commencing at the southeastern corner of Reserve 75,429 for Public Recreation notified in the Gazette on 14 November 1952, and bounded then by a line drawn easterly to the point of junction of the eastern shore of Sussex Haven with the shore of the Pacific Ocean, by a line parallel to the western shore of the entrance to Sussex Haven to a point east of the southernmost extremity of that entrance, by a line westerly, and then by that shore northwesterly to the point of commencement.
		(b)	*Description of net*—Total length not exceeding 5 metres; mesh throughout not less than 30 mm nor more than 36 mm.

		8 (a) *Waters*—Limeburners Creek from its confluence with the Hastings River upwards to its source. (b) *Description of net*—Total length not exceeding 20 metres; mesh throughout not less than 30 mm nor more than 36 mm. 9 (a) *Waters*—The whole of the main arm of the Clarence River seawards of the Ulmarra Ferry Crossing (excluding all creeks, tributaries, effluents and secondary or back channels of that river, that part of the left or northern bank between Brown's or Goodwood Island Wharf and the new (or eastern) opening in the Iluka Boat Harbour training wall and that part of the river which lies seawards of a line drawn from the north-westernmost corner of Portion 64, Parish of Taloumbi, to the north-westernmost corner of Freeburn Island and generally south of Freeburn Island and the main training wall that extends seawards from the easterly extremity of Freeburn Island). (b) *Description of net*—Total length not exceeding 20 metres; mesh throughout not less than 30 mm nor more than 36 mm. 10 (a) *Waters*—Inlet cooling water canal to Munmorah Power Station. (b) *Description of net*—Total length not exceeding 20 metres nor less than 18 metres; mesh throughout not less than 25 mm nor more than 30 mm. 11 (a) *Waters*—Smiths Lake. (b) *Description of net*—Total length not exceeding 63 metres; length of pocket, bunt or bag not exceeding 9 metres; mesh throughout not less than 30 mm nor more than 36 mm; wings of net to be set at such an angle that the distance between the ends of the net does not exceed 45 metres.
Prawn running net	**c32**	**32 Prawn running net** (1)It is lawful to use a running net for taking prawns in the waters specified in the Table to this clause if the net complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) If the net is not staked, the net is used only by the method of casting or shooting the net and picking up and landing the whole of the net into a boat in the manner known as ``running the net'' within 1 hour of the commencement of the casting or shooting. (b) In the case of a net that is being used for taking prawns in the waters of Lake Illawarra: (i) the net must be operated by at least 2 commercial fishers, and (ii) the net must not be operated by, or with the assistance of, any commercial fisher who is also operating, or assisting in the operation of, any other such net, and (iii) the net must not be staked (that is, the net must be used only by the method referred to in paragraph (a)). (c) In the case of a staked net: (i) the net is not set earlier than 1 hour before sunset, and (ii) the net is not set within 10 metres of the high water mark, and

		(iii) the net is not staked by means of a star or 3 sided stake, and (iv) no stakes are left in the water in the period between sunrise and 1 hour before sunset. (2)It is also lawful to use a running net to take other fish (other than a prohibited size class of fish) which are taken by the net when it is being lawfully used for taking prawns. (3)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a prawn running net. **Table Prawn running net** 1 (a) *Waters*—Conjurong or Conjola Lake, Burrill Lake, Wallaga Lake, Tuross Lake, Durras Water, Cuttagee Lake, Middle Lake, Lake Wollumboola, Swan Lake, Coila Lake, Corunna Lake, Tilba Lake, Mummuga or Dalmeny Lake, Lake Birroul or Brou Lake, including all their respective bays, inlets and creeks. (b) *Description of net*—Total length not exceeding 75 metres; mesh throughout not less than 25 mm nor more than 36 mm. 2 (a) *Waters*—St Georges Basin, Lake Macquarie, Tuggerah Lakes and Lake Illawarra, including all their respective bays, inlets and creeks (but excluding those parts of Tuggerah Lakes and Lake Illawarra described in Schedule 2). (b) *Description of net*—Total length not exceeding 140 metres; mesh throughout not less than 25 mm nor more than 36 mm.
Push or scissor prawn net	**c49**	**49 Push or scissors net (prawns)** (1)It is lawful to use a push or scissors net for taking prawns in the waters specified in the Table to this clause if the net complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only as a hand implement and is not staked or set, or joined or placed together with any other net. (b) The net is continuously propelled and not used as a stationary net. (c) The net is operated only by 1 person without assistance from any other person. (d) Only 1 net is used by a person at any one time. (2)It is also lawful to use a push or scissors net to take other fish (other than a prohibited size class of fish) that are taken by the net when it is being lawfully used for taking prawns. (3)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a push or scissors net (prawns). **Table Push or scissors net (prawns)** 1 (a) *Waters*—Any waters (other than inland waters).

		(b) *Description of net*—Net attached to a scissors-type frame; length of lead or bottom line between the lower extremities of the poles not exceeding 2.75 metres; mesh not less than 30 mm nor more than 36 mm.
Hand hauled prawn net	**c48**	**48 Hand-hauled prawn net** (1)It is lawful to use a hand-hauled net for taking prawns in the waters specified in the Table to this clause if the net complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is not staked or set, or joined or placed together with any other net. (b) The net is continuously and manually propelled and not used as a stationary net. (c) The net is not attached to a hauling line. (2)It is also lawful to use a hand-hauled net to take other fish (other than a prohibited size class of fish) that are taken by the net when it is being lawfully used for taking prawns. (3)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a hand-hauled prawn net. **Table Hand-hauled prawn net** 1 (a) *Waters*—Any waters (other than inland waters). (b) *Description of net*—Total length not exceeding 6 metres; mesh throughout not less than 30 mm nor more than 36 mm.
Hand gathering	**c73**	**73 Taking of yabby, worms, pipis etc** (1)A person must not take or attempt to take any yabby (pink nippers), squirt worms, blood worms, beach worms, pipis or any other intertidal invertebrate from a rock platform by any method other than by use of a single blade knife with a blade longer than it is wide, or from any other place by any method other than by use of: (a) a pump or similar device having a barrel or cylinder with a diameter of not more than 85 mm, or (b) a tube or cylinder (whether or not fitted with a cap at one end) with a length of not more than 250 mm and a diameter of not more than 85 mm, or (c) a single blade knife with a blade longer than it is wide, or (d) a spade or fork (except in a seagrass bed, mangrove or saltmarsh area or for the taking of pipis), or (e) pliers. Maximum penalty: 25 penalty units. (2)Subclause (1) does not prevent a person from taking or attempting to take any fish by the method of hand picking (whether or not while wearing a glove).

Handlining	**c65**	**65 Set lines and hand held lines** (1)A person (other than a commercial fisher) must not for the purpose of taking or attempting to take fish in any waters (other than inland waters): (a) set, use or lift more than 4 hand held lines, or (b) set, use or lift any hand held line with more than 3 hooks or 3 gangs of hooks attached or with more than 3 treble hooks attached to a lure, or (c) set, use or lift any hand held line with a gang of hooks which comprises more than 5 hooks attached. Maximum penalty: 100 penalty units. (2)Subclause (1) (b) does not apply to a person who, for the purpose of taking or attempting to take fish in any ocean waters or estuarine waters, sets, uses or lifts not more than 1 hand held line with not more than 6 hooks attached, if: (a) a lure is fixed to each hook, and (b) the line, when being used for the purpose of taking or attempting to take fish, is not left unattended and is used only by the method of jigging. (3)A commercial fisher must not for the purpose of taking or attempting to take fish in any ocean waters or estuarine waters: (a) set, use or lift more than 10 set lines, or (b) set, use or lift any set line with more than 6 hooks attached. Maximum penalty: 100 penalty units. (4)Subclause (3) does not apply to ocean waters more than 3 nautical miles from coastal baselines. (5)Subclause (3) (b) does not apply to a commercial fisher who, for the purpose of taking shark only, in ocean waters south of a line drawn due east from the northern point of the entrance to the Moruya River, sets, uses or lifts a line with more than 6 hooks attached to it if each such hook is not smaller than 9/0. (6)A person must not for the purpose of taking fish (other than Atlantic salmon or trout) set, use or lift in any inland waters a set line or hand held line except as permitted by the following: (a) in the case of waters flowing generally in a westerly direction in or away from the Great Dividing Range—up to 4 set lines each with no more than 1 hook attached and 1 hand held line with no more than 2 hooks attached or 3 treble hooks attached to a lure are permitted, (b) in the case of waters flowing generally in an easterly direction in or away from the Great Dividing Range—up to 2 hand held lines each with no more than 2 hooks attached or 3 treble hooks attached to a lure are permitted but no set lines are permitted, (c) in the case of the backed up waters of any dam or impoundment—up to 2 hand held lines each with no more than 2 hooks attached or 3 treble hooks attached to a lure are permitted but no set lines are permitted. Maximum penalty: 100 penalty units. (7)In this clause: ***gang of hooks*** means a group of hooks, each of which is attached to, and in direct contact with, at least 1 other of those hooks.

		hand held line means a rod and line or handline. **Note.** Section 25 of the Act also makes it an offence for a person to be in possession of any fishing gear in, on or adjacent to any waters if the use by that person of that fishing gear for taking fish from those waters is, at that time, prohibited by or under the Act.
Dip or scoop net (prawns)	**c50**	**50 Dip or scoop net (prawns)** (1)It is lawful to use a dip or scoop net for taking prawns in the waters specified in the Table to this clause if the net complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used as a hand implement only and not staked or set, or joined or placed together with any other net. (b) Only 1 net is used by a person at any one time. (2)It is also lawful to use a dip or scoop net to take other fish that are taken by the net when it is being lawfully used for taking prawns. (3)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a dip or scoop net (prawns). **Table Dip or scoop net (prawns)** 1 (a) *Waters*—Any waters (other than inland waters). (b) *Description of net*—Net attached to a frame, hoop or ring not exceeding 0.6 metre in its greatest diameter, with a handle of not more than 1.2 metres in length, with a total length from the centre of the plane of the frame, hoop or ring to the extremity of the net not exceeding 1.25 metres; mesh not less than 20 mm.
Lampara net	**c40**	**40 Lampara net** (1)It is lawful to use a lampara net for taking fish (other than garfish, prawns or a prohibited size class of fish) in the waters specified in the Table to this clause if the net complies with the description as set out in relation to those waters in that Table and the following conditions are complied with: (a) The net is used only between sunset and sunrise on any day. (b) The net may be used only if it is aided by an attracting light. (2)For the purposes of this Regulation or any other instrument under the Act, a net described in this clause may be referred to as a lampara net. **Table Lampara net** 1 (a) *Waters*—Any waters (other than inland waters). (b) *Description of net*—Total length not exceeding 275 metres (except in respect of a net used in ocean waters

		or on sea beaches, in which case the length of net is not described); length of bunt or bag not exceeding 20 metres with a mesh not less than 13 mm throughout; length of throat or apron not exceeding 20 metres with a mesh not less than 50 mm throughout; length of wings not exceeding 110 metres with a mesh not less than 100 mm throughout.

APPENDIX C

APPENDIX C1 ESTUARY-BASED CONTROLS

Name of Estuary	Gear proposed	Details
Tweed River *(Including Terranora & Cobaki broadwaters)*	450 metre hauling net (longer net than standard hauling net)	Wings of 80mm mesh, bunt 90 metres maximum or up to 1/4 total length of net (whichever is lesser), made of a centre piece between 25 and 50 metres of mesh between 30mm and 50mm, remainder of bunt up to 50 metres in length of mesh not less than 50mm. May only be used in parts of the estuary. Weekend closure
Tweed River weekend closure: 6am Saturday to 6am Monday	375 metre hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend closure applies.
	40 metre prawn hauling net (non standard hauling lines)	Mesh between 30mm and 36mm and hauling lines up to 130 metres or 220 metres depending on what part of the estuary the net is being used in. May only be used in parts of the estuary. Weekend closure applies.
	275 metre garfish net (bullringing)	Mesh throughout between 28mm and 36mm. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. . May only be used in parts of the estuary. Weekend closure applies.
	725 metre meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend closure applies. Not permitted between sunrise and sunset in some parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours. May only be used by the method of splashing in some parts of the estuary between 1 October and 31 May in the ensuing year. May only be used by the method of splashing in some parts of the estuary between 15 May and 31 August in any year.
	Bait net	25 metre net made of mesh between 13mm and 25mm and hauling lines not exceeding 20 metres. Weekend closure applies. May only be used in parts of the estuary.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Weekend closure applies.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Cudgen Lake	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Hoop or lift net	Standard dimensions

Name of Estuary	Gear proposed	Details
Cudgen Lake (cont)	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Cudgera Creek	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Hoop or lift net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Mooball Creek	Hand hauled prawn net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Push or scissor net	Standard dimensions
	Hoop or lift net	Standard dimensions
	Fish trap.	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Brunswick River *Brunswick River weekend closure: 8am Saturday to 8am Monday.*	Hand hauled prawn net	Standard dimensions. Weekend closure applies.
	Dip or scoop net	Standard dimensions. Weekend closure applies.
	Push or scissor net	Standard dimensions. Weekend closure applies.
	Hoop or lift net	Standard dimensions. Weekend closure applies.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Belongil Creek	Hand hauled prawn net	Standard dimensions. For taking prawns only.
	Dip or scoop net	Standard dimensions. For taking prawns only.
	Hoop or lift net	Standard dimensions. For taking prawns only.
	Landing net	Standard dimensions. For taking prawns only.
	Push or scissor net	Standard dimensions. For taking prawns only.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Tallow Creek	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions

Name of Estuary	Gear proposed	Details
Tallow Creek (cont.)	Hoop or lift net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Broken Head Creek	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Richmond River *(incl. North Creek)*	25 metre bait net	Mesh between 13mm and 25mm, hauling lines not exceeding 20 metres. May only be used in parts of the estuary. Weekend and public holiday closure applies. Not permitted between 6am and 6pm on any day and between 6am Saturday and 6am Monday in some parts of the estuary. Not permitted in some parts of the estuary during the months of December, January, February and March. Not permitted in some parts of the estuary during the months March, April, May, June and July.
	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. Not permitted between 6am and 6pm on any day and between 6am Saturday and 6am Monday in parts of the estuary. Not permitted in some parts of the estuary during the months of December, January, February and March. Not permitted in some parts of the estuary during the months March, April, May, June and July.
Richmond River weekend and public holiday closure: 8am Saturday to 8am Monday, or 8am on any NSW/QLD school holiday to 8am following day.	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Weekend and public holiday closure applies. May only be used in parts of the estuary. Not permitted between 6am and 6pm on any day and between 6am Saturday and 6am Monday in parts of the estuary. Not permitted in some parts of the estuary during the months of December, January, February and March Not permitted in some parts of the estuary during the months March, April, May, June
	Prawn net (hauling)	Standard dimensions May only be used in parts of the estuary. Weekend and public holiday closure applies. May not be used between 6am and 6pm on any day and between 6am Saturday and 6am Monday in parts of the estuary. Not permitted in some parts of the estuary during the months of December, January, February and March. Not permitted in some parts of the estuary during the months March, April, May, June and July.

Name of Estuary	Gear proposed	Details
Richmond River (cont)	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. Not permitted between 6am and 6pm on any day or between 6am Saturday and 6am Monday in parts of the estuary. May only be used by the method of splashing in some parts of the estuary The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours. May only be used be the method of splashing in some parts of the estuary between 15 May and 31 August. May only be used by the method of splashing in some parts of the estuary during the months of December, January, February and March. Not permitted in some parts of the estuary during the months March, April, May, June and July.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Not permitted in parts of the estuary during the months March, April, May, June and July.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary. Not permitted between 6am and 6pm on any day and between 6am Saturday and 6pm Monday in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary. Not permitted between 6am and 6pm on any day and between 6am Saturday and 6pm Monday in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Evans River	Hoop or lift net	Standard dimensions.
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. Only one crab trap may be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Jerusalem Creek.	Hand hauled prawn net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Push or scissor net	Standard dimensions
	Hoop or lift net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Clarence River *(incl. Lake Wooloweyah)*	500 metre hauling net Permitted in some parts of the estuary (longer than standard)	Wings of 80mm mesh, bunt 90 metres maximum or up to 1/4 total length of net (whichever is lesser), made up of a centre piece between 25 metres and 50 metres in length of mesh between 30mm and 50mm, remainder of bunt up to 50 metres in length of mesh not less than 50mm. May only be used in parts of the estuary. Weekend closure applies except for the period 1 April to 31 August. Limited to one shot per day.
Clarence River weekend closure: 8am Saturday to 8am Monday	450 metre Hauling net Permitted in some parts of the estuary (longer than standard)	Wings of 80mm mesh, bunt 90 metres maximum or up to 1/4 total length of net (whichever is lesser), made up of a centre piece between 25 and 50 metres in length made of mesh between 30mm and 50mm. The remainder of bunt up to 50 metres in length of mesh not less than 50mm. May only be used in some parts of the estuary. Weekend closure applies except for the period 1 April to 31 August.
	375 metre Garfish net (bullringing) (Longer than standard net).	Mesh throughout between 28mm and 45mm. May only be used in parts of the estuary. Weekend closure applies. May only be used between 1 February and 30 November in any year. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	20 metre prawn net (set pocket)	Mesh between 30mm and 36mm. May only be used in parts of the estuary and a weekend closure applies except for the dark of the moon (the period 3 days after the full moon to 3 days after the new moon).
	1450 metre meshing net (longer than standard net)	Mesh not less than 80mm. May only be used in parts of the estuary. The net must be set in a semi-circle and retrieving of the net must commence within 45 minutes. May only be used by the method of splashing during the months of December and January in any year. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours. In some parts of the estuary the net may only be used by the method of splashing between 15 May and 31 August in each year. In some parts of the estuary the net may only be used by the method of splashing at all times. Weekend closure applies.
	725 metre meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours. In some parts of the estuary the net may only be used by the method of splashing between 15 May and 31 August in each year. In some parts of the estuary the net may only be used by the method of splashing at all times. Weekend closure applies.
	Hoop or lift net	Standard dimensions.
	Hand hauled prawn net	Standard dimensions.
	Push or scissor net	Standard dimensions.
	Dip or scoop net	Standard dimensions.
	Fish trap	Standard dimensions. In some parts of the estuary, fish traps are only permitted between 1 May and 31 August in each year.

Name of Estuary	Gear proposed	Details
Clarence River (cont.)	Crab trap	Standard dimensions. May only be used in some parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary. In some parts of the estuary the trap may only be used within 5 metres of the shore.
Sandon River	Meshing net	Standard dimensions. A permit (valid until 29 September 2001) authorises the use of this net in these waters by 1 nominated commercial fisher. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours.
	Garfish (bullringing) net	Standard dimensions. A permit (valid until 29 September 2001) authorises the use of this net in these waters by 1 nominated commercial fisher.
	Eel trap	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
Wooli Wooli River	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Station Creek	Hand hauled prawn net	Standard dimensions
	Hoop or lift net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Station Creek (cont.)	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Corindi River	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Arrawarra Creek	Dip or scoop net	Standard dimensions – for taking prawns only
	Hoop or lift net	Standard dimensions – for taking prawns only
	Hand hauled prawn net	Standard dimensions – for taking prawns only
Darkum Creek	Dip or scoop net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Hoop or lift net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Woolgoolga Lake	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Hearns Lake	Hoop or lift net	Standard dimensions
	Hand hauled prawn Net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Moonee Creek	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap.	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Coffs Harbour Creek	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Boambee Creek	Dip or scoop net	Standard dimensions. For taking prawns only.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Bonville Creek (incl Pine Creek)	Dip or scoop net	Standard dimensions. For taking prawns only.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Bellinger River *(incl. Kalang River)*	Hauling net	Standard dimensions. Weekend closure applies.
Bellinger River weekend closure: 6pm Friday to 6pm Sunday	Garfish net (bullringing)	Standard dimensions. Weekend closure applies. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions.
		Standard dimensions. Weekend closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours.
	Meshing net	Standard dimensions. Weekend closure applies.
	Hoop or lift net	Standard dimensions. Weekend closure applies.

Name of Estuary	Gear proposed	Details
Bellinger River (cont.)	Hand hauled prawn net	Standard dimensions. Weekend closure applies.
	Push or scissor net	Standard dimensions. Weekend closure applies.
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Dalhousie Creek	275 metre garfish bull-ringing net.	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	40 metre prawn net (hauling)	Standard dimensions
	725 metre meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Oyster Creek	275 metre garfish bull-ringing net.	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	40 metre prawn net (hauling)	Standard dimensions
	725 metre meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions

Name of Estuary	Gear proposed	Details
Oyster Creek (cont.)	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Deep Creek *Deep Creek weekend and public holiday closure:6pm Friday to 6pm Sunday, or 6pm Monday if Monday is a public holiday. 6am to 6pm on any other public holiday.*	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Meshing net	Standard dimensions. Weekend and public holiday closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours.
	Hoop or lift net	In some parts of the estuary the net may only be used by the method of splashing between 15 May and 31 August in any year. May only be used by the method of splashing in parts of the estuary at all times.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Nambucca River *Nambucca River weekend and public holiday closure:6am Saturday to 6am Monday, or 6am to 6pm on any public holiday.*	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours. May only be used by the method of splashing in parts of the estuary between 15 May and 31 August in any year. May only be used by the method of splashing in parts of the estuary at all times.

Name of Estuary	Gear proposed	Details
Nambucca River (cont.)	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. A maximum of 5 nets may only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary. May only be used to take prawns in some parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Macleay River	140 metre prawn seine net.	Mesh between 30mm and 36mm and hauling lines up to 140 metres. May only be used in parts of the estuary. Weekend and public holiday closure applies. Not permitted in parts of the estuary between 20 December and 31 January in the ensuing year.
Macleay River weekend and public holiday closure:6pm Friday to 6pm Sunday. 6am to 6pm on any Monday that is a public holiday	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. Weekend and public holiday closure applies. Not permitted in parts of the estuary between 20 December and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary Weekend and public holiday closure applies. Not permitted in parts of the estuary between 20 December and 31 January in the ensuing year.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. Not permitted in parts of the estuary between 20 December and 31 January in the ensuing year. May only be used by the method of splashing during the months of December and January in any year. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours.May only be used by the method of splashing between 1 May and 31 August in some parts of the estuary. May only be set for a maximum of 2 hours between 1 May and 31 August in some parts of the estuary.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Not permitted in parts of the estuary between 20 December and 31 January in the ensuing year.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary. Not permitted in parts of the estuary between 20 December and 31 January in the ensuing year.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary. Not permitted in parts of the estuary between 20 December and 31 January in the ensuing year.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.

