
**This is the Third of Three Volumes of the Environmental Impact
Statement on the NSW Abalone Fishery**

VOLUME 3

Appendices

Consultant's Reports

September 2005

Environmental Impact Statement prepared by:

The Ecology Lab Pty Ltd

On behalf of:

**NSW Department of Primary Industries and
Shareholders of the NSW Commercial Abalone Fishery**

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APPENDIX A

APPENDIX A1. LIST OF SHAREHOLDERS

Shareholders in the Abalone Fishery as at 27/6/05

GRAEME JEFFREY ADAMS	PO BOX 161	EDEN	NSW	2551
ALLEN ABALONES PTY LTD	118 KANGAROO POINT ROAD	KANGAROO POINT	NSW	2224
GARY MARSHALL ALLEN	118 KANGAROO POINT ROAD	KANGAROO POINT	NSW	2224
AUSLINK MARINE PRODUCTS PTY LTD	UNIT 2105, 127 KENT STREET	SYDNEY	NSW	2000
CARL WILLIAM BABINGTON	PO BOX 686	ULLADULLA	NSW	2539
BERESFORD CLOSE PTY LTD	C/- David Mond & Associates, 91 ORRONG CRESCENT	CAULFIELD NORTH	VIC	3161
JEFFREY JAMES BROOKS	PO BOX 3114	BATEHAVEN	NSW	2536
GEORGE DESMOND BUNNEY	6 HARRINGTON STREET	NAROOMA	NSW	2546
STEPHEN GEORGE BUNNEY	37 EUCALYPTUS DRIVE	DALMENY	NSW	2546
JOHN CHUAN KIANG CHUNG	UNIT 2105, 127 KENT STREET	SYDNEY	NSW	2000
COLDGOLD ENTERPRISES PTY LTD	62 Main Road	HUONVILLE	TAS	7109
COLDGOLD PTY LTD	62 MAIN RD	HUONVILLE	TAS	7109
CONTAIN PTY LTD	5 JERIMBUT STREET	BERMAGUI	NSW	2546
DANDEAN DIVING PTY LTD	5 LYNDON STREET	CORRIMAL	NSW	2518
DAVID WILLIAM SMYTHE & DONNA MARIA SMYTHE	1 CAMILLA COURT	MERIMBULA	NSW	2548
EDEN PERFORMANCE CENTRE PTY LIMITED	PO BOX 418	EDEN	NSW	2551
ANTHONY NOEL FRY	20 PRINCES HIGHWAY	NORTH NAROOMA	NSW	2546
F J CLARK, W C CLARK and SOUTHLANDER PTY LTD	UNIT 114, 12 COMMODORE DRIVE	PARADISE WATERS	QLD	4217
G R & S BANKS PTY LIMITED	25 BRAMBLE STREET	EDEN	NSW	2551
CHRISTOPHER JOHN GROVER	P O BOX 21	BERMAGUI	NSW	2546
I & J HENDERSON INVESTMENTS PTY LTD	226 COOLART ROAD	SOMERVILLE	VIC	3912
I & J HENDERSON PTY LTD	226 COOLART ROAD	SOMERVILLE	VIC	3912
JADER PTY LTD	UNIT 2105, 127 KENT STREET	SYDNEY	NSW	2000
JARRAB PTY LTD	20 YORK RD	BUDERIM	QLD	4556
ROBERT ALLAN KERSHAW	PO BOX 183	NAROOMA	NSW	2546
BEVERLEY DAWN KOELLNER	PO BOX 370	BEGA	NSW	2550
RALPH LAVENDER	27 LITTLE LAKE CRES	WARILLA	NSW	2528
DEBORAH MAY LEWIS	P.O. BOX 512	EDEN	NSW	2551
ROBERT MOBROY LEWIS	P.O BOX 336	EDEN	NSW	2551
JANE ROSINA LINK	1-11 ANZAC ROAD	WARRANTDYTE SOUTH	VIC	3134
SIEGFRIED LINK	1-11 ANZAC ROAD	WARRANTDYTE SOUTH	VIC	3134
JASON WILLIAM LOWE	25 POWELL ROAD	BLACKMANS BAY	TAS	7052
DENNIS GEORGE LUOBIKIS	C/- PO BOX 418	EDEN	NSW	2551
HELEN MALOOF	PO BOX 283	BERRY	NSW	2535
CONRAD JONATHON MCMULLEN	43 PACIFIC WAY	TURA BEACH	NSW	2548
LESLIE JAMES MORRIS	41 SALT STREET "BILLABONG" 21 EAST SAMS	CONCORD	NSW	2137
MICHAEL JOHN NORRIS	CORNER RD	MOGILLA	NSW	2550
OTWAY TRADERS PTY LTD	19 BRAEMAR STREET	CROYDON	VIC	3136
HELEN PERESE	295 OLD HIGHWAY	TERMEIL	NSW	2539
ADRIAN VINCENT PURDIE	19 AURUM CRESCENT	RINGWOOD	VIC	3134
REEF GROVE PTY LTD	21 THE MAINBRACE	TWEED HEADS	NSW	2485
JOHN RONALD SMYTHE	93 BOGGY CREEK RD	MILLINGANDI	NSW	2549
KEVIN JOHN WALKER	4 THE ISLE MARINERS DR, THE ANCHORAGE	TWEED HEADS	NSW	2485
KEVIN JOHN WARREN (JNR)	7 DIPLACUS DRIVE	PALM BEACH	QLD	4221
WELO HOLDINGS PTY LTD	9 NORTHCOTE STREET	ROSE BAY	NSW	2029
WENDELL MARK WESTON	P. O. BOX 163	MILTON	NSW	2538
ALAN LESLIE WILSON	15 HORACE STREET	SHOAL BAY	NSW	2315
YGO EDEN PTY LTD	PO BOX 183	EDEN	NSW	2551

APPENDIX A2. PLANNING NSW GUIDELINES



**Guidelines for the
Environmental Impact Assessment of
Draft Fishery Management Strategies for
the Commercial Abalone and Rock Lobster Fishing Activities**

February 2003

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FOREWORD

The Environment Impact Assessment process under the *Environmental Planning and Assessment Act 1979* provides a framework for assessing the ecological sustainability of commercial fishery management strategies prepared for commercial fisheries under the *Fisheries 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 costs and benefits of the proposed strategy and of the need for mitigation measures.

These guidelines outline the issues to be addressed in environmental impact statements for abalone and lobster commercial fisheries and the content and structure of the Fishery Management Strategies. They have been developed with input from Environment Australia, relevant State agencies, abalone and lobster management advisory committees, Fishery Advisory Councils, 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 those parties responsible for preparing an EIS to assess the likely significance of impacts of implementing a Fishery Management Strategy. The guidelines replace the general requirements for the contents of an EIS under Schedule 2 of the *EP&A