Name of Estuary	Gear proposed	Details
Macleay River (cont.)	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
South West Rocks Creek	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Saltwater Creek	40 metre prawn net (hauling)	Standard dimensions
	725 metre meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Korogoro Creek	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Killick River	Hand hauled prawn net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Hastings River	450 metre hauling net (longer than standard hauling net).	Wings of 80mm mesh, bunt 90 metres maximum or up to 1/4 total length of net (whichever is lesser), made up of a centre piece between 25 and 50 metres length of mesh between 30mm and 50mm. The remainder of the bunt up to 50metres in length of mesh not less than 50mm. May only be used in parts of the estuary. Weekend and public holiday closure applies.

Name of Estuary	Gear proposed	Details
Hastings River (cont.) Hastings River weekend and public holiday closure:6pm Friday to 6pm Sunday. 6am to 6pm on any public holiday between 1 October to 31 March. 6am to 6pm on Easter long weekend.	20 metre prawn set pocket net.	Mesh between 30mm and 36mm. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Weekend and public holiday closure
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. May only be used in some parts of the estuary by the method known as splashing. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours
	Bait net	May only be used by the method of splashing in some parts of the estuary between 1 September and 31 May in the ensuing year. May only be used by the method of splashing in some parts of the estuary between 31 May and 31 August each year.
	Hoop or lift net	25 metre net made of mesh between 13mm and 25mm and hauling lines not exceeding 20 metres. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Lake Innes	500 metre hauling net (longer than standard hauling net)	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length of mesh between 30mm and 50mm. The remainder of the bunt up to 50 metres in length of mesh not less than 50mm. Limited to one shot per day.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, May, September, October and November. The net may be set between sunset and sunrise during the months of June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions

Name of Estuary	Gear proposed	Details
Lake Innes (cont.)	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Lake Cathie	10 metre prawn set pocket net	Total length not exceeding 10 metres and length from bunt to corkline not exceeding 10 metres. Mesh between 30mm and 36mm. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions
	Hand hauled prawn Net	Standard dimensions
	Hoop or lift net	Standard dimensions
	Push or scissor net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Camden Haven River *(incl. Queens Lake and Watson Taylor Lake)*	500 metre hauling net (Queens Lake and Watson Taylor Lake only) longer than standard hauling net	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length of mesh between 30mm and 50mm. The remainder of the bunt up to 50 metres in length of mesh not less than 50mm. May only be used in parts of these estuary. Limited to 1 shot per day. Weekend closure applies.
Camden Haven River weekend and public holiday closure: December to March is 6pm Friday to 7pm Sunday, April to August is 6pm Friday to 4pm Sunday, September to November is 6pm Friday to 6pm Sunday. Sunrise to sunset on any other public holiday	20 metre prawn set pocket net.	Mesh between 30mm and 36mm. May only be used in some parts of the estuary. May not be used between 1 June and 31 August in any year.
	140 metre prawn seine net.	Mesh between 30mm and 36mm and hauling lines up to 140 metres. May only be used in some parts of the estuary. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. May only be used in some parts of the estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Weekend and public holiday
	Prawn net (hauling)	Standard dimensions. May only be used in some parts of the estuary. Weekend and public holiday closure applies.
	Meshing net	Standard dimensions. May only be used in some parts of the estuary. May only be used by the method of splashing.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. May not be used to take prawns between 1 June and 31 August in any year.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.

Name of Estuary	Gear proposed	Details
Camden Haven River (cont.)	Push or scissor net	Standard dimensions. May only be used in parts of the estuary. May not be used for taking prawns between 1 June and 31 August in any year.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions.
	Crab trap	Standard dimensions.
	Eel trap	Standard dimensions.
Manning River There is a proposal to move from prawn hauling from a shore based to a mid-stream fishery by September 2001. This may see a *Manning River weekend and public holiday closure: December to March is 6pm Friday to 7pm Sunday, April to August is 6pm Friday to 4pm Sunday, September to November is 6pm Friday to 6pm Sunday. Sunrise to sunset on any public holiday*	40 metre prawn hauling net (varies from standard prawn hauling net in length of hauling lines)	Mesh between 30mm and 36mm and one hauling line up to 220 metres and the other hauling line between 60 metres and 90 metres. May only be used in parts of the estuary. Not permitted to take prawns between 1 June and 31 August in any year. Weekend and public holiday closure applies.
	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary. Not permitted to be used to take prawns between 1 June and 31 August in any year
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap.	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Khappinghat Creek	Fish trap	Standard dimensions.
	Crab trap	Standard dimensions.
	Eel trap	Standard dimensions.

Name of Estuary	Gear proposed	Details
Wallis Lake	500 metre hauling net (longer than standard hauling net).	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length of mesh between 30mm and 50mm. The remainder of the bunt up to 50 metres in length of mesh not less than 50mm. May only be used in parts of the estuary. Limited to 1 shot per day. Weekend closure applies.
	140 metre prawn hauling net (longer than standard prawn hauling net).	Mesh between 30mm and 36mm and hauling lines up to 140 metres. May only be used in parts of the estuary. Not permitted to take prawns between 1 June and 31 August in any year.Weekend closure applies.
	40 metre prawn hauling net (varies from standard prawn hauling net in length of hauling lines)	Mesh between 30mm and 36mm and one hauling line up to 200 metres and the other hauling line up to 50 metres. May only be used in parts of the estuary. Not permitted to take prawns between 1 June and 31 August in any year. Weekend closure applies.
	20 metre prawn set pocket net.	Mesh between 30mm and 36mm. 32mm minimum mesh in codend. Knotless mesh only to be used in the codend of the net. May only be used in parts of the estuary.
	140 metre prawn seine net.	Mesh between 30mm and 36mm and hauling lines up to 140 metres. May only be used in parts of the estuary. Not permitted to take prawns between 1 June and 31 August in any year. Weekend closure applies. Subject to these conditions, permits (valid until 30 June 2001) issued to fishers endorsed to use this net authorise them to use it by the method of clover leafing.
	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend closure applies.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. Weekend closure applies.
Wallis Lake weekend closure: November to February is 4pm Friday to 6pm Sunday. March, April, September and October is 4pm Friday to 4pm Sunday.	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Flathead net	Standard dimensions. Standard dimensions. New dimensions and controls for this net will be determined with the benefit of data from the mesh selectivity research program which will be finalised in 2001. Please see the section on flathead nets in part 2 for further details).
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Weekend closure applies.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions. A maximum of 20 traps may be used at any one time in parts of the estuary.
	Eel trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Smiths Lake	140 metre prawn hauling net (longer than standard prawn hauling net).	Mesh between 30mm and 36mm and hauling lines up to 130 metres. Not permitted to take prawns between 1 June and 31 August in any year. Weekend and public holiday closure applies.
	63 metre set pocket prawn net.	Bunt up to 9 metres. Mesh between 30mm and 36mm Distance between wings not to exceed 45 metres.
Smiths Lake weekend closure: November to February is 4pm Friday to 6pm Sunday or 6pm Monday if Monday is a public holiday, or 4am Friday to 6pm Sundy if Friday is a public holiday. Not permitted between 4am and 6pm on any other public holiday during that period. March, April, May, September and October is 4pm Friday to 4pm Sunday or 4pm Monday if Monday is a public holiday, or 4am Friday to 4pm Sundy if Friday is a public holiday.	500 metre hauling net (longer than standard hauling net).	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. The remainder of the bunt up to 50metres in length made up of mesh not less than 50mm. Weekend and public holiday closure applies. Limited to one shot per day.
	Prawn net (seine)	A permit has been issued (valid until 30 June 2001) which authorises commercial fishers with the appropriate endorsement to use a prawn seine net in parts of the estuary. Not permitted to take prawns between 1 June and 31 August in any year. Maximum length of 140 metres of mesh between 30mm and 36mm and hauling lines of a maximum length of 140 metres. The permit further restricts the use of this net to parts of the estuary during the use of prawn set pocket nets. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Weekend and public holiday closure applies.
	Meshing net	Standard dimensions. Weekend and public holiday closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Flathead net	Standard dimensions. New dimensions and controls for this net will be determined with the benefit of data from the mesh selectivity research program which will be finalised in 2001. Please see the section on flathead nets in part 2 for further details).
	Hoop or lift net	Standard dimensions. Weekend and public holiday closure applies.
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Myall Lakes	500 metre hauling net (longer than standard hauling net)	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. The remainder of the bunt up to 50metres in length made up of mesh not less than 50mm. Limited to one shot per day.

Name of Estuary	Gear proposed	Details
Myall Lakes (cont.)	140 metre prawn hauling net (longer than standard prawn hauling net).	Mesh between 30mm and 36mm and hauling lines up to 130 metres. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
		Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Myall River	20 metre prawn set pocket net	Mesh between 30mm and 36mm. May only be used in parts of the estuary.
	275 metre Trumpeter whiting net	Wings with mesh between 50mm and 65mm not more than 50 meshes deep, bunt 50 metres of mesh between 30mm and 40mm and hauling lines between 100 metres and 225 metres. May only be used in parts of the
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary.
	Hauling net	Standard dimensions. May only be used in parts of the estuary.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Hauling net	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. In some parts, the net may only be used by the method of splashing between 15 May and 31 August in any year. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. May only be used by the method of splashing at all times in some parts of the estuary.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.

Name of Estuary	Gear proposed	Details
Myall River (cont.)	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Lake Booloombayt	500 metre hauling net (longer than standard hauling net)	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. The remainder of the bunt up to 50metres in length made up of mesh not less than 50mm. May only be used in parts of the estuary. Limited to one shot per day.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary.
	140 metre prawn hauling net (longer than standard prawn hauling net)	Mesh between 30mm and 36mm and hauling lines up to 130 metres. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Port Stephens	Hauling net	Standard dimensions. May only be used in parts of the estuary. Not permitted to take Sea Mullet between 1 November and 31 January in the ensuing year.
	275 metre Trumpeter whiting net.	Wings with mesh between 50mm and 65mm not more than 50 meshes deep, bunt 50 metres of mesh between 30mm and 40mm and hauling lines between 100 metres and 225 metres. May only be used in parts of the
	Garfish hauling net	Mesh between 28mm and 36mm. May only be used in parts of this estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.

Name of Estuary	Gear proposed	Details
Port Stephens (cont.)	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions. A maximum of 20 crab traps may be used at any one time in parts of the estuary.
	Eel trap	Standard dimensions
	Hauling net	Standard dimensions
Karuah River	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Meshing net	Standard dimensions. May only be used by the method of splashing during the months of December and January in any year. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August
	Hoop or lift net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Hunter River	Hauling net	Standard dimensions. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary. Not permitted between 1 June and 30 November in any year.

Name of Estuary	Gear proposed	Details
Hunter River (cont.)	Meshing net	Standard dimensions. May only be used in parts of the estuary. In some parts of the estuary the net must be no more than 200 metres long (shorter than standard meshing net) of 80mm mesh and no more than 33 meshes deep. This net must be set with the headline floating and must be used by the method of splashing. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Lake Macquarie	20 metre prawn hauling net (shorter than standard prawn hauling net).	Mesh between 30mm and 36mm and hauling lines up to 65 metres. May only be used in parts of the estuary. Weekend closure applies.
	140 metre prawn running net.	Mesh between 25mm and 36mm. Weekend closure applies.
	Prawn seine net.	Maximum length of 140 metres. Mesh between 30mm and 36mm and hauling lines up to 280 metres. May only be used in parts of the estuary. May only be used in parts of the estuary. Weekend closure applies. Subject to these conditions, permits (valid until 30 June 2001) issued to fishers endorsed to use this net authorise them to use it by the method of clover leafing
	500 metre hauling net (longer than standard hauling net)	Wings 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. The remainder of the bunt up to 50 metres in length made up of mesh not less than 50mm. May only be used in parts of the estuary. Weekend closure applies. Limited to one shot per day.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Weekend closure applies.
Lake Macquarie weekend closure: 4pm Friday to 4pm Sunday	Meshing net	Standard dimensions. May only be used in parts of the estuary. Not permitted to be used by the method of splashing in parts of the estuary. Weekend closure applies. May only be used by the method of splashing in some parts of the estuary during the months of December and January in any year. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours

Name of Estuary	Gear proposed	Details
Lake Macquarie (cont.)	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Weekend closure applies.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary. Weekend closure applies.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary. Weekend closure applies.
	Dip or scoop net	Standard dimensions
Tuggerah Lakes	500 metre hauling net (longer than standard hauling net)	Wings 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. The remainder of the bunt up to 50 metres in length made up of mesh not less than 50mm. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 28 February in the ensuing year. May only be used in parts of the estuary between 1 November and 30 April in the ensuing year. Not permitted in parts of the estuary between 1 May and 31 August in any year. Limited to one shot per day.
	550 metre Garfish bullringing net (longer than standard garfish bullringing net).	Mesh throughout between 28mm and 36mm. Net may only be used between 1 February and 30 November in any year. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. May not be used in parts of the estuary between 1 December and 28 February in the ensuing year. May only be used in parts of the estuary between 1 November and 30 April in the ensuing year. Not permitted in parts of the estuary between 1 May and 31 August in any
	140 metre prawn hauling net (longer than standard prawn hauling net).	Mesh between 30mm and 36mm and hauling lines up to 140 metres. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 28 February in the ensuing year. May only be used in parts of the estuary between 1 November and 30 April in the ensuing year. Not permitted in parts of the estuary between 1 May and 31 August in any year.
	18 metre to 20 metre prawn set pocket net.	Total length between 18 metres and 20 metres. Mesh between 25mm and 30mm. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 28 February in the ensuing year. May only be used in parts of the estuary between 1 November and 30 April in the ensuing year. Not permitted in parts of the estuary between 1 May and 31 August in any year.
	5 metre prawn set pocket net.	Mesh between 30mm and 36mm. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 28 February in the ensuing year. May only be used in parts of the estuary between 1 November and 30 April in the ensuing year. Not permitted in parts of the estuary between 1 May and 31 August in any year.
	140 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 28 February in the ensuing year. Not permitted in parts of the estuary between 1 May and 31 August in any year.

Name of Estuary	Gear proposed	Details
Tuggerah Lakes (cont.)	140 metre prawn seine net.	Mesh between 30mm and 36mm and hauling lines up to 140 metres. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 28 February in the ensuing year. Not permitted between official sunset and official sunrise on any day. May only be used in parts of the estuary between 1 November and 30 April in the ensuing year. Not permitted in parts of the estuary between 1 May
	Meshing net	Standard dimensions. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 28 February in the ensuing year. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. May only be used by the method of splashing in parts of the estuary. May only be used in some parts of the estuary between 1 November and 30 April in the ensuing year. Not permitted in some parts of the estuary between 1 May and 31 August in any year. May only be used by the method of splashing between 15 May and 31 August in any year.
	Flathead net	Standard dimensions. New dimensions and controls for this net will be determined with the benefit of data from the mesh selectivity research program which will be finalised in 2001. Please see the section on flathead nets in part 2 for further details).
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 28 February in the ensuing year. May only be used in parts of the estuary between 1 November and 30 April in the ensuing year. Not permitted in some parts of the estuary between 1 May and 31
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Wamberal Lagoon	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS
Terrigal Lake	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS
Avoca Lake	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS
Cockrone Lake	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS

Name of Estuary	Gear proposed	Details
Brisbane Water	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS
Hawkesbury River	Garfish hauling net.	Mesh between 28mm and 36mm. May only be used in parts of this estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Weekend and public holiday closure applies.
Hawkesbury River weekend and public holiday closure: 6pm Friday to 6pm Sunday, or 6pm Monday if Monday is a public holiday. In	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Weekend and public holiday closure applies.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. May only be used by the method known as splashing between 15 May and 31 August in any year.
	Whitebait species net	Maximum over-all length of 190 metres of mesh not less than 13mm, and a cod end not more than 2 metres in length of mesh not more than 5mm. A permit issued (valid until 30 June 2001) authorises one commercial fisher to use this net in parts of the estuary. The only species that may be retained when using this net are Anchovy, pilchard, whitebait and krill. Weekend and public holiday closure applies.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Pittwater	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. May not be aided by the use of a powered winch in parts of the estuary.
Pittwater weekend and public holiday closure: 8am Saturday to	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Weekend and public holiday closure
	Garfish hauling net	Standard dimensions. Weekend closure applies. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.

Name of Estuary	Gear proposed	Details
Pittwater (cont.)	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary. May not be aided by the use of a powered winch in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. Not permitted in parts of the estuary between 1 January and 30 June in any year. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Whitebait species net	Maximum over-all length of 190 metres of mesh not less than 13mm, and a cod end not more than 2 metres in length of mesh not more than 5mm. A permit issued (valid until 30 June 2001) authorises one commercial fisher to use this net in parts of the estuary. The only species that may be retained when using this net are Anchovy, pilchard, whitebait and krill.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Narrabeen Lagoon	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS
Dee Why Lagoon	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS
Harbord Lagoon	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS
Sydney Harbour	Garfish hauling net.	Mesh between 28mm and 36mm. May only be used in parts of the estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Weekend and public holiday closure applies. Not permitted in parts of the estuary between October and March in the ensuing year

Name of Estuary	Gear proposed	Details
Sydney Harbour (cont.)	250 metre Pilchard, anchovy and bait net.	Wings up to 90 metres with mesh of 80mm, bunt up to 60 metres of mesh between 50mm and 65mm, bag up to 12 metres of mesh not more than 30mm, cod-end up to 6 metres of mesh not more than 25mm and hauling lines not longer than 125 metres. May only be used in parts of the estuary. Weekend and public holiday closure applies. May only be used for taking krill in some parts of the estuary. Not permitted in parts of the estuary between October and March in the ensuing year.
Sydney Harbour weekend and public holiday closure: 8am Saturday to 8am Monday, or 8am to 6pm on a public holiday. Some area specific weekend closure times apply throughout areas within Sydney Harbour. Further information can be obtained from individual closure notices.	60 metre prawn hauling net (longer than the standard prawn hauling net)	Mesh between 30mm and 36mm and hauling lines up to 130 metres. May only be used in parts of the estuary Weekend and public holiday closure applies. Not permitted in parts of the estuary between October and March in the ensuing year.
	Hauling net	Standard dimensions. Weekend and public holiday closure applies. In parts of the estuary the net is not permitted between 1 November and 4 January in the ensuing year. In some other parts of the estuary the net is not permitted between October and March in the ensuing year. Hauling net weekend closures include 12pm Saturday to 8am Monday, 12am Friday to 8am Monday, and 8am Saturday to 8am Monday throughout parts of the estuary depending on the area in which the net is to be used.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Weekend and public holiday closure applies.
	Meshing net	Standard dimensions. Weekend and public holiday closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. Not permitted in parts of the estuary between October and March in the ensuing year.
	Whitebait species net	Maximum over-all length of 190 metres of mesh not less than 13mm, and a cod end not more than 2 metres in length of mesh not more than 5mm. A permit issued (valid until 30 June 2001) authorises 2 commercial fishers to use this net in parts of the estuary. The only species that may be retained when using this net are Anchovy, pilchard, whitebait and krill.
	Hoop or lift net	Standard dimensions. Not permitted in parts of the estuary between October and March in the ensuing year.
	Hand hauled prawn net	Standard dimensions. Not permitted in parts of the estuary between October and March in the ensuing year.
	Push or scissor net	Standard dimensions. Not permitted in parts of the estuary between October and March in the ensuing year.
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.

Name of Estuary	Gear proposed	Details
Botany Bay *(incl. Georges River)*	Garfish hauling net.	Mesh between 28mm and 36mm. May only be used in parts of this estuary. Weekend closure applies. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	90 metre prawn hauling net (longer than standard prawn hauling net).	Mesh between 30mm and 36mm and hauling lines up to 220 metres. May only be used in parts of this estuary. Weekend closure applies.
Botany Bay weekend closure for parts of the estuary: 6am Saturday to 6am Monday.	Hauling net	Standard dimensions. May only be used in parts of the estuary . Weekend closure applies. A permit issued authorises the use if this net with hauling lines up to a maximum length of 1200 metres in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of this estuary. Weekend closure applies. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Whitebait species net	Maximum over-all length of 190 metres of mesh not less than 13mm, and a cod end not more than 2 metres in length of mesh not more than 5mm. A permit issued (valid until 30 June 2001) authorises 2 commercial fishers to use this net in parts of the estuary. The only species that may be retained when using this net are Anchovy, pilchard, whitebait and krill.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Port Hacking	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS
Towradgie Creek	40 metre prawn net (hauling)	Standard dimensions
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Towradgie Creek (cont.)	Eel trap	Standard dimensions
Port Kembla Harbour	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Lake Illawarra	500 metre hauling net (longer than standard hauling net)	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. The remainder of the bunt up to 50 metres in length made up of mesh not less than 50mm. May only be used in parts of the estuary. Weekend and public holiday closure applies. Not permitted between1 December and 28 or 29 February in any year. Not permitted during the period 1 March to 30 November unless the net is operated by a minimum of 4 licenced fishers. Limited to one shot per day.
Lake Illawarra weekend and public holiday closure: 1 May to 31 August - 8am Saturday and 5pm Sunday, or 8am and 5pm on public holidays. 1 September to 30 April- 8am Saturday and 6pm Sunday, or 8am and 6pm on public holidays	140 metre prawn hauling net (longer than standard prawn hauling net).	Mesh between 30mm and 36mm and hauling lines up to 220 metres. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	140 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary.
	140 metre prawn seine net.	Mesh between 30mm and 36mm and hauling lines up to 220 metres. Net may only be used in parts of the estuary. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	5 metre prawn set pocket net	Mesh between 30mm and 36mm. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. May only be used by the method of bullringing and splashing in some parts of the estuary. May only be used by the method of splashing in some parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Flathead net	Standard dimensions. New dimensions and controls for this net will be determined with the benefit of data from the mesh selectivity research program which will be finalised in 2001. Please see the section on flathead nets in part 2 for further details).
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.

Name of Estuary	Gear proposed	Details
Lake Illawarra (cont.)	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Minnamurra River	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Wrights Creek	40 metre prawn net (hauling)	Standard dimensions
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Werri Lagoon	Hand hauled prawn net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
Werri Lagoon (cont)	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Crooked River	Dip or scoop net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Shoalhaven River *(incl. Crookhaven River)*	90 metre prawn hauling net (longer than standard prawn hauling net).	Mesh between 30mm and 36mm and hauling lines up to 220 metres. May only be used in parts of the estuary.
	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
Shoalhaven River weekend and public holiday closure: 1 May to 31 August - 8am Saturday and 5pm Sunday, or 8am and 5pm on public holidays. 1 September to 30 April- 8am Saturday and 6pm Sunday, or 8am and 6pm on public holidays.	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. May only be used by the method of splashing in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. May only be used by the method of splashing between 15 May and 31 August in parts of the estuary. Weekend and public holiday closure applies.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Lake Wollumboola	75 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary.
	Hauling net	Standard dimensions
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions

Name of Estuary	Gear proposed	Details
Lake Wollumboola (cont.)	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Jervis Bay	Meshing net	Standard dimensions. May only be used in parts of the estuary by the method known as splashing.
	Whitebait species net	Maximum over-all length of 190 metres of mesh not less than 13mm, and a cod end not more than 2 metres in length of mesh not more than 5mm. A permit issued (valid until 30 June 2001) authorises one commercial fisher to use this net in parts of the estuary. The only species that may be retained when using this net are Anchovy, pilchard, whitebait and krill
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
St Georges Basin	500 metre hauling net (longer than standard hauling net)	Wings of 80mm mesh, bunt 90 metres max or up to _ total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length of mesh between 30mm and 50mm. Remainder of the bunt up to 50 metres in length of mesh not less than 50mm. May only be used in parts of the estuary. Weekend and public holiday closure applies. Limited to one shot per day
St Georges Basin weekend and public holiday closure: 1 November to 30 April- 6pm Friday to 6pm Sunday, or 6pm Monday if Monday is a public holiday. 6am to 6pm on any other public holiday during that time	90 metre prawn hauling net (longer than standard prawn hauling net)	Mesh between 30mm and 36mm and hauling lines up to 220 metres. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	140 metre prawn running net	Mesh between 25mm and 36mm. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	140 metre prawn seine net	Mesh between 30mm and 36mm and hauling lines up to 220 metres. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. May only be used by the method of bullringing between 6pm Friday and 6pm Sunday (or 6pm Monday if Monday is a public holiday), or between 6am and 6pm on any other public holiday during the period 1 November to 30 April in the ensuing

Name of Estuary	Gear proposed	Details
St Georges Basin (cont)	Meshing net	Standard dimensions. May only be used in parts of the estuary. May only be used by the method of splashing in some parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. May only be used by the method of splashing between 6pm Friday and 6pm Sunday (or 6pm Monday if Monday is a public holiday), or between 6am and 6pm on any other public holiday during the period 1 November to 30 April in the ensuing year.
	Flathead net	Standard dimensions. New dimensions and controls for this net will be determined with the benefit of data from the mesh selectivity research program which will be finalised in 2001. Please see the section on flathead nets in part 2 for further details).
	Prawn set pocket net	Total length of 5 metres. Mesh throughout between 30mm and 36mm.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Swan Lake	75 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary.
	Hauling net	Standard dimensions. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions
	Fish trap.	Standard dimensions.
	Crab trap	Standard dimensions.

Name of Estuary	Gear proposed	Details
Swan Lake (cont.)	Eel trap	Standard dimensions.
Berrara Creek	Hand hauled prawn net	Standard dimensions.
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions.
Nerrindilah Creek	40 metre prawn net (hauling)	Standard dimensions
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Lake Conjola *(incl. Berringer Lake)*	450 metre hauling net (longer than standard hauling net).	Wings 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. The remainder of the bunt up to 50 metres in length made up of mesh not less than 50mm. May only be used in parts of the
	75 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used for taking prawns in some parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used for taking prawns in some parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used for taking prawns in some parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.

Name of Estuary	Gear proposed	Details
Lake Conjola (cont.)	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Narrawallee Inlet	Hauling net	Standard dimensions. May only be used in parts of the estuary. Not permitted between 1 December and 1 March in the ensuing year.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May not be used between 1 December and 1 March in the ensuing year.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary. Not permitted between 1 December and 1 March in the ensuing year.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. Not permitted between 1 December and 1 March in the ensuing year. May only be used by the method of splashing in parts of the estuary between 6am Monday and 6pm Friday during the period 1 March to 30 November in each year.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Not permitted between 1 December and 1 March in the ensuing year.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary. Not permitted between 1 December and 1 March in the ensuing year.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary. Not permitted between 1 December and 1 March in the ensuing year.
	Dip or scoop net	Standard dimensions. May only be used for taking prawns in parts of the estuary.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Burrill Lake *Burril Lake weekend and public holiday closure: 6am Saturday to 6pm Sunday, or 6am to 6pm on any public holiday*	75 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary.
	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.

Name of Estuary	Gear proposed	Details
Burrill Lake (cont.)	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions.
	Push or scissor net	Standard dimensions.
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions.
	Crab trap	Standard dimensions.
	Eel trap	Standard dimensions.
Toubouree Lake	Meshing net	Standard dimensions. May only be used in some parts of the estuary between 1 October and 30 May in any year. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Termeil Lake	Hauling net	Standard dimensions
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Termeil Lake (cont.)	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Meroo Lake	Hauling net	Standard dimensions
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Willinga Lake	Dip or scoop net	For taking prawns only.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Durras Lake	75 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary.
	375 metre meshing net. Smaller length than standard mesh net.	Mesh not less than 80mm. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. May only be used between 1 February and 30 November in each year. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.

Name of Estuary	Gear proposed	Details
Durras Lake (cont.)	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Batemans Bay *(incl. Clyde River and Cullendulla Creek)*	Hauling net	Standard dimensions. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. May only be used by the method known as splashing between 15 May to 31 August in any year. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Tomaga River	Hauling net	Standard dimensions. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.

Name of Estuary	Gear proposed	Details
Tomaga River (cont.)	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used for taking prawns in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Candlagan Creek	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS
Moruya River	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
Moruya River weekend and public holiday closure: November to February- 6am Saturday to 8pm Sunday or 6pm Monday if Monday is a public holiday. March to October- 6am Saturday to 6pm Sunday, or 6am to 6pm on any public holiday.	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. May only be used by the method of splashing in parts of the estuary between 15 May and 31 August in any year. May only be used by the method of splashing in parts of the estuary at all times.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary. May only be used to take prawns in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary. May only be used to take prawns in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary. May only be used to take prawns in parts of the estuary.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Congo Creek	Prawn net (hauling)	Standard dimensions. Not permitted during the months January, February, March, April, November and December in any year.

Name of Estuary	Gear proposed	Details
Congo Creek (cont.)	Meshing net	Standard dimensions. Not permitted during the months January, February, March, April, November and December in any year. May only be used by the method of splashing during the months of December and January in any year. May only be used by the method of splashing between sunrise and sunset during
	Hoop or lift net	Standard dimensions. Not permitted during the months January, February, March, April, November and December in any year.
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Meringo River	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Coila Lake	450 metre hauling net (longer than standard hauling net).	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. Remainder of bunt up to 50 metres in length made up of mesh not less than 50mm.
	75 metre prawn hauling net (longer than the standard prawn hauling net)	Mesh between 30mm and 36mm and hauling lines up to 130 metres
	75 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.

Name of Estuary	Gear proposed	Details
Coila Lake (cont.)	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Tuross Lake *(incl. Borang Lake). Tuross Lake weekend and public holiday closure- Some parts: November to February- 6am Saturday to 8pm Sunday, or 6pm Monday if Monday is a public holiday. March to October 6am Saturday to 6pm Sunday or 6pm Monday if Monday is a public holiday. 6am to 6pm on any other weekday public holiday. Some parts: November-6am Saturday to 8pm Sunday, or 6pm Monday if Monday is a public holiday. May to October- 6am Saturday to 6pm Sunday or 6pm Monday if Monday is a public holiday. 6am to 6pm on any other weekday public holiday*	450 metre hauling net (longer than standard hauling net).	Wings of 80mm mesh, bunt 90 metres max or up to _ total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. The remainder of the bunt up to 50metres in length made up of mesh not less than 50mm. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 30 April in the ensuing year. Weekend and public holiday closures apply. In some parts of the estuary the net is not permitted in parts of the estuary between 1 December and 30 April in the ensuing year
	75 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 30 April in the ensuing year. Weekend and public holiday closures apply. In some parts of the estuary the net is not permitted in parts of the estuary between 1 December and 30 April
	80 metre prawn seine net.	Mesh between 30mm and 36mm and hauling lines up to 80 metres. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 30 April in the ensuing year. Weekend and public holiday closures apply. In some parts of the estuary the net is not permitted in parts of the estuary between 1 December and 30 April in the ensuing year
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. Weekend and public holiday closures apply. In some parts of the estuary the net is not permitted in parts of the estuary between 1 December and 30 April in the ensuing year
	Prawn net (hauling)	Standard dimensions.May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 30 April in the ensuing year. Weekend and public holiday closures apply. In some parts of the estuary the net is not permitted in parts of the estuary between 1 December and 30 April in the ensuing year

Name of Estuary	Gear proposed	Details
Tuross Lake *(cont.)*	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. May only be used by the method of splashing between 15 May and 31 August in any year. Not permitted in parts of the estuary between 1 December and 30 April in the ensuing year. Weekend and public holiday closures apply. In some parts of the estuary the net is not permitted in parts of the estuary between 1 December and 30 April in the ensuing year.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Not permitted in parts of the estuary between 1 December and 30 April in the ensuing year. Weekend and public holiday closures apply. In some parts of the estuary the net is not permitted in parts of the estuary between 1 December and 30 April in the ensuing
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closures apply. In some parts of the estuary the net is not permitted in parts of the estuary between 1 December and 30 April in the ensuing year.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closures apply. In some parts of the estuary the net is not permitted in parts of the estuary between 1 December and 30 April in the ensuing year.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closures apply. In some parts of the estuary the net is not permitted in parts of the estuary between 1 December and 30 April in the ensuing year.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Lake Brunderee	Hauling net	Standard dimensions
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions

Name of Estuary	Gear proposed	Details
Lake Brunderee (cont.)	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Lake Brou	75 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary.
	Hauling net	Standard dimensions. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Dalmeny (Mummuga) Lake	75 metre prawn running net.	Mesh between 25mm and 36mm
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. Not permitted between 6pm Friday and 6pm Sunday in any week. Weekend closure applies.
Dalmeny Lake weekend closure: 6pm Friday to 6pm Sunday	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. Not permitted between 6pm Friday and 6pm Sunday in any week. Weekend closure
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions

Name of Estuary	Gear proposed	Details
Dalmeny Lake (cont.)	Dip or scoop net	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Kianga Lake	Hauling net	Standard dimensions
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Wagonga Inlet	CLOSED TO ALL NETS AND TRAPS	CLOSED TO ALL NETS AND TRAPS
Nangudga Lake	Hauling net	Standard dimensions. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions

Name of Estuary	Gear proposed	Details
Nangudga Lake (cont.)	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Corunna Lake	75 metre prawn running net.	Mesh between 25mm and 36mm
	Hauling net	Standard dimensions
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Tilba Tilba Lake	75 metre prawn running net.	Mesh between 25mm and 36mm
	Hauling net	Standard dimensions
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions

Name of Estuary	Gear proposed	Details
Tilba Tilba Lake (cont.)	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Little Lake	375 metre hauling net	Standard dimensions
	275 metre garfish bull-ringing net.	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	40 metre prawn net (hauling)	Standard dimensions
	725 metre meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Wallaga Lake	450 metre hauling net (longer than standard hauling net)	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. The remainder of the bunt up to 50metres in length made up of mesh not less than 50mm. May only be used in parts of the estuary. Weekend and public holiday closure applies. Limited to one shot per day.
	75 metre prawn hauling net (longer than the standard prawn hauling net)	Mesh between 30mm and 36mm and hauling lines up to 130 metres. May only be used in parts of the estuary. Weekend and public holiday closures apply.

Name of Estuary	Gear proposed	Details
Wallaga Lake (cont.)	75 metre prawn running	Mesh between 25mm and 36mm. May only be used in parts of the estuary.
Wallaga Lake weekend and public holiday closure: November to February- 6am Saturday to 8pm Sunday or 6pm Monday if Monday is a public holiday. March to October 6am Saturday to 6pm Sunday or 6pm Monday if Monday is a public holiday. 6am to 6pm on all other public holidays.	725 metre meshing net.	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. May only be used by the method of splashing in parts of the estuary between 15 May and 31 August. May only be used by the method of splashing at all times in parts of the estuary. Weekend and public holiday closures apply.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary. Weekend and public holiday closures apply.
	Hoop or lift net	Standard dimensions. Weekend and public holiday closures apply.
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Bermagui River	Hauling net	Standard dimensions. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary only. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. In parts of the estuary only.
	Push or scissor net	Standard dimensions.
	Dip or scoop net	Standard dimensions.
	Fish trap.	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Barragoot Lake	Hauling net	Standard dimensions
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Cuttagee Lake (incl. Little Cuttagee Lake)	450 metre hauling net (longer than standard hauling net).	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. Remainder of bunt up to 50 metres in length made up of mesh not less than 50mm. May only be used in parts of the estuary.
	75 metre prawn running net.	Mesh between 25mm and 36mm. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions.
	Crab trap	Standard dimensions.

Name of Estuary	Gear proposed	Details
Cuttagee Lake (cont.)	Eel trap	Standard dimensions.
Murrah Lake	450 metre hauling net (longer than standard hauling net).	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. Remainder of bunt up to 50 metres in length made up of mesh not less than 50mm.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Bunga Lagoon	375 metre hauling net	Standard dimensions
	275 metre garfish bull-ringing net.	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	40 metre prawn net (hauling)	Standard dimensions
	725 metre meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Bunga Lagoon (cont.)	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Wapengo Lake	450 metre hauling net (longer than standard hauling net)	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. Remainder of bunt up to 50 metres in length made up of mesh not less than 50mm. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary for taking prawns.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Middle Lake (Bega)	75 metre prawn running net.	Mesh between 25mm and 36mm
	Hauling net	Standard dimensions
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions

Name of Estuary	Gear proposed	Details
Middle Lake (cont.)	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Nelson Lake	450 metre hauling net (longer than standard hauling net)	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. Remainder of bunt up to 50 metres in length made up of mesh not less than 50mm. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Bega River (Incl Blackfellows Lake)	90 metre prawn hauling net (longer than standard prawn hauling net)	Mesh between 30mm and 36mm and hauling lines up to 190 metres. Weekend and public holiday closure applies.
	Hauling net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Garfish net (bullringing)	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing
	Meshing net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3

Name of Estuary	Gear proposed	Details
Bega River (cont.)	Between 15 May and 31 August in any year the net may only be used by the method of splashing	Between 15 May and 31 August in any year the net may only be used by the method of splashing.
Bega River weekend and public holiday closure: 6am Saturday to 6pm Sunday or 6pm Monday if Monday is a public holiday. 6am to 6pm on any other public holiday	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary. Weekend and public holiday closure applies.
	Hand hauled prawn net	Standard dimensions. May only be used in parts of the estuary.
	Push or scissor net	Standard dimensions. May only be used in parts of the estuary.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Wallagoot Lake	Garfish net (bullringing)	Standard dimensions. May only be used between 1 May and 31 August in any year.
	Meshing net	Standard dimensions. May only be used between 1 May and 31 October in any year. May only be used by the method of splashing between sunrise and sunset during October in any year.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Bournda Lagoon	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Back Lake (Merimbula)	375 metre hauling net	Standard dimensions
	275 metre garfish bull-ringing net.	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	40 metre prawn net (hauling)	Standard dimensions

Name of Estuary	Gear proposed	Details
Back Lake (cont.)	725 metre meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Merimbula Lake	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Pambula River and Lake (incl. Yowaka River)	Hauling net	Standard dimensions. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year. May only be used in parts of the estuary.
	Prawn net (hauling)	Standard dimensions. May only be used in parts of the estuary.
	Meshing net	Standard dimensions. May only be used in parts of the estuary. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours
	Hoop or lift net	Standard dimensions. May only be used in parts of the estuary.
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Curalo Lake	450 metre hauling net (longer than standard hauling net).	Wings of 80mm mesh, bunt 90 metres max or up to 1/4 total length of net (whichever is lesser), made up of centre piece between 25 and 50 metres length made of mesh between 30mm and 50mm. Remainder of bunt up to 50 metres in length made up of mesh not less than 50mm. May only be used in parts of the estuary.
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours.
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Nullica River	Hauling net	Standard dimensions
	Garfish net (bullringing)	Standard dimensions. Garfish may not be taken by the use of nets between 1 December in each year and 31 January in the ensuing year.
	Prawn net (hauling)	Standard dimensions
	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. May only be used by the method of splashing in parts of the estuary between 15 May and 31 August in any year. May only be used by the method of splashing at all times in some parts of
	Hoop or lift net	Standard dimensions
	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions

Name of Estuary	Gear proposed	Details
Towamba River	Meshing net	Standard dimensions. The net may be used as a splashing net at all times. The net may be set between sunset and sunrise for a maximum of 3 hours during the months February, March April, September, October and November. The net may be set between sunset and sunrise during the months of May, June, July and August for in excess of 3 hours. May only be used in parts of the estuary. May only be used in the method known as splashing. Not permitted between 6pm Friday and 6pm Sunday or between 6am and 6pm on any public holiday.
	Dip or scoop net	Standard dimensions. May only be used in parts of the estuary.
	Fish trap	Standard dimensions. May only be used in parts of the estuary.
	Crab trap	Standard dimensions. May only be used in parts of the estuary.
	Eel trap	Standard dimensions. May only be used in parts of the estuary.
Wonboyn River	Hand hauled prawn net	Standard dimensions
	Push or scissor net	Standard dimensions
	Dip or scoop net	Standard dimensions
	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Merrica River	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Nadgee River	Fish trap.	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions
Nadgee Lake	Fish trap	Standard dimensions
	Crab trap	Standard dimensions
	Eel trap	Standard dimensions

APPENDIX C2 DESCRIPTION OF SILVER TREVALLY (*PSEUDOCARANX DENTEX*)

The following overview is based on information provided in Pease *et al*., (1981b), Kailola *et al*., (1993), Fletcher and McVea (2000), Neira *et al*.,. (1998), Rowling and Raines (2000), and the NSW Fisheries catch statistics database.

Silver trevally (*Pseudocaranx dentex*) occurs in estuarine and coastal waters of all Australian states, and around northern New Zealand. Most of the Australian catch is taken in NSW and eastern Victoria. It is possible that catches from waters west of Bass Strait are comprised mainly of a different (but almost identical) species (*Pseudocaranx wrighti*). Silver trevally are a schooling species, which inhabits mainly sandy substrates. They feed on benthic invertebrates, including worms and molluscs, and also on benthic and planktonic crustaceans.

Female silver trevally have moderate fecundity (50 to 200 thousand eggs) and spawn during an extended period from spring to autumn. Larvae occur in coastal waters throughout this period, and may enter estuaries before settling out as juveniles. Fish less than 10 cm in length were found in samples from Botany Bay between December and August, however the life history of juvenile trevally is poorly known. Maturation occurs between 18 and 25 cm in length. Although mature fish occur most often in ocean waters, they do enter estuaries at certain times.

Silver trevally are a relatively long lived, slow growing species, attaining a maximum age in excess of 25 years. In NSW coastal waters trevally reach a maximum size of about 65 cm fork length and weight of about 4 kg. Since the 1980s, the average size of silver trevally in catches has declined considerably and in recent years fish greater than about 35 cm in length (or 0.75 kg in weight) have been very poorly represented in catches. Commercial catches are dominated by young fish, less than about 5 years of age.

In estuarine waters, the main commercial catches of trevally are taken in the late summer and early autumn. Haul nets take the bulk of the catch in the large estuaries in the Sydney area. Significant catches of trevally are also taken by commercial fish trawl and trap fishers in ocean waters, and the species is very popular amongst recreational fishers in both estuarine and ocean waters. In the mid-1990s the annual catch of silver trevally from ocean waters by recreational fishers was estimated to be at least 130 t.

There has been a significant decline in commercial landings of silver trevally since the mid-1980s, from about 1000 t per annum to around 300 t per annum. Most trevally are sold fresh at the Sydney and Melbourne fish markets where the species receives moderate prices ($1.50 – $2.50 per kg) depending on the quality of handling after capture. High quality ‘ice slurried’ trevally are also exported, receiving higher prices ($3.50 - $5.00 per kg).

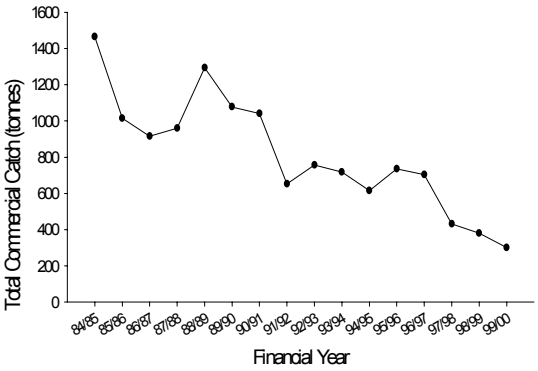


Figure AC1. The total reported commercial catch of silver trevally in NSW for the period of 1984/85 to 1999/2000

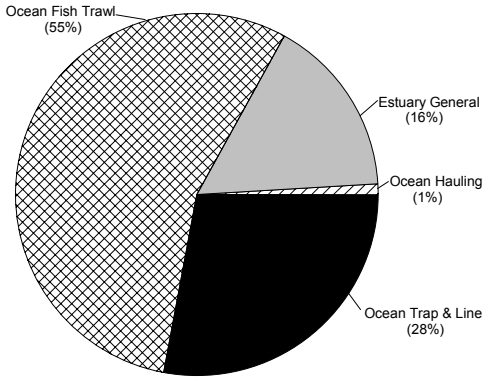


Figure AC2. The average percentage of reported catch of silver trevally between commercial fisheries for the period of 1997/98 and 1998/99.

APPENDIX E

APPENDIX E1 SPECIES STOCK ASSESSMENTS

Of the species listed in Table E1, stock assessment information on yellowfin bream, dusky flathead, sand whiting, luderick, sea mullet, silver trevally, eastern king prawns and school prawns can be found in the 'NSW Fisheries – Status of Fisheries Resources 1999/2000' (NSW Fisheries 2001). Stock assessment information on longfinned river eels and catch trends of the 'unknown' and 'uncertain' species listed in Table E1 follows.

1. Longfinned River Eels

Longfinned river eels (*Anguilla reinhardtii*) are a long-lived species (maximum age > 50 years) that are exploited by commercial, recreational and Indigenous fishers in most of the coastal catchments of NSW. Most of the commercial catch of adult eels is obtained with specialised eel traps in the estuary. Fishers with special permits may also trap adult eels in freshwater impoundments. The minimum legal length for eels in these fisheries is 30 cm. Eels between 30 and 60 cm are sold to the aquaculture industry for grow-out to a larger size. Eels greater than 60 cm are primarily exported live to China. Most of the recreational and Indigenous catch of eels (minimum legal length also 30 cm, with a bag limit of 20 eels) is obtained from flowing freshwater areas and impoundments by fishing with a hook and line. A limited harvest (less than 40 kg annually) of juveniles, called glass eels (unpigmented and less than 7 cm in length), are obtained by fishers with special permits to catch and sell glass eels of the longfinned and shortfinned species (*Anguilla australis*) to the aquaculture industry. The eel aquaculture industry is dependent on wild harvest seed stock because techniques have not been developed for successfully rearing larval eels.

Because very little is know about the biology of this species, FRDC funded studies of glass and adult eels commenced in 1998 and will continue through 2001 (Pease NSW Fisheries, pers. comm.). Information about spatial and temporal aspects of sex ratios and growth, as well as size and age structure of the stocks is currently being analysed. Until this work has been completed, assessments of longfinned eel stocks should be considered as preliminary.

a) Stock level and dynamics

Landings, effort and catch rates

Eel catches were not recorded in the commercial catch and effort database until 1970. Allocation of catch to different species of eel is confused because of ambiguous and multiple common names. Anecdotal information from fishers and processors indicates that at least 98% of the landings from estuaries that were recorded under all eel categories since 1970 were actually longfinned river eels. Landings increased slowly through the 70s and 80s then increased dramatically to a peak of over 400 tonnes in 1992/93 (Figure AE1), shortly after a market developed for exporting live eels to China and permits were first issued for eel trapping in freshwater impoundments. Landings declined in 1996/97 and have remained relatively stable over the last four years. Most of the commercial catch comes from the Clarence, Hawkesbury and Port Stephens catchments.

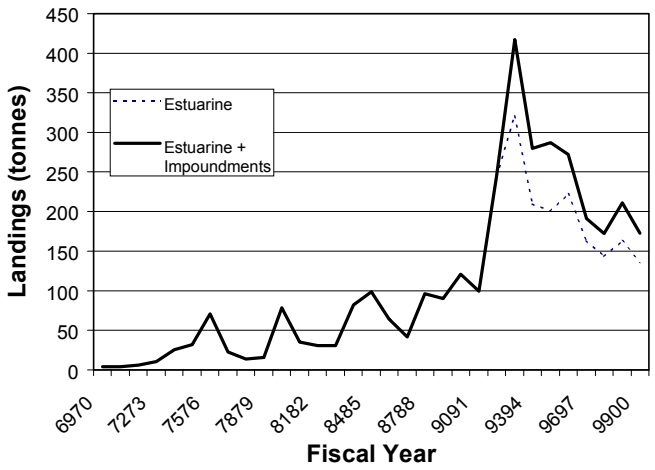


Figure AE1. Total reported landings of longfinned river eels in NSW.

Effort in the estuarine fishery, as measured by the annual number of fishers submitting catch returns with eel catches, has remained relatively stable. The annual number of fishers catching eels in the estuary has ranged from 183 (in 1990/91) to 264 (in 1995/96) since 1984/85, when effort information became available. Since 1997, fishers targeting eels must have an eel trapping endorsement. Permits to fish in freshwater impoundments have been issued annually since 1992, when 39 permits were issued. Only fishers who have held a permit for the previous year are allowed to apply the following year. In the fiscal year 1999/00, only 13 fishers submitted daily catch records showing eel catches from freshwater impoundments.

Only 26% of the fishers harvest 90% of the estuarine catch of eels. These are the fishers that consistently target eels for a major component of their annual income. Fishers that target eels only during the off-season for other estuarine fisheries obtain the remainder of the catch. For this reason, catch rates per fisher-month do not adequately reflect stock abundance. A more detailed analysis of catch rates by fishers consistently targeting eels may be useful.

Permits for fishers to catch glass eels for aquaculture seed stock have been issued since 1997. Both longfinned and shortfinned glass eels are collected, but catches are not reported by species because of difficulties associated with separating and identifying the catches. If it is assumed that the annual catch of longfinned glass eels is approximately half of the total annual catch, then landings have ranged from approximately 5 to 20 kg per year. The number of permit holders has ranged from 3 to 9. The catch per permit holder is not an indicator of recruiting stocks because catches are based primarily on market demand from the aquaculture industry.

There is no quantitative information on the recreational/Indigenous fishery for eels in NSW. Such catches are probably significant, but it is doubtful that this is of the same magnitude as the commercial fishery. The results of the national recreational survey will hopefully provide some information about the magnitude of recreational and Indigenous catches of this species.

Spawning stock level

River eels spawn only once before dying. They do not start to become sexually mature until shortly before they migrate out of the estuaries to their oceanic spawning grounds. Therefore, spawning stocks can only be directly measured by estimating the number of eels that are migrating out of all the catchments in NSW. No estimate of spawning stock level of longfinned eels is currently

available. However, NSW Fisheries is currently evaluating an indirect method of assessing spawning stocks based on glass eel recruitment. It is assumed that spawning stocks are currently adequate to sustain the current level of harvest. It should be noted that a significant (but unknown) proportion of the spawning stocks come from flowing fresh waters, which are closed to commercial fishing.

Current exploitation status

It is assumed that the longfinned eel stocks of some catchments, such as the Clarence River, Hawkesbury River and Port Stephens's catchments, are fully exploited, while many of the other catchments in NSW are underfished. This is based on a preliminary assessment considering the reported commercial catch and preliminary size and age information of commercial catches.

Estimation methods and reliability

An initial assessment of longfinned eel stocks has been made, based on long-term commercial catches (Figure AE1) and catch rates (1983/84 to present). The reliability of the assessment is unknown because the assessment process for longfinned eels has not been developed yet. No estimate of the biomass of the longfinned eel stock has been made.

Research is currently underway to evaluate the feasibility of using annual glass eel recruitment surveys as providing indices of spawning stock abundance. Recruitment of glass eels to the coastal catchments of NSW is the only stage in the eel life history that can be feasibly monitored over a large geographical range. This information would also be useful for setting allowable catches in the glass eel permit fishery if such a management tool is adopted.

b) Population structure and life cycle behaviour

This species occurs in coastal catchments along the entire east coast of Australia as well as in New Guinea, Solomon Islands, New Caledonia, Lord Howe Island, Norfolk Island and the North Island of New Zealand. Based on the size and distribution of longfinned eel larvae (known as leptocephali) collected during oceanographic surveys, along with our knowledge of more thoroughly studied species, such as the European, American and Japanese eels, it is thought that all eels from throughout this species extensive geographic range spawn in one relatively small region of the southwestern Pacific, north of New Caledonia. It is therefore thought that there is one panmictic stock of longfinned eels. A researcher at Southern Cross University is currently studying genetic material from this species to determine whether the panmictic hypothesis is correct or whether there is spatial and/or temporal structures in the stock. Similar genetic studies of the European eel have revealed significant regional stock structure. Stocks that are structured at the catchment or regional level obviously require a different management strategy than widely distributed panmictic stocks, which would require management on fishing mortality in other states of Australia and other countries.

Once eels recruit to a catchment, they remain in that catchment during their juvenile and sexually immature adult life history stages (up to approximately 50 years). Therefore, fishing mortality must be monitored within individual catchments. Of the primary fish species in the estuary general fishery, river eels are the only species that do not move from one estuary to another nor do they occur on coastal beaches or reefs.

c) Spatial and temporal distribution

Longfinned eels occur in all coastal catchments of NSW and are found from the marine dominated lower estuary to the top end of the freshwater reaches. The flowing fresh waters of all catchments are closed to commercial fishing and therefore provide some refugia for spawning stocks.

In the relatively warm northern rivers of NSW, eels are active throughout the year. In the Clarence River, eel trapping is generally a winter activity. South of the Manning River, eels are less active during the cooler winter months and most trapping occurs in the Spring and Summer.

2. Other Species

There is very limited biological and fishery-related information available for the 'unknown' and 'uncertain' species contributing to 97% of the estuary general landings over the 1997-2000 period. Thus stock assessments for these species are not available. These species are sand mullet, silver biddy, flat-tail mullet, mulloway, river garfish, shortfinned river eel, tailor, tarwhine, trumpeter whiting, estuary catfish, pipi, leatherjacket species, old maid, blue swimmer crab, mud crab, greasyback prawns, cockle, squid species and beachworms. Trends in reported estuary general landings for each of these species over the past 16 years are shown in Figure AE2. Table AE1 summarises this information giving the minimum, maximum and average reported estuary general landings over the same period.

Reported catches of sand mullet, shortfinned river eel, estuary catfish, pipi, old maid, blue swimmer crab, mud crab and cockles by the estuary general fishery have increased over the past 16 years (Figure AE2). In particular, reported catches of shortfinned river eel, blue swimmer crab and old maid have risen dramatically since the early 1990s, and reported catches of sand mullet and estuary catfish have risen dramatically since 1997/98. Whilst reported catches of silver biddy, mulloway, river garfish, tarwhine, trumpeter whiting, greasyback prawns and beachworms have fluctuated throughout the past 16 years, there has been no consistent downward or upward trend in estuary general catches for these species (Figure AE2). Reported catches of flat-tail mullet, tailor, leatherjacket species and squid by the estuary general fishery have declined over the 16 year period (Figure AE2).

Sampling of trumpeter whiting, silver biddy and yellowtail is currently being done. FRDC have just funded research work to be done on river garfish that will commence in late 2001. Research proposals to granting bodies are currently being reviewed for work on blue swimmer crabs.

Table AE1: The minimum, maximum and average annual reported landings (tonnes) over the 1984/85 to 1999/2000 period for species caught in the estuary general fishery where the current fishing level (Table E1) is unknown or uncertain.

species/ group	minimum	maximum	average
sand mullet	3.15	212.1	61.09
silver biddy	104.63	185.85	143.77
flat tail mullet	72.32	145.66	115.94
mulloway	32.78	72.17	50.85
river garfish	18.6	55.66	37.65
trumpeter whiting	24.55	56.29	139.42
shortfin river eel	0	82.18	19.27
tailor	25.95	95.48	56.54
estuary catfish	0	30.38	5.06
tarwhine	16.07	66.11	32.64
leatherjacket (at least 3 species)	13.17	44.15	26.15
old maid	0	19.09	8.83
pipi	54.21	620.19	284.69
blue swimmer crab	19.6	259.48	126.43
mud crab	39.71	156.96	100.37
greasyback prawn	18.65	104.58	44.97
cockle	0.43	70.1	29.18
squid (at least 4 species)	25.04	59.47	38.36
beachworms	3.76	173.99	27.55

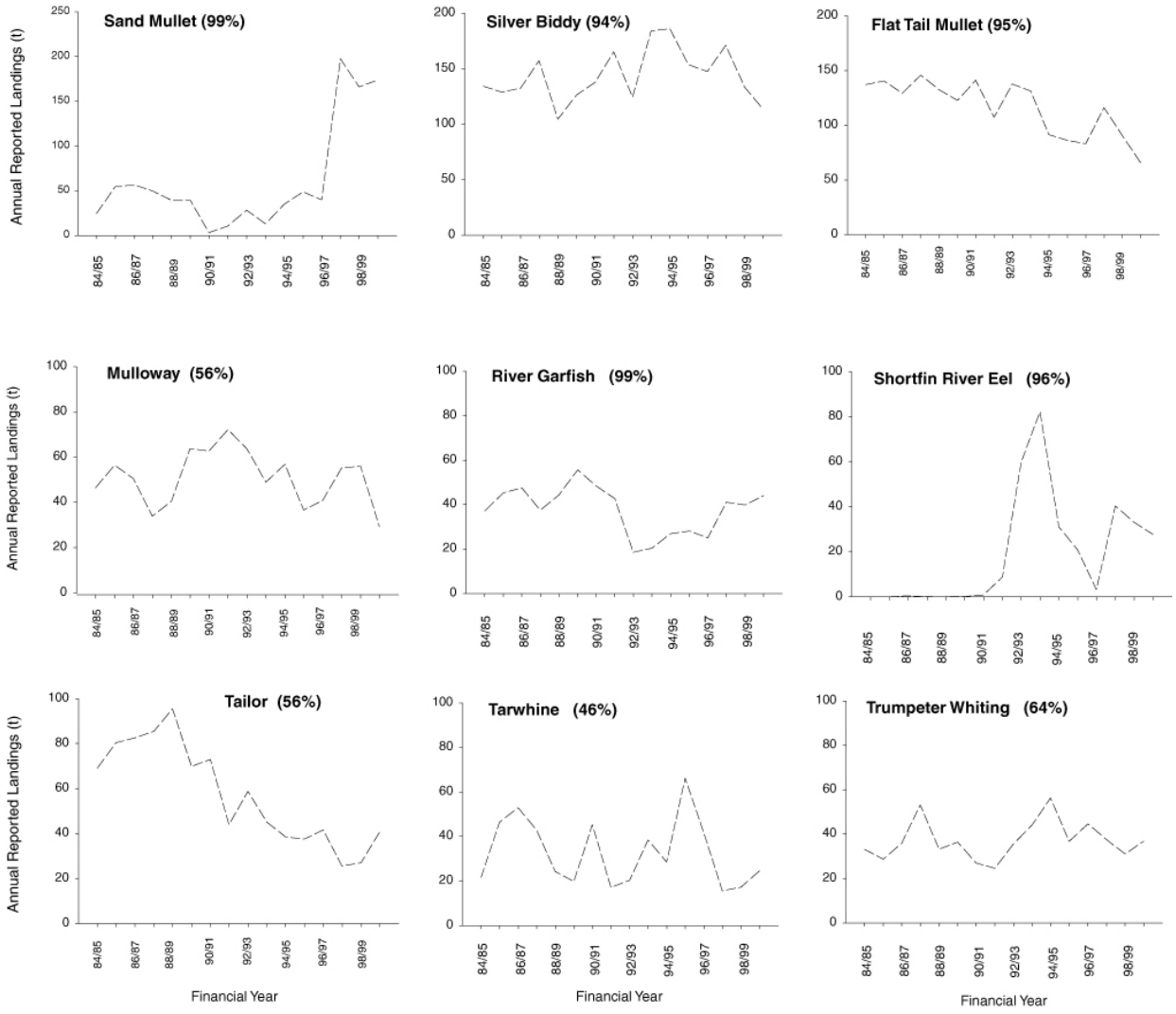
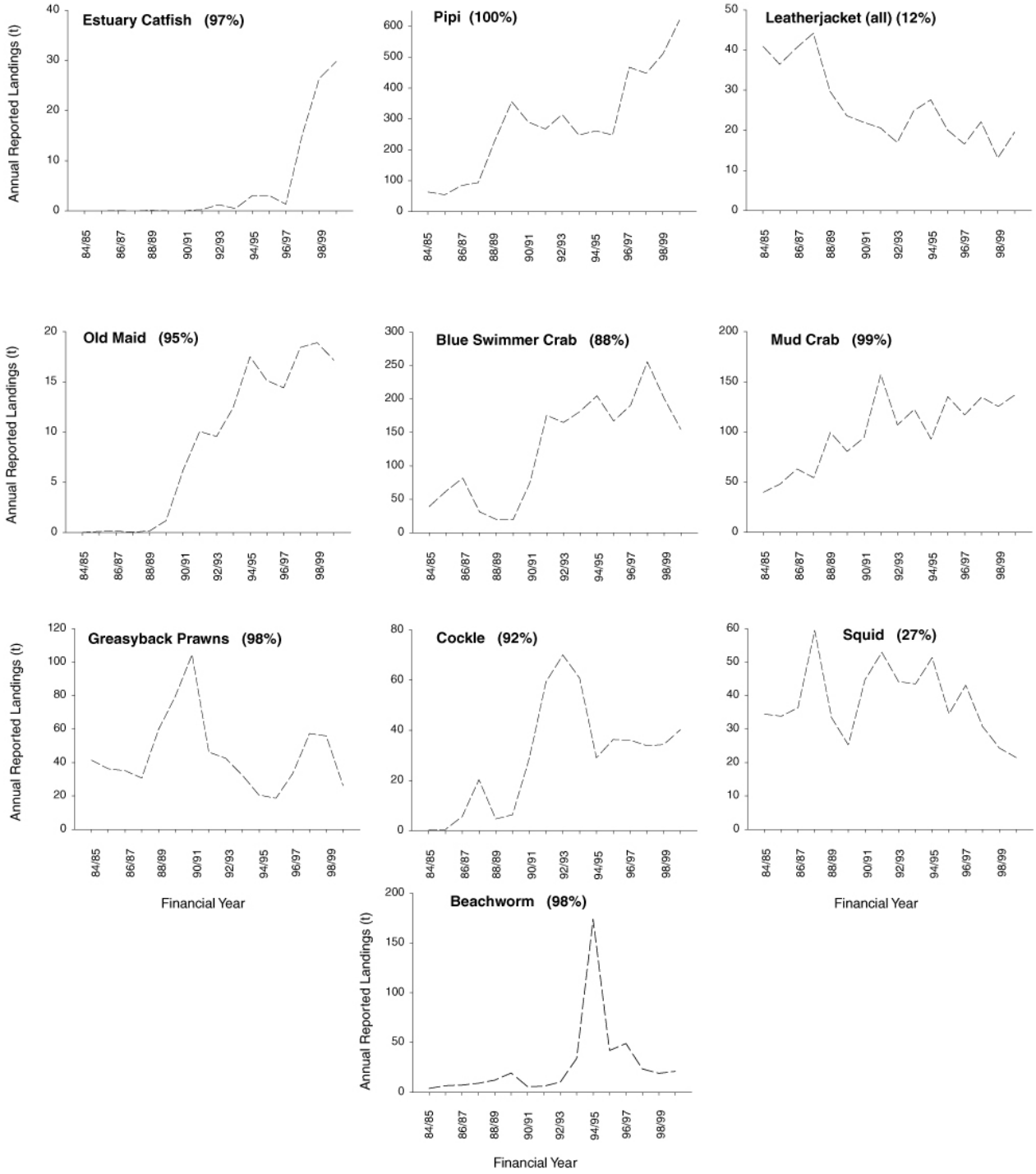


Figure AE2. Trends in reported landings of the species comprising 97% of the estuary general fishery over the 1997-98 to 1999-2000 period were the current fishing level (Table E1) is unknown or uncertain. Note: Due to changes in the system of reporting commercial catches values may be an overestimate prior to 1997-98. Values in brackets indicate the percentage of total commercial landings contributed by the estuary general fishery for that species during the 1997-2000 period.

Figure AE2 (cont.)



APPENDIX F

APPENDIX F1 ESTUARY CHARACTERISTICS

The estuary general fishery is conducted to some degree in most of the estuaries along the NSW coast. The estuaries have a range of shapes, sizes and geological origins, and these factors are largely responsible for determining the distribution and abundance of physical habitats and ecological assemblages.

1. General Characteristics

Estuaries represent a 'mixing zone' between completely sheltered freshwaters and the open ocean (e.g. Das *et al.,* 2000). The forces driving this mixing include tides, wind, waves and river runoff (O' Loughlin *et al.,* 1999), although the relative importance of each of these varies according to estuary type and the location within an estuary (Roy *et al.,* 2001). Tidal currents are often dominant, depending on entrance condition and bathymetry. Gravitational circulation, caused by density differences between fresh and salt water may also be important in estuaries that are subject to large volumes of river runoff. Wind-driven circulation is most important in large shallow estuaries with small tidal ranges and low freshwater inflows (O' Loughlin *et al.,* 1999), although sizeable wind-waves (sufficient to cause long shore currents, sediment transport and/or foreshore erosion) may form wherever sufficient fetch is available. Ocean swell may also be factor near an estuary's entrance, particularly during rough sea conditions. Other factors, such as the degree and rate of sedimentation and water quality characterisation of an estuary, are also important influences on the presence and abundance of the major habitat components such as seagrasses, mangroves, saltmarsh and intertidal sand and mudflats.

2. Main Estuary Types Occurring in NSW

There are at least 950 water bodies joining the Tasman Sea along the New South Wales seaboard (Williams *et al.,* 1998), however, the majority of these are very small and only intermittently opened to the sea. Only 130 have a water area greater than 0.05 km^2 and are regularly referred to as estuaries. Various attributes of these 130 estuaries have been documented by Bell and Edwards (1980), West *et al.,* (1985) and Roy *et al.,* (2001).

Based on geological criteria and the degree of marine influence, Roy *et al.,* (2001) recognise five coastal water body groupings in eastern Australia: (1) Bays; (2) Tide-dominated estuaries; (3) Wave-dominated estuaries; (4) Intermittent estuaries; and (5) Freshwater bodies. Within these groups are 13 water body types, most of which occur in NSW (Roy *et al.,* 2001). This classification scheme builds on the earlier work of Roy *et al.,* (1980) and Roy (1982, 1984). Whilst truly estuarine environments (and the majority of NSW estuaries) fall into groups 2 to 4, the remaining groups include types that either comply with Day's (1980) definition of an estuary, or are directly linked to estuarine environments at least part of the time. The various estuary types (at least those with a water area greater than 0.05 km^2) differ in their frequency of occurrences and respective distributions along the NSW coastline (Roy 1982; West *et al.,* 1985; Roy *et al.,* 2001).

a) Bays or open ocean embayments

Ocean embayments are rare (five in total) and, with the exception of Sydney's Botany Bay, are all located on the south coast: Jervis Bay; Ulladulla Harbour; Batemans Bay; and Twofold Bay. These are characterised by marine waters and have little freshwater inflow; they are transitional between true

estuaries and the coastal ocean. Within such embayments, tides are unimpeded, and ocean swells retain a strong influence well inside the entrance. These estuaries are normally wide and reasonably deep, and internal currents are therefore usually weak, but considerable wave-induced water movement can occur in the shallows.

b) Tide-dominated estuaries

Tide-dominated estuaries are represented in NSW by drowned valley estuaries such as Broken Bay and Sydney Harbour (Roy *et al.,* 2001). Drowned valley estuaries are also relatively uncommon (eight in total), and are concentrated on the central part of the NSW coast, especially near Sydney (e.g. Broken Bay, Port Jackson, Georges River and Port Hacking). These estuaries are characterised by convoluted shorelines, with deep sheltered tributaries and lots of sheltered bays. These estuaries are subject to most of the oceanic tidal range throughout all but their uppermost reaches. Currents are usually weak within the sheltered bays and tributaries, but may be moderately strong within the main water body, particularly where a point or island impinges on the main tidal flow. Complex tidal circulation patterns involving eddies and back-flows are typical (e.g. Das *et al.,* 2000). Ocean swells normally only penetrate the lower reaches, and river discharge has little influence, except during floods. Drowned valley estuaries are typically larger than the other types of estuary occurring along the NSW coastline (West *et al.,* 1985; Roy *et al.,* 2001).

c) Wave-dominated estuaries

There are 49 wave-dominated estuaries in NSW, and are represented by barrier estuaries such as Lake Macquarie and by interbarrier estuaries such as Tilligerry Creek, Port Stephens, of which there are only six (Roy *et al.,* 2001). The characteristics of barrier estuaries depend greatly on the degree of infilling or maturity (Roy 1982; Roy *et al.,* 2001).

Immature barrier estuaries, such as Lake Macquarie, Wallis Lake and Brisbane Waters have a wide basin (lagoon) linked to the ocean by a narrow entrance channel, which in most cases remains open to the ocean. In such estuaries, tidal range normally decreases dramatically as one travels upstream through the entrance channel, such that within the basin, the range is usually only a small fraction of that of the open ocean. Tidal currents are strong in the entrance channel, but very weak within the basin itself where local wind waves and wind-induced water movements are the dominant sediment transporting mechanisms. Also, ocean swells are quickly attenuated in the lower end of the entrance channel.

Mature barrier estuaries such as Tweed, Richmond, Clarence, Hunter and Shoalhaven Rivers have become infilled to the point where a distinct basin is lacking, the entrance channel configuration continues throughout the estuary. In such cases freshwater input is usually high (probably explaining the high degree of historical infilling) and the main river channel (possibly split into two or more arms) essentially continues all the way to the ocean. Such estuaries have become river dominated (Roy *et al.,* 2001). True wave-domination has been lost, currents (due to a combination of river discharge and tidal action) are normally moderate to strong throughout most of the system, and tidal range decreases only gradually with distance upstream. As in immature barrier estuaries, ocean swells do not penetrate far beyond the entrance. Whilst barrier estuaries occur behind a single coastal sand barrier, interbarrier estuaries occur between two such barriers of differing geological age.

d) Intermittent estuaries

Intermittent estuaries are represented in NSW by saline coastal lagoons such as Smiths Lake, and by small coastal creeks such as Harbord Lagoon (Roy *et al.,* 2001). There are 57 saline coastal lagoons in NSW and they are especially common in the south. The larger and/or better known examples include Lake Innes/Lake Cathie, Smiths Lake, Narrabeen Lagoon, Lake Wollumboola, Swan Lake and Coila Lake. Small coastal creeks are quite rare in NSW, with only five examples, all of which are in the northern half of the State.

These are similar to the immature barrier estuaries discussed above, except that are only periodically open to the ocean. Because of relatively small catchments and therefore river discharges, beach sand blocks their mouths for much of the time. Openings, usually in the form of a narrow entrance channel, normally occur as a result of heavy rainfall within the catchment, possibly in conjunction with high tides and heavy seas. Such lakes may open naturally, or be opened mechanically to alleviate flood threats (NSW Fisheries 1999a; O'Loughlin *et al.,* 1999; Roy *et al.,* 2001). Whilst open, their hydrology usually becomes similar to that of immature barrier estuaries. During periods of closure tidal influence ceases, however longer term changes (over weeks or months) in water level may occur according to the balance between inflow and evaporation (NSW Fisheries 1999a). Intermittent estuaries are typically smaller than the other types of estuary occurring along the NSW coastline (West *et al.,* 1985; Roy *et al.,* 2001).

e) Freshwater bodies

Coastal freshwater bodies are represented in NSW by 'brackish barrier lakes' such as Myall Lakes, of which there are only four, and by backswamps such as Everlasting Swamp in the Clarence River system. Many of the backswamps have been drained or modified. These water body types have at least occasional linkages (particularly during floods) to either the sea or a true estuary. These linkages facilitate the passage of nutrients, organic matter and aquatic organisms.

APPENDIX F2 ESTUARINE HABITAT DESCRIPTIONS

1. Seagrass

Seagrasses are flowering plants that live and reproduce completely submerged in seawater (King 1981a; West 1989). They are rooted in the sediments, with the leaves appearing above the ground. They produce flowers and seeds, similar to terrestrial grasses (Keough and Jenkins 1995). Six species of true seagrass are found within NSW (West 1989). Strapweed (*Posidonia australis*) has straight broad leaves and grows from just below the water surface to a depth of 35 m, largely dependent upon water clarity (Keough and Jenkins 1995). Their leaves are often up to 60 cm long and 10-15 mm wide. Of eight known from around Australia, only one species occurs in NSW. There are three species of narrow-leaved seagrasses, commonly called eelgrass, found in NSW. Their leaves are generally only a few millimetres wide and less than 30 cm long. These include *Zostera capricorni, Z. muelleri* and *Heterozostera tasmanica*. Eelgrass is found in very shallow water, often on mudflats that are exposed at low tide (Keough and Jenkins 1995). The other true seagrasses are referred to as paddleweeds and in NSW include the species *Halophila ovalis* and *H. decipiens*. They have small, oval-shaped leaves generally less than 5 cm long. Unlike the other seagrasses, these do not form extensive beds, but are generally found on their own in deeper water or mixed in with beds of the other seagrasses (Keough and Jenkins 1995). Although not a true seagrass, sea tassel (*Ruppia maritima, R. megacarpa* and *R. polycarpa*) is often considered as such and is included here. Unlike the true seagrasses, sea tassel does not live in seawater, preferring fresh to brackish conditions and is usually pollinated above the water surface (West 1989).

Seagrass is widely recognised as an important habitat for juvenile fish (e.g. SPCC 1981a; Pollard 1984; Bell and Pollard 1989; Connolly 1994), but it serves many more roles than the mere provision of food and habitat for species of economic value. They are also reported to: prevent erosion by restricting water movement and binding sediment (Fonseca *et al.,* 1982; Scoffin 1970); form the basis of food webs through high productivity and providing detritus (Borowitzka and Lethebridge 1989; Hillman *et al.,* 1989); provide surfaces for colonisation by epiphytes and periphyton (Harlin 1975; Pollard and Moriarty 1991); and trap and recycle nutrients (Hemminga *et al.,* 1991). Some studies have also reported the importance of detached seagrass supporting abundant fish communities adjacent to the beaches upon which it washes up on, forming accumulations known as wrack (Lenanton *et al.,* 1982). In northern Australia, seagrasses form a major component of the diet of dugongs and turtles, but in more temperate environments such as NSW, few animals actually directly consume seagrass (Klumpp *et al.,* 1989). Rather, as stated above, its importance to most megafauna is in the provision of food and habitat for the species upon which they feed.

The overall assemblages associated with seagrass beds have been defined into a number of ecological groups (Howard *et al.,* 1989). Periphyton consists of microscopic organisms such as bacteria and single-celled plants, which cover the seagrass blades. Epiphytes are multi-celled plants, such as algae, that cover the leaves. Infauna are animals that live in the sediment and rhizomes, including worms, bivalve molluscs (e.g. pipis) and crustaceans (e.g. nippers or yabbies). Mobile epifauna are usually smaller, mobile animals associated with the surface of the sediment, among debris or on the blades, and include gastropod molluscs (e.g. snails) and crustaceans (e.g. crabs and amphipods). Sessile epifauna are animals attached permanently to stems or leaves. Epibenthic fauna

are larger, often predatory, mobile animals that are associated loosely with the seagrass bed itself rather than individual leaves, and include crabs, prawns and fishes.

Seagrasses provide an important resource for many species of fish targeted by the estuary general fishery. While fish rarely eat seagrass itself, they do eat attached epiphytes and eat the small invertebrates that live among the seagrass (Bell and Pollard 1989). Many species of fish of economic importance, including marine species, arrive in seagrass beds as small juveniles, including yellowfin bream, tarwhine, snapper, luderick, blue groper, silver biddy and several leatherjackets. Other, non-commercial species that are commonly associated with seagrasses include pipefishes (Syngnathidae), gobies (Gobiidae), scorpion fishes (Scorpaenidae) and toadfishes (Tetraodontidae) (Lincoln Smith and Jones 1995). Some species remain in the seagrasses their entire lives, whereas some species move to other habitats, including other species of seagrass, as they grow. Different species of seagrasses are known to support different assemblages of fish and invertebrates (SPCC 1981a; Middleton *et al.,* 1984), and other studies have also reported that the position of seagrass beds within an estuary is also important. Within the larger estuaries, beds closest to the mouth of the estuary supported a greater abundance and diversity of juveniles than those further upstream (Bell *et al.,* 1988; Hannan and Williams 1998; McNeill *et al.,* 1992).

Almost all estuaries have some cover of seagrass, but four estuaries account for more than 50% of the total area of seagrass in NSW: Wallis Lake 30%; Clarence River 15%; Lake Macquarie 10%; and Tuggerah Lakes 7%. These and other barrier estuaries contain most of the larger seagrass beds, the exception is Jervis Bay (6%), which is an open ocean embayment. Those estuaries thought to have little or no seagrass are predominantly very small, intermittently open estuaries. It is not only the distribution that is important, it is also the composition and quality of the seagrass beds. For example, in poorly flushed estuaries such as Tuggerah Lakes, some seagrass has been smothered by algae, whilst in Botany Bay, altered wave regimes have caused sea bed erosion and seagrass loss (West 1989; Keough and Jenkins 1995). In other estuaries, the species composition of seagrass beds has been altered. Eelgrass has replaced strapweed in parts of Botany Bay (Keough and Jenkins 1995), and paddleweed has replaced eelgrass in parts of Lake Macquarie (King 1986). As discussed above, such changes have implications for the types of assemblages that beds, and ultimately estuaries, can support.

2. Mangroves

Mangroves are trees and shrubs that grow in soft sediments in the intertidal zone of estuaries, generally in sheltered areas where silt can accumulate. They usually form dense forests when conditions are optimal, but can exist as small, scattered trees on rocky shores in extremely sheltered areas (Chapman and Underwood 1995). Mangroves usually spread their roots out widely in the upper layers of sediment, as opposed to vertically, in order to maximise exposure to oxygen and to enhance stability in otherwise unstable substrata (Chapman and Underwood 1995). Many mangroves also have aerial roots called pneumatophores, which arise vertically out of the sediment and absorb oxygen and other gases. It is thought that sub-optimal growing conditions, particularly in polluted environments, results in an increase in the numbers of pneumatophores (Hutchings and Saenger 1987). In order to survive in saline environments, mangroves either secrete salt through glands in their leaves, exclude salt via a filtering system or accumulate it in old leaves (Chapman and Underwood 1995). Of over thirty species known in Australia, five have been recorded in NSW (West *et al.,* 1985). These include the grey (*Avicennia marina*), river (*Aegiceras corniculatum*), milky (*Excoecaria agallocha*), spider (*Rhizophora stylosa*) and large-leafed mangrove (*Bruguiera gymnorrhiza*).

Like seagrasses, mangroves have been widely recognised as important ecological communities, and some studies suggest they are the most productive (in terms of organic matter produced per hectare per year) of all estuarine habitats (Larkum 1981). They: provide habitat for a variety of fish and invertebrates (e.g. SPCC 1981a & b; Pollard and Hannan 1994; Robertson and Alongi 1995); provide organic materials that form the basis of detrital food chains (West 1985; Robertson and Alongi 1995); provide feeding and roosting habitat for numerous species of birds (Chapman and Underwood 1995); stabilise sediments (West 1985; Robertson and Alongi 1995); recycle nutrients (Robertson and Alongi 1995); and act as a filter system between the land and aquatic environment (NSW Fisheries 1999a). Many commercially important marine and estuarine species live in mangrove channels as small juveniles including yellowfin bream, luderick, dusky flathead, silver biddy, sea mullet, flat-tail mullet, prawns and mud crabs. They also feed and shelter in mangrove channels as adults, as do several non-commercial species (Bell *et al.,* 1984). As mangroves are partially drained at low tide, there are few resident fishes of mangroves, rather they are visited during high tide by species from adjacent habitats (Hutchings and Recher 1974; Rooker and Dennis 1991). Resident species are likely to include gobies, perchlets and toadfish.

Mangroves are not as widespread as seagrasses because of their reliance upon more marine conditions. As such, they are rarely recorded from estuaries that are intermittently open to the sea, which comprise about 50% of all estuaries. Further, three estuaries, Port Stephens (25%), Hunter River (15%) and Hawkesbury River (10%) account for 50% of the total area of mangroves recorded in NSW. These are all located in the central region of the State, are large in terms of surface area and are permanently open to the sea.

3. Saltmarsh

Saltmarsh refers to a collection of herbaceous plants and low shrubs that can tolerate highly saline soils and at least occasional inundation by seawater (King 1981b; Morrisey 1995). Generally, they are found on the high shore between average high water of spring and neap tides and consequently often remain covered by water for long periods (Morrisey 1995). They develop on shorelines in estuaries with soft sediments and along sheltered parts of the coast, usually behind sandbars and in bays. As such, they are less common in the relatively steep-sided drowned river valleys and more common in barrier and coastal lagoons. Saltmarshes are relatively flat, with shallow pools separated by mounds that are usually vegetated. The plants that make up saltmarshes belong to a small number of families, most notably the grasses (Poaceae), saltbushes (Chenopodiaceae), rushes (Juncaceae) and sedges (Cyperaceae), and although more than 200 species have been recorded in Australia, most assemblages contain only a few species (Morrisey 1995). Further, the species are generally divided into distinct zones across the marsh, or up the shore. In NSW, the lower shores are dominated by samphire (*Sarcocornia quinqueflora*), with saltwater couch (*Sporobolus virginicus*) on the slightly higher ground. Rushes (particularly *Juncus kraussii*) are also often prominent, especially near landward margins. Other common species include streaked arrow-grass (*Triglochin striata*), seablite (*Suaeda australis*) and *Samolus repens*.

There has been little work done in Australia on the value of saltmarsh as fish habitat, and extrapolations from studies in the Northern Hemisphere are not possible because they relate to fundamentally different marshes. Not only is the species composition different, but the plants are much taller than their analogues in NSW (Adam *et al.,* 1988). Overall, saltmarshes are thought to play a similar water filtration role to that outlined for mangroves (Adam *et al.,* 1985). They are also commonly regarded as highly productive (Zann 1996), although specific information on details such

as energy pathways, and the export of detritus to adjacent habitats, is very limited and invariably from overseas studies in different types of saltmarsh to those in NSW (Morrisey 1995; Adam *et al.,* 1985).

Due to their perceived high productivity, it is probable that the major role of saltmarshes as far as fish and invertebrates are concerned is in the export of organic material to estuarine and marine environments. Numerous overseas studies have reported the importance of saltmarsh creeks as juvenile fish habitat, but as stated previously these marshes are very different to those in NSW, which do not have major contiguous creeks flowing through them (Adam *et al.,* 1985).

Williams *et al.,* (1995) studied saltmarsh fish communities as part of a major study of habitat rehabilitation in the lower Hunter River. The most common commercial species were flat-tail mullet and yellowfin bream. Individuals of these two species were mainly juveniles, but also included some adults. The non-commercial species included gobies, perchlets and sprats. Morton *et al.,* (1987) sampled fish in a tidal inlet to a saltmarsh in southern Moreton Bay, Queensland. Nineteen species of fish were recorded, 11 of which were of economic importance. Banded toadfish were the most common species (~ 27%), followed by flat-tail mullet (~ 25%) and yellowfin bream (~ 16%).

Saltmarshes also provide important habitat for birds, crabs, molluscs and insects (Morrisey 1995). Saltmarshes are used by a large variety of migratory and resident birds for feeding, roosting and/or breeding, including egrets, sandpipers, curlews, whimbrels, plovers, dotterels and banded stilts (Morrisey 1995; Zann 1995, 1996). They also provide habitat for some terrestrial species, such as chats and parrots, and several birds of prey, such as brahminy kites, whistling kites and harriers.

Saltmarsh is widely distributed and occurs within estuaries along the entire NSW coastline. In 1985, the total area occupied by saltmarsh within NSW was approximately 57 km^2 (West *et al.,* 1985) and, as with the other estuarine habitats, only a few estuaries account for more than 50% of the total over. Port Stephens has the largest area of saltmarsh, 7.7 km^2, and when added to Karuah River (an arm of Port Stephens) with 4.8 km^2, they account for 25%. Lake Innes/Cathie (12%), Hunter River (10%) and Wallis Lake (8%) also have extensive areas of saltmarsh. Like seagrass and, to an even greater degree, anthropogenic processes have affected many areas of saltmarsh. Those near urban centres are degraded because of weed infestations, dumping, stormwater runoff and damage from off-road vehicles (Adam *et al.,* 1988; Zann 1995, 1996). Significant losses have occurred as a result of reclamation and drainage and it is suggested that along the Central Coast, more than half of the original saltmarsh area may have been lost (Adam *et al.,* 1988; Zann 1995, 1996). In some cases, local destruction or modification of saltmarsh will have occurred where foreshore works, such as floodgates, culverts and levee banks, impede tidal exchange (Williams and Watford 1996).

4. Unvegetated soft substrata

Unvegetated soft substrata, including shallow mudflats, sandflats and deeper areas, are the most common habitat in estuaries, yet are largely ignored because of their lack of physical structure. Their type and distribution have not been recorded in previous estuarine inventories, rather mapping vegetated areas (West *et al.,* 1985; Bell and Edwards 1980) has implied their extent. Such mapping, however, does not discriminate between sandy and muddy areas, which support different assemblages of invertebrates and therefore probably different fishes and birds.

In comparison to vegetated habitats such as seagrass and mangroves, intertidal shores have not been studied much in Australia (Inglis 1995), possibly because of their lack of habitat complexity and readily identifiable features. Intertidal shores can comprise both sandflats and mudflats, the major difference being the relative proportions of sand, silt, clay and organic matter in the sediment.

Sandflats are generally found near the mouths of estuaries, where there are stronger currents and wave action, and sand. Mudflats are located further upstream in more sheltered environments, where silt and clay that has been carried downstream from the upper catchment settles out in response to a reduction in flow and mixing with more saline waters (DPWS 1992). Mudflats remain saturated during low tide due to their smaller particle size and chemical properties prohibiting the creation of large spaces between particles (Inglis 1995). This also causes minimal flushing with oceanic water, and combined with the decomposition of organic matter, causes all but the top few centimetres of sediment to become deoxygenated (Inglis 1995). As most animals can not survive anoxic conditions, mudflats are comprised of a distinct set of fauna, which is discussed in detail below.

Most of the studies of assemblages of fish associated with unvegetated sediments have been done in comparison to vegetated habitats such as seagrass (e.g. Gray *et al.,* 1996; Connolly 1994; Ferrell and Bell 1991; SPCC 1981a). Such studies generally found that seagrasses supported more diverse and abundant assemblages, but that bare sand was also important for some species, particularly sand whiting, sand mullet, silver biddy, snapper, flatheads and flounders (SPCC 1981a; Gray *et al.,* 1990; Ferrell and Sumpton 1997). Bare substrata are also important habitat for many species of baitfish, particularly sprats and sardines (Clupeidae), hardyheads (Atherinidae) and anchovies (Engraulidae) (Lincoln Smith and Jones 1995). SPCC (1981a) recorded 102 species from soft bare substrata within Botany Bay and, in relation to other habitats types within the bay, concluded that many species of marine and estuarine fishes inhabit soft bare substrata during at least part of their life cycle. Whilst not generally recognised as nursery habitat to the same extent as are vegetative habitats such as seagrass, bare substrata, particularly that adjacent to seagrasses, provides further habitat complexity within an estuary and important habitat for the adults of many species.

In addition to fishes, soft substrates are inhabited by a large variety (often hundreds of species) of invertebrates including polychaete worms, crustaceans and molluscs collectively termed benthos (Rainer 1982; Jones *et al.,* 1986; Morrisey *et al.,* 1992a & b; CSIRO 1994). Depth, salinity, sediment size characteristics and the degree of sediment movement are among the physical factors that determine benthic community composition (Jones and Candy 1981; CSIRO 1994; Zann 1996). Irrespective of specific assemblage composition, benthos can be broadly classified according to their method of feeding (Morrisey 1995). Suspension-feeders trap suspended organic material, microbes and small animals from the water above the sediment. Deposit-feeders obtain food by swallowing the sediment itself. Browsers move over the surface of the sediment consuming organic matter. Predators often live in tubes or burrows waiting for their prey to pass by, or roam the surface of the sediment in search of prey (e.g. crabs and prawns). Scavengers are the final group and consists largely of gastropod molluscs feeding on decaying animal matter. Any or all benthos can be subsequently eaten by many species of fish (SPCC 1981b). Sand whiting and silver biddy feed on polychaete worms and small crustaceans, whilst yellowfin bream eat worms, molluscs and larger crustaceans.

Bare substrata are no less prone to modification than other habitats. Human impacts are particularly evident in those estuaries supporting major port facilities and/or having extensive industrial/residential development in their catchments; e.g. Newcastle Harbour, Port Jackson and Port Kembla. Large areas within these estuaries have been made deeper and muddier as a result of dredging (e.g. Jones and Candy 1981; Birch *et al.,* 1997), and contaminated by nutrients, heavy metals and toxic chemicals (Shotter *et al.,* 1995; Birch 1996; Birch *et al.,* 1996, 1997; Irvine and Birch in press). With respect to benthic invertebrates, these impacts are likely to have resulted in reduced diversity (e.g. Jones and Candy 1981) and shifts in community composition (Jones 1997).

As stated previously, bare substrata have not been included in estuarine inventories done in the past in NSW (e.g. Bucher and Saenger 1991; West *et al* 1985; Bell and Edwards 1980). The distribution of the major intertidal shores, however, has been inferred by a mapping program by the EPA (formerly the SPCC). The EPA mapped the distribution of coastal resources that could be affected by oil spills, and used records of occurrence of wading and threatened birds from the NPWS database and waterway maps to map their occurrence within estuaries (S. Carter, NSW Fisheries, pers. comm.). Most such areas are found in the lower parts of estuaries where sandflats are utilised, and in the upper parts where mudflats dominate.

5. Rocky Shores and Reefs

The other key habitat within estuaries is that of intertidal rocky shores and subtidal rocky reefs, although they are far less common than the other habitats. Rocky shores include both natural reef and man-made habitats such as breakwaters (SPCC 1981a; Pollard 1989). Natural rocky shores are most common in the drowned river valleys such as Port Jackson, Hawkesbury River and Port Hacking (Morrisey 1995), and artificial rocky shores are common at the mouths of many barrier estuaries, such as Clarence River and Wallis Lake. The areas of rocky shorelines and reefs have not been mapped in previous inventories.

There are no studies of overall distribution or physical or biological composition within NSW estuaries. It is likely that many estuarine reefs, being subject to freshwater influence, are relatively species-poor, providing interim habitat for larger juvenile fish moving between nursery habitats (such as seagrass and mangroves) and habitats used by adults (SPCC 1981b).

Many species of fish and invertebrates depend on rocky reef habitat for some or all of their life (e.g. SPCC 1981b; Hamer 1986). Species of economic importance include rock blackfish, red morwong, luderick, bream, octopus, eastern rock lobster and abalone. Also, many of the protected aquatic species in NSW depend on rocky reef habitat for part, if not most of their life cycle, including grey nurse shark, blue devil fish, elegant wrasse, black and estuarine cod, blue groper, Australian bass and estuary perch (NSW Fisheries 1999a).

Diverse assemblages of brown, red and green macroalgae, along with sponges, ascidians and other sessile invertebrates enhance habitat complexity of rocky shores and reefs and provide many opportunities for specialisation (e.g. Jones and Andrew 1990; Lincoln Smith and Jones 1995). The large macroalgae (such as kelp) that partially cover most rocky reefs enhance overall species diversity by providing patches of shaded habitat favoured by distinct assemblages of organisms (Kennelly 1995). Also, rocky reefs along most of the NSW coast, including those within estuaries, are utilised on a seasonal basis by juveniles of tropical species. These juveniles are swept southward by the East Australian Current each summer and autumn (Kailola *et al.*, 1993; Kuiter 1993), but do not usually survive the winter or, if they do, they fail to establish breeding populations (Lincoln Smith and Jones 1995). Rocky reef provides refuge and feeding opportunities for a variety of fish and mobile invertebrates (e.g. SPCC 1981b; Jones and Andrew 1990; Lincoln Smith *et al*., 1992; Lincoln Smith and Jones 1995). Small fish and invertebrates can escape predators by hiding in cracks and crevices and larger fish such as yellowfin bream, sergeant baker, wirrah and red rock cod, along with octopus and cuttlefish appear to use rocky reef as cover from which they can ambush passing prey. Pelagic fish including kingfish, tailor and Australian salmon are also attracted to rocky reef areas by aggregations of small baitfish such as yellowtail. Some fish, such as luderick, herring cale, surgeon fishes and drummers along with abalone and sea urchins eat drift and/or attached algae associated with rocky reefs (e.g. Hamer 1986; Jones and Andrew 1990).

It is apparent that there are numerous aquatic habitats within estuaries, and that they all serve different and important functions for fish and invertebrates targeted in the estuary general fishery. Rather than attempt to prioritise habitats in terms of importance however, it is more important to realise that they are interconnected. Loss of one habitat type or area is unlikely to be compensated for by the existence of an adjacent habitat. Studies suggest that in terms of habitat for juvenile fish and invertebrates, seagrass is the most important habitat, but if adjacent mangroves and saltmarsh are lost, then there is likely to be a drop in productivity and an increase in sediments and nutrients entering the system. These inputs could diminish the value of seagrass habitat or ultimately lead to its disappearance, with the resultant change in faunal composition. With this in mind, the following sections will highlight those areas of particular conservation significance within estuaries and assess the potential impact that the proposal is having, or could have on those habitats and areas.

APPENDIX F3 JAMBA AND CAMBA BIRDS

(Source: Simpson and Day 1996; Pizzey and Doyle 1984; NPWS Atlas of Wildlife database).

FAMILY	COMMON NAME	SCIENTIFIC NAME		DISTRIBUTION		
				region	timing	breeding
Procellariidae	Streaked Shearwater	*Calonectris leucomelas*	J,C	All	Su	no
	Wedge-tailed Shearwater	*Puffinus pacificus*	J	All	Sp & Su	all
	Fleshy-footed Shearwater	*Puffinus carneipes*	J	All	Su & Au	no
	Sooty Shearwater	*Puffinus griseus*	J,C	All	Sp, Su & Au	no
	Short-tailed Shearwater	*Puffinus tenuirostris*	J	All	Sp, Su & Au	no
Ardeidae	Cattle Egret	*Bubulcus ibis*	J,C	All	Winter	no
	White Egret	*Egretta alba*	J,C	All	All	all
	Eastern Reef Egret	*Egretta sacra*	C	All	All	no
Scolopacidae	Turnstone	*Arenaria interpres*	J,C	All	Sp & Su	no
	Eastern Curlew	*Numenius madagascariensis*	J	All	Sp, Su & Au	no
	Whimbrel	*Numenius phaeopus*	J,C	All	Sp & Su	no
	Little Whimbrel	*Numenius minutus*	J,C	1-4	Sp & Su	no
	Little Greenshank	*Tringa stagnatilis*	J,C	All	Winter	no
	Greenshank	*Tringa nebularia*	J,C	All	Sp & Su	no
	Wood Sandpiper	*Tringa glareola*	J,C	All	Sp & Su	no
	Grey-tailed Tattler	*Tringa brevipes*	J,C	All	Sp & Su	no
	Wandering Tattler	*Tringa incana*	J,C	1-5	Sp & Su	no
	Common Sandpiper	*Tringa hypoleucos*	J,C	All	Sp, Su & Au	no
	Terek Sandpiper	*Xenus cinereus*	J,C	All	Sp & Su	no
	Japanese Snipe	*Gallinago hardwickii*	J,C	All	Sp & Su	no
	Black-tailed Godwit	*Limosa limosa*	J,C	All	Sp & Su	no
	Bar-tailed Godwit	*Limosa lapponica*	J,C	All	Sp & Su	no
	Red-necked Stint	*Calidris ruficollis*	J,C	All	Aug-May	no
	Long-toed Stint	*Calidris minutilla*	J,C	All	Sp & Su	no
	Sharp-tailed Sandpiper	*Calidris acuminata*	J,C	All	Aug-Apr	no
	Curlew Sandpiper	*Calidris ferruginea*	J,C	All	Sp & Su	no
	Knot	*Calidris canutus*	J,C	All	Aug-Apr	no
	Great Knot	*Calidris tenuirostris*	J,C	All	Sp & Su	no
	Sanderling	*Crocethia alba*	J,C	All	Sp & Su	no
	Broad-billed Sandpiper	*Limicola falcinellus*	J,C	All	Sp & Su	no
	Ruff	*Philomachus pugnax*	J,C	1-4	Sp & Su	no
Rostratulidae	Painted Snipe	*Rostratula benghalensis*	C	All	All	all
Charadriidae	Mongolian Sand-Plover	*Charadrius mongolus*	J,C	All	Sp & Su	no
	Large Sand-Plover	*Charadrius leschenaultii*	J,C	All	Aug-May	no
	Eastern Golden Plover	*Pluvialis dominica*	J,C	All	Aug-Apr	no
	Grey Plover	*Pluvialis squatarola*	J,C	All	Aug-Apr	no
Stercorariidae	Pomarine Skua	*Stercorarius pomarinus*	J,C	All	Sp & Su	no
	Arctic Skua	*Stercorarius parasiticus*	J	All	Sp & Su	no
Laridae	White-winged Black-tern	*Chlidonias leucoptera*	J,C	All	Sp & Su	no
	Crested Tern	*Sterna bergii*	J	All	All	all
	Asiatic Common Tern	*Sterna hirundo*	J,C	All	Sp & Su	no
	Little Tern	*Sterna albifrons*	J,C	All	Sp & Su	Scattered*
	Caspian Tern	*Sterna caspia*	C	All	All	4-7
Accipitridae	White-bellied Sea-Eagle	*Haliaeetus leucogaster*	C	All	All	all

* denotes that little terns have historically bred in approximately 70 estuaries, but the numbers of successful sites is diminishing. The most successful sites at the time of this report were Harrington, Farquhar Inlet, Sawtell, Botany Bay and Lake Wollumboola.

APPENDIX F4 PROFILES OF THREATENED SPECIES

1. Fisheries Management Act 1994

a) Endangered species

Green sawfish (*Pristis zijsron*)

The following information was taken from the NSW Fisheries Scientific Committee's website (www.fsc.nsw.gov.au), which provides profiles of species listed in the *FM Act*. Green sawfish have been recorded in the tropical Indo-West Pacific from eastern Australia and Papua New Guinea through to western India, with a disjunct population off Mozambique and eastern South Africa. In Australia, the species occurs mainly in the tropics from Broome to southern Queensland, with individuals found as far south as Sydney and a single record from Glenelg, South Australia. In NSW, specimens have been collected from Byron Bay in the north to Parramatta River in the south, plus an unofficial record from Jervis Bay. The species is thought to grow to approximately 7.3 m in length and has been reliably recorded at 5 m, with males maturing by 4.3 m. This is a species with low fecundity and it is thought that they may have up to 20 young. They feed on fishes and benthic invertebrates, using the saw as a club to stun schooling fishes such as mullet, and as a shovel to uncover benthic animals (Allen 1989). Green sawfish have suffered a serious population decline in NSW. Prior to 1972, the species was regularly found in the shallow waters at the mouths of the Tweed, Clarence and Richmond Rivers and on outside ocean beaches such as Yamba. The last specimen from the Sydney region was taken in 1926. The causes of this decline are thought likely to include:

- bycatch in shallow water prawn trawling, and other netting methods in shallow water, as they would rarely have been returned to the water alive;
- targeted harvest for flesh, fins and saws. The fins command a high price in the shark fin trade and the saws are used in traditional medicine and were sold as curios; and
- habitat degradation.

Sawfish are also listed as vulnerable under the *EPBC Act* 1999.

Grey nurse shark (*Carcharias taurus*)

Grey nurse sharks are found around the world in inshore waters, primarily in sub-tropical and temperate regions around the main continental landmasses, with the exception of the eastern coast of North and South America and Antarctica. Known key sites for grey nurse sharks or major aggregations of the species in NSW can be found at reefs off Port Stephens, Seal Rocks, Forster, Laurieton, Batemans Bay and South West Rocks. Relatively little is known about the migratory habits of Australian grey nurse sharks. There is evidence from Australian data that suggests migrational movement, probably in response to water temperatures, up and down the coast. At certain times of the year, grey nurse sharks aggregate according to sex. Males are predominant in southern Queensland during July to October, while a high proportion of sharks off central NSW at the same time of year is composed of females. Grey nurse sharks are often observed just above the seabed in or near deep sandy-bottomed gutters or rocky caves, in the vicinity of inshore rocky reefs and islands, generally between 15 m and 25 m. They have also been recorded in the surf zone, around coral reefs, and to

depths of around 200 metres on the continental shelf. The diet of the adult grey nurse shark consists of a wide range of fish, other sharks, squids, crabs and lobsters, and some observations also suggest that schools of grey nurse sharks can feed cooperatively by concentrating schooling prey before feeding on them (Environment Australia 2000a).

In Australia, two populations are thought to exist, one on the east coast and one on the west. The east coast population has been recorded from as far north as Mackay and extends south around the greater part of the southern half of the continent. On the west coast, the population extends as far north as the North West Shelf. They are still found within this general historical range, but the east coast population is thought to have declined considerably. During the 1960s and 1970s, spearfishers took large numbers of grey nurse sharks and reduced the population to a low level. Setlining by commercial fishers also continues to take a small number each year, and the beach meshing program was also responsible for catching large numbers of grey nurse sharks up until 1975. Despite protection since 1984 in NSW waters, the species has not shown an increase in population size. Current research (quarterly surveys from November 1998) indicates a much lower adult population size than when the species was recommended to be listed as a vulnerable species in NSW (early 1999), and the status of juvenile numbers in the sampled population is uncertain (www.fsc.nsw.gov.au, 1999). These factors were also largely responsible for its listing as a vulnerable species under the *EPBC Act*.

b) Vulnerable species

Black cod (*Epinephelus daemelii*)

Black cod are found on estuarine and inshore reefs and deeper offshore reefs in temperate and subtropical waters of the southeastern Pacific. In Australia, they are found from Queensland to Kangaroo Island, although they are rare and probably only represented by non-breeding migrants in more southern areas. Hence, they are found along the entire NSW coastline, which is also the centre of the species' Australian mainland distribution (Heemstra and Randall 1993; Pogonoski *et al.,* In prep). Their maximum size is 1 - 2 metres in length, but are commonly only found up to 0.8 m (Hutchins and Swainston 1986). Smaller fish are females, which change sex to become male at around 1 m in length (Pollard unpublished). They are an aggressive, highly territorial species, and are usually found in association with caves, ledges or large underwater structures such as bridge pylons that they may occupy for life (Gill and Reader 1992; Henrisson and Smith 1994). Their numbers are reported to have declined significantly as a result of spearfishing pressure in the 1970s (Pogonoski *et al.,* In prep.). Lincoln Smith *et al.,* (1989) reported that 137 black cod were caught in spearfishing competitions in NSW in 1976 alone. Their territorial and curious nature, combined with their slow movement, is thought to have made them an easy target and a prize catch by both line and spearfishers, although they are no longer thought to be targeted by either group of fishers. Commercial fishers still report occasional captures, particularly from deeper offshore reefs. Historical, anecdotal evidence suggests that a decline in abundance in the Sydney region occurred around 1900 when coastal towns became populous and fishing and shipping pressures increased (Roughley 1916). Their slow growth and territoriality probably also prevents rapid recovery from decreases in population size. Despite protection in NSW waters since 1983, there is no evidence of an increase in their abundance.

Great white shark (*Carcharodon carcharias*)

White sharks are found worldwide in temperate, coastal waters but are rare in tropical waters. In Australia, they have been recorded from southern Queensland to northwestern Western Australia. There are no reliable estimates of the number of white sharks in Australian waters, but it is thought

that the numbers of fish are decreasing. Based on data sets from the region between Port Stephens and Wollongong, great whites appear to have suffered a population decline in NSW, with a reported decreases in annual catches in beach meshing from 1950s to 1990s, and less compelling evidence of decline from game-fishing landings (www.fsc.nsw.gov.au, 1998).

In many places around the world the white shark is a protected species (Environment Australia 2000b). This happened first in South Africa in 1992, then in Namibia, the Maldives, and in Florida and California. This species is now protected in all Australian states and territorial waters. It is believed that a white shark of 5 - 6m in length is likely to be 15 - 25 years old, and the most commonly encountered white sharks are between 3 - 4 m in length. Females mature at 4.5 - 5 m in length and males at probably less than 4 m, and as the fish matures, its diet changes. Fishes to about 2 metres normally eat squid and other fishes such as stingrays and other sharks. Adults eat seals, sea lions, dolphins and dead whales, although some will continue to eat fishes such as snapper. They have also been known to eat elephant seals, sea otters, turtles and sea birds. Great white sharks are also listed as vulnerable under the *EPBC Act*.

c) Protected species - Section 19 (totally protected)

Australian grayling (*Prototroctes maraena*)

Australian grayling are essentially a freshwater fish that inhabits coastal streams in southeastern Australia, including Tasmania. It is the only extant species in the family Prototroctidae, as the New Zealand grayling (P. *oxyrhynchus*) is presumed extinct. Australian grayling grow to about 300 mm or about 6 years, but are more common at around 250 mm. They form aggregations and spawn in freshwater between mid-May and mid-July, and many are thought to die shortly after spawning, at about 2 - 3 years of age. The larvae are apparently swept downstream to the estuary or the sea and sub-adult fish, 55 - 75 mm in length, return to freshwater habitats six months later (Faragher 1995). In the past, anglers often caught them during spawning aggregations, but they are now totally protected. Their diet includes small crustaceans, insects and their larvae and algae. Australian grayling appear to undergo long-term fluctuations in population abundance, with spawning success and larval survival governed by highly variable flows and unobstructed passage to the sea. These requirements are thought to have restricted their distribution to several river catchments on the far south coast of NSW (Faragher 1995). This species is also listed as vulnerable under the *EPBC Act* 1999.

Eastern blue devil (*Paraplesiops bleekeri*)

Eastern blue devils are recorded from coastal waters of southern Queensland to southern NSW, and seem common only south of Sydney to Ulladulla (Kuiter 1993). They grow to 40 cm in length and inhabit rocky reefs in both estuaries and offshore, in from 3 - 30 m depth. Eastern blue devil fish are totally protected.

Elegant wrasse (*Anampses elegans*)

Elegant wrasse are recorded from the southwestern Pacific, generally from central to southern NSW, Lord Howe Island, Easter Island and northern New Zealand. Juveniles are found in weeds in coastal bays and harbours, larger juveniles in small aggregations on coastal and estuarine rocky reefs and adults usually deeper to about 30 m (Kuiter 1993). They feed on a variety of invertebrates and algae. Females often occur in aggregations of up to 80 or more fish, in contrast to the singular, territorial males, and grow to about 30 cm. Elegant wrasses are totally protected.

Estuary cod (*Epinephelus coioides*)

Estuary cod are found on estuarine and inshore reefs along the NSW coastline from about Sydney northwards (Heemstra and Randall 1993; Pogonoski *et al.,* In prep.). They are reasonably territorial, but have been found in a wide variety of estuarine and marine habitats: within NSW estuaries, they are most likely to occur around drop-offs or in caves (Pogonoski *et al.,* In prep.). Estuary cod grow to about 1 metre in length (Kuiter 1993), and although they were probably never abundant in NSW estuaries, are considered vulnerable to a variety of fishing pressures including demand for the live fish trade (Pogonoski *et al.,* In prep.). Consequently, they are totally protected in NSW waters.

Queensland groper (*Epinephelus lanceolatus*)

The Queensland groper is fairly similar to the estuary cod, and has a similar range and habitat preference within NSW (Pogonoski *et al.,* In prep). They do, however, grow to a much larger size of up to 3 metres (Kuiter 1993). Queensland groper is totally protected within NSW waters for similar reasons to those applicable to the estuary cod (see above).

Weedy seadragon (*Phyllopteryx taeniolatus*)

Seadragons are a member of the family Syngnathidae, which also includes seahorses and pipefishes. An unusual feature of this family of small fishes is that the male broods the young, which leave the brood pouch at a relatively advanced stage (Kuiter 1993). Weedy seadragons are found on estuarine and inshore reefs along the NSW coastline north to about Port Stephens (Hutchins and Swainston 1986). Their preferred habitat appears to be the interface between kelp beds and sand (Kuiter 1993). Their maximum size is about 45 cm (Kuiter 1993). The species is quite common in its preferred habitat and population numbers are not thought to have declined (Pogonoski *et al.,* In prep.), however, due to its vulnerability to over-collecting for the aquarium trade, it is totally protected within NSW waters.

d) Protected species - Section 20 (protected from commercial fishing)

Australian bass (*Macquaria novemaculeata*)

Australian bass are primarily a freshwater fish, found in coastal rivers, lakes and estuaries along the entire NSW coastline (Pollard and Growns 1993). They occur from as far north as Fraser Island off Queensland, to Wilsons Promontory in Victoria. Adults migrate downstream to breed in estuaries during winter, with spawning success and subsequent recruitment linked to flooding (Harris 1986). They feed on prawns, fish, molluscs and insects. Australian bass are a prized sportfish among anglers and are protected from commercial exploitation in NSW. Populations have declined in the face of previous harvesting of spawning aggregations, river regulation (affecting both fish passage and the frequency of flooding), and catchment alteration (Harris 1984; Pollard and Growns 1993).

Blue groper (*Achoerodus viridis*)

The blue groper is a marine fish that inhabit inshore rocky reefs along the entire NSW coastline (Kuiter 1993). Their young recruit to sheltered habitats that provide physical structure, including estuarine seagrass beds (Gillanders 1999). Larger juveniles are common around sheltered rocky reefs within the lower reaches of marine-dominated estuaries, and appear to move out to inshore reefs gradually as they grow (Gillanders 1999). They are a popular angling species, attaining at least 1.2 metres in length (Kuiter 1993). Populations appeared to decline sharply in the 1960s because of

fishing pressure and, although significant recovery has occurred in recent years, the species remains protected from spearfishing and commercial exploitation within NSW in view of its curious behaviour and popularity with SCUBA divers (Smith *et al.,* 1996).

Estuary perch (*Macquaria colonorum*)

The estuary perch has a similar distribution and biology to that of the Australian bass but it prefers slightly more saline waters, and is therefore more likely to be found in upper estuarine/ brackish water rather than freshwater areas (Merrick and Schmida 1984). Spawning occurs in saltwater areas of estuaries when temperatures reach 14.5 - 16^{o}C. Each female releases several hundred thousand eggs that float to the surface, where hatching occurs 2 - 3 days later. The diet of larger fish consists of prawns, worms, bivalve molluscs and fishes (Allen 1989). In view of its similarity to the bass, the estuary perch is subject to the same bag and size limits, and is also protected from commercial exploitation in NSW.

2. Threatened Species Conservation Act 1995

Unless otherwise specifically referenced, the following species profiles were obtained from the website of the NSW National Parks and Wildlife Service, at www.npws.nsw.gov.au/2001. The profiles for marine turtles and dolphins were obtained from the website of Environment Australia, at www.environment.gov.au , respectively.

a) Endangered species

Plants

Wilsonia rotundifolia

Wilsonia rotundifolia is a dwarf subshrub of the family Convolvulaceae. It is salt tolerant and occurs in coastal saltmarshes and inland saline sites. In coastal NSW, it is known from four coastal populations at Lake Wollumboola, Swan Lake, Meringo Lagoon and Lake Coila, and the total number of plants in coastal sites is only a few hundred. It occurs in mid marsh, mixed with *Sporobolus virginicus* and *Sarcocornia quinqueflora*. Trampling, by humans or cattle, results in stem breakage, and populations are potentially threatened by urban development (NPWS Scientific Committee Final Determination newsletter).

Birds

Beach stone-curlew (*Esacus magnirostris*)

Beach stone-curlews are exclusively coastal and have been recorded around the north coast of Australia and associated islands from Onslow in Western Australia to the Nambucca River in NSW, and rarely southwards to Forster (Marchant and Higgins 1993). They have largely disappeared from the southeastern part of its former range and are now rarely recorded on ocean beaches in NSW. They prefer open, undisturbed beaches, islands, reefs and estuarine intertidal sandflats and mudflats with mangroves nearby. They also frequent river mouths, offshore sandbars associated with coral atolls, reefs and rock platforms and coastal lagoons. They forage at low tide in search of crabs and other marine invertebrates. Threats to the species include loss of habitat due to residential and industrial development, human disturbance through beach-combing, boating and 4WD vehicles, predation by raptors, cats and dogs, nest destruction by pigs or high tides and nest desertion.

Bush stone-curlew (*Burhinus grallarius*)

Bush stone-curlews are widespread in the north and northeast of Australia (Marchant and Higgins 1993). This species has largely disappeared from the southern part of its former range, probably because of extensive clearing of woodlands. Records indicate that the species was once common throughout eastern NSW, but it is now restricted to populations at Gosford, Port Macquarie, Grafton, Port Stephens and Karuah. They prefer lightly timbered open forest and woodlands, particularly of casuarina, eucalyptus, acacia or polycarpa. They are occasionally recorded in mangroves and saltmarsh, especially when bordered by casuarinas, and have been recorded nesting within saltmarsh (Marchant and Higgins 1993). They feed on insects, molluscs, centipedes, crustaceans, spiders, frogs, lizards, snakes and some vegetation and seeds (Marchant and Higgins 1993). Threats to the species include loss of habitat due to residential and industrial development, intense cultivation, small subdivision, overgrazing and burning (Marchant and Higgins 1993).

Hooded plover (*Thinornis rubricollis*)

Hooded plover occur on sandy beaches and inland saltlakes of southeastern and southwestern Australia. They are endemic to southern Australia and are found along the coast from Jervis Bay to the western Eyre Peninsula in South Australia, along the coast of Tasmania, the Bass Strait Islands and from 30^{o}S on the Western Australia coast to the western edge of the Great Australian Bight. Occasional strays are recorded as far north as Sydney, but the most important sites for the species are on the south coast. Sussex Inlet, particularly on Bhewerre and Cudmirrah Beaches, is thought to support the highest density of hooded plovers, followed by the coastline between Lake Conjola and Lake Tabourie (Carter 1995). A survey in 1988 suggested the NSW population might be as low as 62 individuals of a total population of approximately 5000 (Marchant and Higgins 1993). Hooded plover are found most often on long stretches of sandy shore, backed by tussock or dunes covered in creeping plants with nearby inland lakes. Their preferred habitat has a wide wave-wash zone with beachcast seaweed for feeding, backed by sparsely vegetated sand dunes for shelter and nesting. Their diet includes polychaete worms, molluscs, crustaceans, insects, waterplants and seeds. Threats to the species include artificially high populations of silver gulls around human settlements leading to increased predation, predation by foxes and raptors, loss of habitat due to development for housing and recreation, human disturbance during the summer breeding season, particularly four-wheel driving along sand dunes and beaches, and destruction of nests by stock.

Little tern (*Sterna albifrons*)

Little terns are migratory or partly migratory seabirds. They occur from Shark Bay in Western Australia, around northern and eastern Australia, to the east coast of Tasmania and around to the Gulf of St Vincent in South Australia. In NSW, a second population of the subspecies *sinensis* predominantly occurs, which is migratory, breeding in the spring and summer along the entire east coast from Tasmania to northern Queensland. The other population of the subspecies breeds in Asia and migrates to Australia in summer, masking the size of the threatened, eastern Australian population. Little terns have been recorded nesting at 70 sites along the NSW coast, but at only 31 since 1987 and 11 in 1998/99. Since 1995, the largest, most successful colonies have been at Sawtell, Harrington, Botany Bay, Lake Wollumboola and more recently Farquhar Inlet (formerly known as Old Bar) (NPWS 2000b). In NSW, the species is strictly coastal. Most of the nesting sites are sand-spits, sand islands or beaches within or adjacent to the estuaries of rivers, creeks and coastal lakes. Nesting also occurs at some sites on ocean beaches well away from estuaries, but often with a large coastal lake nearby. Little terns in NSW feed predominantly, perhaps exclusively, on fish less than 10 cm long

and often generally referred to as whitebait. They include perchlets (*Ambassis* spp.), surfsardines (*Iso rhothophilus*) and sprats (Clupeidae), but may also include juvenile mullet, gudgeons, tailor and whiting. Most feeding occurs inside or at the mouths of estuaries and up to 500 m offshore. There are numerous threats to the species, and human disturbance has been identified as a major, and often the most important, factor leading to poor breeding success and abandonment of nest sites. Human disturbance can range from the extreme of 4WD and trail-bike use through to walking or simply sitting or fishing on the beach, all of which may keep the terns off nests. Others include adverse weather conditions, nesting at locations prone to flooding, predation by foxes, dogs, cats, rats and a variety of birds, coastal development, availability of food, damage to estuarine habitats and pollution (NPWS 2000b). It is also listed as endangered under the *EPBC Act* 1999.

Zannichellia palustris

Zannichellia palustris is a submerged, weakly rhizomatous aquatic annual or perennial plant. It has a cosmopolitan distribution, but in Australia is known only from the Murray River estuary in South Australia and the lower Hunter region in NSW. It is considered to be indigenous to NSW and is recognised as rare nationally. It occurs in fresh to brackish, still to slowly-moving waters, and recent collections of *Zannichellia palustris* in NSW are from Ironbark Creek and tributaries at Shortland and Wallsend, in Black Creek at Cessnock and in ponds on Kooragang Island. It has also been recorded from near Belmont. NSW populations of *Zannichellia palustris* behave as annuals and dieback completely each summer. The individual patches range from about 5 m^2 to 100 m^2, but vary from year to year. None of the known sites of *Zannichellia palustris* in NSW are formally protected, and none are managed in any way for the conservation of the species. Further, all the known sites are in areas where considerable changes have, and are continuing, to take place in their catchments. These changes in catchment land use may result in changes in hydrological conditions and water quality, which may affect the ability of the species to persist in areas where it is known to occur.

b) Endangered populations

Little penguins (*Eudyptula minor*) at Manly, Sydney Harbour

Little penguins, only found in Australia and New Zealand, once ranged from Swan River in Western Australia through Tasmania and up to Moreton Bay in Queensland, and may still occasionally venture that far. They are relatively common in the waters of southern Australia, breeding mainly on offshore islands. They generally breed from south of Port Stephens in NSW, including the Sydney region, along the coast through Victoria, South Australia, Tasmania and as far as Fremantle in Western Australia. In 1986, it was estimated that the total breeding population in eighteen known colonies in NSW consisted of 17,000 pairs, most at the large colonies on Montague, Tollgate and Brush Islands. It is now believed to be closer to 49,000 birds at 22 known sites, however, the population in North Harbour/Manly is the only population known to breed on mainland NSW, and consists of only approximately 50 breeding pairs.

Little penguins nesting habitat normally consists of burrows built in sand dunes, rockpiles, sea caves and occasionally under buildings. At Manly, a range of nest types are utilised, including under rocks on the foreshore, rock falls under seaside houses, garages, under stairs, in wood piles and under overhanging vegetation. Male penguins return to their colonies between June and August to reconstruct or dig new burrows and to attract females. About 3 months later, fledglings leave the nest and only return annually to moult until they are about 3 - 4 years old, when they return to breed.

Little penguins appear to be opportunistic feeders, foraging in relatively shallow waters. Their diet consists mainly of small schooling fish, like anchovies (*Engraulis australis*), pilchards (*Sardinops neopilchardus*), squid (Order Teuthida) and to a lesser extent, krill (Euphausiids). The population of penguins on Lion Island, in the Hawkesbury River, is also known to feed on blue sprats (*Spratelloides robustus*), small-mouthed hardyheads (*Atherinosoma microstoma*) and Ogilby's hardyheads (*Atherinomorus ogilbyi*).

The major threat to the Manly population is the loss of suitable habitat. Past development has greatly reduced available habitat in the area. Disturbance of little penguins and their habitat is also a major threat to the population. Predators such as dogs, cats, and foxes are known to take penguins from shallow burrows and as they move between the water and their nesting habitat. Commercial fishing has also been listed in the threat abatement plan as a threatening process, although there is currently no data to support the claim and fishing is not listed in the Act as a Key Threatening Process. Fishing, primarily hauling in this area, provides competition for food resources, disturbance due to noise outside burrows and may obstruct penguins from returning to their nests (NPWS 2000a).

c) Endangered communities

Shorebirds at Taren Point

The Taren Point Shorebird Community is the community of shorebirds that uniquely occurs on the relict marginal shoal of the Georges River that occurs between Taren Point and Shell Point in Botany Bay. This bird community is part of the highly diverse shorebird assemblage characteristic of rich coastal mudflats of eastern Australia dominated by species from the Order Charadriiformes (also known as waders). The features that distinguish the Taren Point Shorebird Community from other assemblages in Botany Bay is the unique occurrence of the vulnerable species Terek sandpiper, and a greater abundance of the small shorebirds such as red-necked stint, ruddy turnstone, red knot, curlew sandpiper, Pacific golden plover and grey-tailed tattler. There is also a general absence of sand plovers, which occur elsewhere in Botany Bay. The Taren Point Shorebird Community occupies an area that is defined by the distinct geological feature, which is a relict muddy-sand marginal shoal of the Georges River that was formed during the Holocene. The northern boundary is a small spit on the eastern side of the Captain Cook Bridge and the southern boundary is the terminal lobe of Shell Point. Threats to the survival of the community include intensification or alteration of uses of the area utilised by the community, and changes to the extent and distribution of the fringing mangrove community. Towra Point Nature Reserve is adjacent to the area occupied by this shorebird community, but it is of different geomorphological origin and does not provide alternative habitat for the Taren Point Shorebird Community.

d) Vulnerable species

Plants

Wilsonia backhousei

Wilsonia backhousei is a perennial, matforming, prostrate subshrub of the family Convolvulaceae. It often occurs as pure, or nearly pure, stands. At most sites, stands are limited in extent (in the order of a few $10m^2$). The most extensive stands occur around Jervis Bay. It is found in intertidal saltmarshes and, more rarely, on seacliffs. In NSW, *Wilsonia backhousei* is scattered along the coast, reaching its northern limit at Wamberal Lagoon. There has been a considerable decline in

the abundance of the species this century, largely because of loss of habitat. It is also readily damaged by trampling and vehicle use, and recovery from damage is slow (NPWS Scientific Committee Final Determination newsletter).

Reptiles

Green turtle (*Chelonia mydas*)

Green turtles occur worldwide and are found in tropical and subtropical waters. They inhabit seagrass beds and coral reefs with a good cover of seaweed. Adult turtles are herbivores, feeding on seaweeds and seagrasses, whereas immature turtles feed on jellyfish, small molluscs, crustaceans and sponges. Green turtles grow to an average of about 1 metre and are sexually mature generally between 91.5 – 122.5 cm CCL. They may migrate up to 3000 km from feeding grounds in Indonesia, Papua New Guinea, New Caledonia, Fiji, Queensland, Northern Territory and Western Australia to breed and nest in southern and northern Great Barrier Reef, northwest Northern Territory, Gulf of Carpentaria, Western Australia, Coral Sea and Ashmore Reef. Nesting generally occurs from late November to January and earlier in the Northern Territory from July to December. They recruit from the pelagic phase as immature turtles (CCL = 40 - 50 cm) to inhabit subtidal and intertidal coral and rocky reefs and seagrass meadows of the continental shelf. While they are most abundant within 1000 km of their nesting beaches, they live year round in coastal waters from central Western Australia, through Northern Territory and Queensland to central New South Wales, continuing to feed in waters as cool as 15°C. Green turtles are also listed as vulnerable under *EPBC Act* 1999.

Leatherback turtle (*Dermochelys coriacea*)

Leatherback turtles are the largest of the marine turtles, with shells averaging 1.6 metres in length and with a total weight of up to 500 kg. They are so named because of their leathery shell, which is black with lighter spots and has five ridges. They inhabit tropical and warmer temperate waters, feeding on jellyfish and other soft bodied invertebrates. Unlike other marine turtles, leatherbacks spend almost their entire life feeding within the water column and are generally regarded as an oceanic species. Leatherback turtles do not nest in Australia in any numbers. Only a small population of leatherback turtles has been found breeding and nesting in eastern Australia, mainly from December to January. In Queensland, 1 - 3 females per year nest on Wreck Rock and adjacent beaches, and sporadic nesting occurs at other widely scattered sites in Queensland, New South Wales and the Northern Territory. In Western Australia, there are 2 - 6 sightings off the mid-west coast per year. The major breeding and nesting sites in the Asia/Pacific occur in Indonesia, Malaysia, Papua New Guinea and the Solomon Islands. They are listed as vulnerable under *EPBC Act* 1999.

Loggerhead turtle (*Caretta caretta*)

Loggerhead turtles are found worldwide, inhabiting tropical and warmer temperate waters such as coral reefs, bays and estuaries. While they are most abundant within 1000 km of their nesting beaches, they live year round in coastal waters from southern Western Australia, through the Northern Territory and Queensland to southern New South Wales. The southern Great Barrier Reef and adjacent mainland near Bundaberg is the breeding centre of the eastern Australian population. Breeding is centred on Dirk Hartog Island (Shark Bay), Muiron Islands, Ningaloo and the North West Cape area for the western population. Loggerhead turtles eat shellfish, crabs, sea urchins and jellyfish. They reach sexual maturity at about 30 years or more and grow to an average of 1 metre in size. Loggerhead turtles migrate from feeding grounds in the Northern Territory, New South Wales and Queensland to the above nesting sites on the eastern and western Australian coastlines. Mating occurs from late

October to early December, followed by nesting from late October to early March. They recruit from the pelagic phase as immature turtles (CCL = 70 - 80 cm, >10 years) to inhabit subtidal and intertidal coral and rocky reefs and seagrass meadows as well as deeper soft-bottomed habitats of the continental shelf. They are listed as endangered under *EPBC Act* 1999.

Birds

Australasian bittern (*Botaurus poiciloptilus*)

The Australasian bittern occurs from southern Queensland to Tasmania and southeastern South Australia, including most of Victoria and New South Wales. It also occurs in the southwestern corner of Western Australia. In NSW, the species has been recorded along the coast as well as in wetlands of the Murrumbidgee and Lachlan Rivers and is frequently recorded in the Murray-Darling Basin. It inhabits terrestrial and estuarine wetlands, generally where there is permanent water with dense vegetation including sedges, rushes and reeds. Essentially a freshwater species, it also occurs in dense saltmarsh vegetation in estuaries and flooded grasslands. At dusk, the species forages in shallow water up to 30 cm deep, primarily feeding on frogs, fish, invertebrates (including crayfish), leaves and fruit. The major threats to the species include grazing and trampling of riparian vegetation and siltation of waterbodies by livestock, predation by foxes, regulation of waterways, clearing and draining of habitat, salinisation and pollution of wetlands and degradation of drought refuges.

Black bittern (*Ixobrychus flavicollis*)

The black bittern occurs from southern New South Wales, north to Cape York and along the entire northern coast to the Kimberley region. They also occur in the southwestern corner of Western Australia. In NSW, the species has been recorded scattered along the coast, rarely south of Sydney or inland. They inhabit freshwater and estuarine wetlands, generally where there is permanent water with dense vegetation. They occur in flooded grassland, forest, woodland, rainforest and mangroves. At dusk and at night, the species forages for reptiles, fish and invertebrates, including dragonflies, shrimp and crayfish. The major threats to the species include grazing and trampling of riparian vegetation by livestock, predation by feral cats, clearing and draining of habitat, and salinisation and pollution of wetlands.

Black-tailed godwit (*Limosa limosa*)

Godwits are migratory wading birds that breed in Mongolia and Siberia, and visit Australia during the summer, arriving in August and leaving in March. They are most common between Weipa and Darwin, but are also found in small numbers along much of the Queensland coast south of Cairns, south of Derby in Western Australia, the southeast of South Australia, and mainly around Port Phillip Bay in Victoria. In NSW, they have been regularly recorded only on Kooragang Island (Hunter River), with scattered sightings from both coastal and inland areas. Inland records, particularly within the Murray-Darling Basin, indicate that a regular inland passage is used. Godwits are primarily found along the coast on sand spits, lagoons and mudflats, and inland on mudflats of lakes and swamps. They have also been recorded in meadows and sewage treatment works. Their diet includes a variety of invertebrates such as insects and larvae, earthworms, crustaceans, molluscs, spiders, spawn and tadpoles of frogs and fish eggs. Threats to the species include hydrological changes to inland lakes and tourism or agricultural developments reducing coastal and inland habitat areas.

Broad-billed sandpiper (*Limicola falcinellus* subsp. *sibirica*)

This subspecies of sandpiper are migratory wading birds that breed in north and northeastern Soviet Union, and visit India, southeast Asia and Australia during the summer. In Australia, they are most common along the northern coasts, particularly the northwest, with occasional birds seen on the southern coasts and very few inland. In NSW, the main site for the species is the Hunter River, with records along the coast south to Shoalhaven River. They are known to favour estuarine sand- and mudflats, particularly areas of soft mud on the seaward side of mangroves, saltmarshes and reefs as feeding and roosting habitat. They have also been recorded in shallow freshwater lagoons and sewerage treatment works. Their diet includes insects, worms, crustaceans, molluscs and seeds. Threats to the species include hydrological changes to inland lakes (for individuals that remain in Australia over winter) and development of coastal estuaries, mudflats and saltmarshes.

Collared kingfisher (*Todiramphus chloris*)

Also called the mangrove or white-collared kingfisher, this species occurs in the northern half of Australia, from Carnarvon, Western Australia, to Ballina, NSW (Pizzey and Doyle 1984). They are commonly found in plant associations of the littoral zone, particularly mangroves, but also tidal creeks and adjacent beaches, mudflats and around jetties. They also nest in hollows in mangrove trees or cavities tunnelled into termite mounds. Unlike the azure kingfisher (*Ceyx azureus*), they do not feed exclusively over water, but forage mostly over land. Their diet includes reptiles, small mammals, nestlings and eggs of birds, and fish. Near water, they feed from the surface of the water and from mangrove mud.

Comb-crested jacana (*Irediparra gallinacea*)

In Australia, comb-crested jacanas occur in the north and northeast of the country, originally from the Kimberley region east to about the Hunter region in NSW. They are thought to have expanded this range, however, and are now recorded as far south as Bermagui (Marchant and Higgins 1993). They are found primarily in freshwater wetlands, lagoons, billabongs, swamps, lakes and rivers where there is an abundance of floating aquatic vegetation, particularly waterlilies, nardoo or milfoil. They feed on seeds and aquatic insects from amongst aquatic vegetation and debris. They nest on loosely constructed platforms of aquatic vegetation up to 10 m wide and in NSW, breeding takes place between September and April.

Freckled duck (*Stictonetta naevosa*)

Essentially a freshwater species, freckled ducks also occur in coastal districts of southeastern and southwestern Australia, particularly during drought years. Eastern breeding grounds include the Murray-Darling Basin, Lake Eyre and southwestern Queensland. In coastal areas, they prefer swamps heavily vegetated with ti-trees. They feed on algae, seeds and the vegetative parts of various aquatic grasses and sedges, small crustaceans, zooplankton, worms, insects and small fish. Threats to the species include loss of habitat and breeding sites, river regulation and illegal hunting.

Great knot (*Calidris tenuirostris*)

Knots are migratory wading birds that breed in Siberia and migrate to Australia in large numbers from late August, leaving in March and April. Some individuals may stay over winter. They occur throughout Australia, including the coastal islands of Tasmania, but is most common and abundant in the north, and uncommon to rare further south. In NSW, they have been recorded in scattered sites along the coast to about Narooma, and are primarily found within sheltered, coastal

habitats containing large intertidal sand- and mudflats, including in inlets, bays, harbours, estuaries and lagoons. They have also been recorded on exposed reefs or rock platforms. Their diet includes bivalve molluscs, gastropods, polychaete worms and crustaceans. Threats to the species include hydrological changes to inland lakes (for those that remain over winter) and tourism or agricultural developments reducing coastal and inland habitat areas.

Greater sand plover (*Charadrius leschenaultii*)

Sand plovers are migratory wading birds that breed in central Asia and migrate to Australia in summer. The species is commonly recorded on the west coast, but is apparently rare on the east coast. In NSW, they have been recorded in coastal areas from the northern rivers region south to Shoalhaven Heads, with the majority of birds recorded in the Clarence and Richmond Rivers. They forage on intertidal sand- and mudflats in estuaries, and roost during high tide on sandy beaches or rocky shores. They have also been recorded on inshore reefs, rock platforms, and small rocky islands and sand cays on coral reefs. Their diet includes insects, molluscs and crustaceans. Threats to the species include hydrological changes to the Clarence and Richmond Rivers and tourism or agricultural developments reducing coastal and inland habitat areas.

Lesser sand plover (*Charadrius mongolus*)

Lesser sand plovers are migratory wading birds that breed in eastern Siberia, southern Mongolia, western China and the Himalayas and migrate to the coasts of eastern and southern Africa, the Middle East, India, Southeast Asia and Australia in summer. The species occurs around the entire coastline of Australia but is most abundant in the Gulf of Carpentaria and along the east coast of Queensland and northern NSW. They are rarely recorded south of Shoalhaven River. They favour beaches, sandflats, mudflats and mangroves within estuaries, and roost during high tide on sandy beaches or rocky shores. In NSW, important estuaries for them include Port Stephens, Harrington Inlet and the Clarence and Richmond Rivers. Their diet includes crustaceans, molluscs, insects and polychaete worms. Threats to the species include hydrological changes to the Clarence and Richmond Rivers and tourism or agricultural developments reducing coastal and inland habitat areas.

Mangrove honeyeater (*Lichenostomus fasciogularis*)

Mangrove honeyeaters are found in mangroves and adjacent woodlands of coastal northeastern Australia, from Townsville in Queensland to Macksville in NSW (Pizzey and Doyle 1984; Simpson and Day 1996). Their nest consists of a deep cup of fine dry grass or dried seagrass in the fork of mangrove trees down to 60 cm above the high water mark. They usually feed on the blossoms of mangrove trees, but also descend to the mangrove floor at low tide to feed among the trunks and roots.

Osprey (*Pandion haliaetus*)

Ospreys have a disjunct distribution around the Australian coastline, occurring in the north from Broome in WA to the south coast of NSW, in the south from Kangaroo Island to the Great Australian Bight, and from Esperance to Cape Keraudren in the west (Marchant and Higgins 1993). In NSW, the osprey occurs primarily along the coast, south to about Womboyn Lake and is found in greater numbers in the north of the state (Marchant and Higgins 1993). They require extensive areas of clear, open water for fishing, often ranging up into freshwaters of larger rivers. They are found on offshore islands, littoral habitats, terrestrial wetlands and coastal lands of tropical and temperate Australia (Marchant and Higgins 1993). They nest in prominent positions near the ocean or large waterbodies, on rocky headlands, stacks, cliffs, palm trees, in tall dead trees, and on artificial

platforms (Marchant and Higgins 1993). More recently, particularly on the north coast of NSW, ospreys have been nesting on electrical supply poles as they provide the type of vantage points of their former natural habitat. The NPWS and NorthPower have been working together to customise these poles to avoid electrocution and to provide stable nesting platforms. They feed mostly on fish, clutching them from the surface of the water or diving to less than 1 m, and are able to eat toxic (Diodontidae, Tetraodontidae) and spiny fishes (Balistidae and Acanthuridae). They also feed on terrestrial vertebrates, seabirds and crustaceans (Marchant and Higgins 1993). Osprey are tolerant of human activity, often nesting within or adjacent to urban areas, but over clearing and degradation of water quality are likely to have an adverse impact on their nesting and feeding habitat (Marchant and Higgins 1993).

Pied oystercatcher (*Haematopus longirostris*)

The pied oystercatcher is distributed along the entire Australian coastline and offshore islands, with most key sites located in the southeast. These include The Coorong in SA, Derwent River in Tasmania and Corner Inlet in Victoria (Marchant and Higgins 1993). They roost and forage on sandy beaches, mudflats, sandbanks and rocky shores, and occasionally roost in mangroves. They also forage on oyster leases, but are more common at the low water mark on beaches where they probe soft substrata for molluscs, worms and crabs and sometimes take small fish from shallow water. They nest on sandy beaches, sandbars and along estuaries, immediately above the high water mark, as well as on sand dunes or saltmarshes and mudflats (Marchant and Higgins 1993). Threats to the species include alteration of habitat, human disturbance, destruction of nests and predation by foxes.

Sanderling (*Calidris alba*)

Sanderlings are an uncommon to locally common migrant from Siberia and other breeding grounds within the Arctic. They generally spend the summer in coastal areas of northern and eastern Australia and some individuals remain over winter. Sanderling prefer open sandy beaches exposed to open sea-swell, exposed sand bars and spits, and are also found in coastal areas on low beaches of firm sand, near reefs and inlets, along tidal mudflats and bare coastal lagoons. In NSW, important estuaries for them include Harrington Inlet and Old Bar at the mouth of Manning River. They forage at the edge of the water in the wave-washed zone and sometimes among rotting kelp, as well as at the edges of shallow pools on sandspits and mudflats. Their diet consists of insects and their larvae, crustaceans, jellyfish, fish, spiders, worms, plants and seeds, and larger molluscs and crustaceans are also taken as carrion. Threats to the species include hydrological changes to estuaries and similar waterbodies that may modify or remove habitat, and tourism or agricultural developments reducing coastal and inland habitat areas.

Sooty oystercatcher (*Haematopus fuliginosus*)

Sooty oystercatchers are endemic to Australia and are widespread along the east, west and south coasts, with scattered records from northern Australia. There are thought to be only small numbers of birds in NSW distributed evenly along the coast (Marchant and Higgins 1993), although the coastline between Lake Conjola and Lake Tabourie is thought to support more than 1% of the Australian population (Carter 1995). They are a strictly marine coastal species, preferring rocky intertidal shorelines with a minimal cover of foliose algae, coral reefs or sandy beaches near intertidal mudflats. They also occasionally forage on oyster leases, but are more common on intertidal rock platforms where they feed on molluscs, crustaceans, ascidians, echinoderms and small fish. When feeding on beaches, they take worms, larvae of seaweed flies and sandhoppers. They nest on offshore

islands and rock stacks, often close to rocky coasts, and sometimes on remote headlands, promontories or steep beaches (Marchant and Higgins 1993).

Terek sandpiper (*Xenus cinereus*)

The Terek sandpiper is a non-breeding migratory visitor to Australia's west, north and east coasts. In NSW, the species has been recorded from the Northern Rivers region south to Lake Wollumboola. The two main sites are the Hunter and Richmond Rivers, with the Hunter identified as nationally and internationally important for the species. They prefer muddy beaches near mangroves, coastal mudflats, lagoons, creeks and estuaries, but have been observed on rocky pools and coral reefs and occasionally up to 10 km inland around brackish pools. Their diet consists of polychaete worms, crustaceans, small shellfish, beetles, waterbugs, and the adults and larvae of various flies. Threats to the species include hydrological changes to estuaries that may modify or remove habitat, tourism or agricultural developments reducing coastal and inland habitat areas, urban and industrial development, and disturbance by recreational activities.

Marine mammals

Humpback whale (*Megaptera novaeangliae*)

Humpbacks have a worldwide distribution, but spend the summer months feeding in pelagic waters of Antarctica, generally between 60 – 70°S. In winter and spring, they migrate to warmer breeding grounds, 15 – 20°S, and are recorded in coastal waters off all states of except for the Northern Territory. There is distinct Northern and Southern Hemisphere populations based on temporal migration separation, and there are thought to be at least six Southern Hemisphere populations. Two of these populations are recorded off Australia's coastline, one off the west coast and the other off the east coast. There is thought to be a sex ratio bias towards males in east coast migration, and a possibility that not all females migrate north each year. Key localities within Australian waters include: Cape Naturaliste/Geographe Bay, north of Rottnest Island, Shark Bay, North West Cape, off Dampier Archipelago and coastal islands off Kimberley in Western Australia; southern coast, off Coffs Harbour and Cape Byron in New South Wales; Stradbroke Island, Hervey Bay, and islands in Great Barrier Reef, especially Whitsunday Passage area off Queensland. The exact locations of breeding grounds are unknown, although breeding occurs in central Great Barrier Reef area and there is probably a wide range of opportunity for breeding over several degrees of latitude on both the east and west coasts. Humpbacks feed mainly in Antarctic waters almost exclusively on krill (*Euphausia superba*). Elsewhere they feed on small shoaling fish and occasionally benthic organisms, and there is some evidence of feeding on fish and plankton swarms in warmer waters, e.g. off Eden and on larval *Munida gregaria* during their southern migration off New Zealand. Catches in the subtropics off northwest Western Australia and eastern Australia showed almost no evidence of local feeding. They feed by variety of methods, generally determined by their location. In the Southern Hemisphere, they feed by swallowing large volumes of prey and water or by disturbing the water, creating a washing machine effect. In the Northern Hemisphere, they feed by lunging and bubble feeding, which involves production of a bubble net formed by exhalation under water, concentrating prey. Humpbacks were heavily exploited by commercial operations until about 1970, and estimates suggest the population may have been reduced to 5% of its initial size by 1963. Despite international protection since then, recovery seems to have been delayed until mid-1970s, possibly mainly through continued illegal catches until about 1970. Current threats are thought to include direct disturbance on migration path and in breeding areas by:

- whale watching and research vessels/aircraft, pleasure craft, swimmers and divers;
- coastal seismic operations;
- defence operations;
- collision with large vessels;
- entanglement in fishing gear/shark nets; and
- pollution, including increasing amounts of plastic debris at sea, oil spills and dumping of industrial wastes into waterways and the sea, leading to accumulation of toxic substances in body tissues, although this is likely to be minimal given that it rarely feeds in low latitudes (Bannister *et al.,* 1996).

Humpback whales are also classified as vulnerable under the *EPBC Act*.

Indo-Pacific humpbacked dolphin (*Sousa chinensis*)

This dolphin occurs in southern China, through the Indo–Malay Archipelago to northern and northeastern Australia, where it is most regularly recorded in Western Australia (north of 24°S), Northern Territory and Queensland, with occasional strandings reported in New South Wales (mostly north of 29°S). They are primarily a coastal species, occurring in estuaries and rivers of tropical and subtropical climates. They occur close to the coast, in less than 20 m depth, although aerial surveys in the Great Barrier Reef region may have located them in waters between the outer reef and the mainland, further from shore than has been previously reported in the literature. Key localities for the species in Australia include Moreton Bay, Tin Can Inlet and Great Sandy Strait in Queensland. Their diet consists of a variety of species of fish, some cephalopods and crustaceans. They have been known to feed in association with prawn trawlers in Moreton Bay, and presumably elsewhere throughout their range in Australia. There is no reliable data on mortality rates or on abundance. In Moreton Bay, 36% of dolphins show evidence of shark attack, suggesting mortality from sharks may be significant. In South Africa, many animals also have very high levels of organochlorines, probably sufficiently high to kill a female's first calf, and it is possible that similar high pollutant loads occur in dolphins of Moreton Bay, but no data are available at present. Threats to the species are thought to include habitat destruction and degradation, noise pollution, harassment or disturbance (particularly close to major cities as in Moreton Bay), incidental capture in shark nets and trawl-nets, illegal killing, and overfishing of prey species. They are also prone to live capture for display purposes, in Queensland (permits granted for up to 12 per year at present) and northern NSW. Other potential threats include pollution and mass mortalities induced by pathogens.

Southern right whale (*Eubalaena australis*)

Southern right whales are circumpolar and only found in the southern hemisphere between approximately 30° and 60°S. They move from pelagic waters of higher latitudes where feeding occurs in summer, to warmer, lower latitudes for breeding in winter, when they approach close to the coast. In Australia, they are distributed around the southern coastline from Perth, WA to Sydney, NSW, including Tasmania. Their range is possibly extending, with recent sightings from Shark Bay and North West Cape, WA and north of Sydney to Cape Byron, NSW. Adult females are sighted most frequently close to coast, coming inshore to give birth on a mainly three-year cycle. Little is known about the diet of southern rights, but observations, lack of suitable prey and whaling data imply that they do not feed near the coast in winter, with calving females effectively fasting for at least four months. Prey is thought to be mainly pelagic larval crustaceans, particularly *Munida gregaria* and

copepods. They are taken primarily during summer in the open ocean, south of about 40°S. Threats to the species are thought to include historical gross exploitation at least into the late 1960s, and despite international protection, is likely to have prevented significant recovery until recently. More recent threats are thought to include direct disturbance, particularly in near-shore concentration/calving areas, from:

- whale watching and research vessels/aircraft, pleasure craft, swimmers and divers;
- low-flying aircraft;
- coastal industrial activity, e.g. seismic, drilling, sandmining and shipping operations;
- defence operations;
- collision with large vessels, particularly on shipping routes on eastern seaboard, in Bass Strait and across the Great Australian Bight; and
- entanglement in fishing gear.

Potential threats are thought to include increased whale watching pressure, industrial activity and pollution levels, and these may all be compounded by an increase in right whale numbers. The latter will also affect availability of suitable coastal calving habitat (Bannister *et al.,* 1996). Southern right whales are also classified as vulnerable under the *EPBC Act*.

APPENDIX F5 THE EIGHT PART TEST

The various pieces of legislation under which this assessment is being done require the determination of whether there is likely to be a significant effect of the estuary general fishery on any threatened species, populations or ecological communities or their habitats. This requires consideration of the matters listed in s5A of the *EP&A Act*, generally referred to as the Eight Part Test and itemised in italics below. If the test reveals that a significant impact is likely then a Species Impact Statement (SIS) will be required, or the draft FMS may be modified such that a significant effect is unlikely. Further, a SIS would have to be prepared if the strategy incorporated land or water that was declared as critical habitat.

a) Part 1 — Life cycle of threatened species

In the case of a life cycle of threatened species, whether the species is likely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

The estuary general fishery is highly unlikely to place any species, at a State or regional level, at risk of extinction by interrupting their life cycle. In other words, the fishery does not impact on species such that they can neither breed, feed, roost, migrate nor otherwise disperse. Despite this, those threatened species perhaps at the greatest risk include little terns and hooded plovers.

The most important nesting sites for little terns are likely to be patrolled by wardens to prevent access by humans and other animals. This should prevent disturbance of nesting sites by commercial fishers. Further, three of the four currently most successful breeding sites, at Sawtell, Old Bar and Botany Bay, are closed to net fishing, reducing the likelihood of any impact due to fishing.

The area currently thought to be the most important for hooded plover in NSW is Sussex Inlet, particularly on Bherwerre and Cudmirrah Beaches, followed by the coastline between Lake Conjola and Lake Tabourie. The only activity within the estuary general fishery that could affect coastal beaches is hand gathering. The assessment found that effects are unlikely due to the lack of intensity of the method, its selectivity and the popularity of recreation in areas where it can be done. There is unlikely to be any effect on the life-cycle of hooded plover, however, any management or recovery plan for the species should incorporate more extensive analysis of all uses of that stretch of coastline.

b) Part 2 — Endangered population.

In the case of an endangered population, whether the life cycle of the species that constitutes the endangered population is likely to be disrupted such that the viability of the population is likely to be significantly compromised.

The little penguin population at North Harbour is the only population that could be affected by the fishery. That population is unlikely to be significantly compromised by the continuation of commercial hauling or lobster trapping. Little penguins are known to travel between 10 and 30 km in foraging for food during nesting and much further during the non-breeding period (review by Gibbs 1997). As foraging is not restricted to the small area between Cannae Pt and Manly Pt, where hauling is permitted, it is highly unlikely that such an interaction could affect the lifecycle of the species.

Disturbance during hauling operations, such as preventing adults from returning to their fledglings with food, (similar to that which has been reported at a colony offshore from Wollongong) has not been reported for the Manly colony (NPWS 2000b). If such events were reported, the breeding success could be compromised. It will be important for the recovery team, recovery plan and future

monitoring programs for this colony to ensure that they consider the potential for such interactions and to record occurrences and outcomes.

The likelihood of this occurring is further reduced due to the periods of greatest activity adjacent to the colony. The peak hauling seasons are winter and autumn, and even then, there are only two crews that haul in this area. One of them visits the area twice a month and the other 2-3 times a week. Even if this activity were taking place in summer, it is unlikely to drive the population to extinction.

c) Part 3 — Regional distribution of habitat.

In relation to the regional distribution of the habitat of a threatened species, population or ecological community, whether a significant area of known habitat is to be modified or removed.

The literature review for this assessment found little or no data about the effects of the fishery on habitats of estuaries. Examination of effort data and closures suggested that only about half of the estuaries in the State had closures that would protect habitats, but it is not known to what degree those habitats are utilised by threatened species.

Most of the threatened species of fish considered in this assessment are marine species that could occupy suitable habitats in estuaries, primarily rocky reef. Given the extent of this type of habitat along the coast, and the limited scope for the techniques used in the fishery to affect this type of habitat, the fishery is considered unlikely to modify or remove a significant area of rocky reef.

The fishery would not modify or remove a significant area of habitat for turtles, whales or dolphins.

The little penguin population at Manly, by definition, is likely to have a significant area of known habitat affected by the fishery, but this is unlikely to occur to the extent that it modifies or removes any habitat.

There is currently very little known about the distribution and abundance of hooded plover, but studies would suggest that it is extremely limited in both extent and number. The coastal beaches between St Georges Head and Brush Island on the South Coast appear to be the most important sites for this species. Hand gathering is the only fishing technique that could be done on those beaches, and it has been done on less than 500 occasions over the last 15 years, providing little opportunity for habitat modification. Further, there is abundant potential habitat remaining, thus this fishery would not modify a significant area.

d) Part 4 — Isolated habitat.

Whether an area of known habitat is likely to become isolated from currently interconnecting or proximate areas of habitat for a threatened species, population or ecological community.

The estuary general fishery will not isolate any areas of habitats, nor will it fragment them such that they could become progressively isolated. Further, the connectivity of marine and estuarine systems is such that reproductive isolation is almost impossible, especially in terms of the techniques used in the fishery.

The penguin population at North Harbour and the shorebird community at Taren Point that have become isolated have not done so because of commercial fishing, nor is it causing an incremental isolation. Expanding urban development and a natural geographic formation are largely responsible

for the isolation of these two groups, respectively. The fishery is also unlikely to prevent any possible further expansion of these areas.

e) Part 5 — Critical habitat

Whether critical habitat will be affected.

Critical habitats have not been defined for any of the species considered in this assessment. Irrespective of this, a precautionary approach would suggest that the habitats occupied by the little penguin population and Taren Point shorebird community are critical to their survival. At the time of writing this report, the NSW NPWS was considering a proposal to list parts of North Harbour Aquatic Reserve as Critical Habitat for the species. As stated above, however, the fishery is unlikely to modify or remove the habitats, or restrict their distribution. As such, there will be few or no effects on those habitats.

f) Part 6 — Adequate representation in conservation areas.

Whether a threatened species, population or ecological community, or their habitats, are adequately represented in conservation reserves (or other similar protected areas) in the region.

It is important to note that very little is known about the distribution within estuaries of most of the threatened species of fish. Further, this part of test (and most of it for that matter) is designed to examine whether affecting a small area of habitat or small number of a species might be offset by their occurrence in protected areas. Very little is known about the biodiversity of our marine protected areas, and even less of aquatic threatened species, so it is impossible to assess whether the species or their habitats are adequately represented in conservation reserves or the like.

Numerous conservation reserves along the coast provide habitats for the various threatened species considered in this assessment. The endangered population of little penguins occurs in an Aquatic Reserve and representative habitats of most of the other species occur adjacent to National Parks, Nature Reserves or areas closed to commercial fishing.

Only the shorebird community at Taren Pt does not occur in a conservation reserve of some form. Much of the habitat within it could be found elsewhere within Botany Bay, but the geographic formation of the shoal at Taren Pt is considered unique, and as such maintains a unique community. Irrespective of this, the estuary general fishery is unlikely to place this bird community at risk of extinction.

g) Part 7 — Threatening processes.

Whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process.

There are currently no declared threatening processes under the *FM Act*, nor is commercial fishing listed as a threatening process under the *TSC Act*. Further, the activities undertaken in this proposal are considered highly unlikely to exacerbate existing threatening processes under the TSC Act.

The recovery plan for little penguins at North Harbour does recognise commercial fishing as a threatening process to the colony, and as such this assessment accepts that there is potential for it to constitute a threatening process under the *TSC Act* in future. At this stage, the fishery does not appear

to be adversely affecting two or more threatened species, one of the criteria necessary for an activity to be declared a threatening process.

The only processes related to fishing under the *EPBC Act* are the incidental catch (bycatch) of sea turtle during coastal otter-trawling operations within Australian waters north of 28° South, and the incidental catch (or bycatch) of seabirds during oceanic longline fishing operations. Neither of these techniques applies to the estuary general fishery.

h) Part 8 — Limit of known distribution.

Whether any threatened species, population or ecological community is at the limit of its known distribution.

The endangered population of little penguins at North Harbour and the shorebird community at Taren Pt must be at the limits of their distributions. The proposal will not reduce or affect the ability of these entities to expand their ranges. Other birds whose distribution limits are likely to occur in NSW include beach stone-curlew, bush stone-curlew, hooded plover, black bittern, collared kingfisher, comb-crested jacana and mangrove honeyeater.

The three plant species considered in this assessment are all at the northern limits of their distribution in NSW.

Green sawfish are more common in the north of eastern Australia, and the northern rivers region probably represents the southern limits for these species.

i) Conclusion

This assessment has considered the eight factors under s5A of the *EP&A Act* in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities or their habitats. The assessment was based on a review of biological information derived from the various agencies responsible for those species, from published literature and from personal communications. The assessment has found that the proposal will not have a significant effect on any threatened species, populations or ecological communities or their habitats, and as such a Species Impact Statement is not required for the estuary general fishery.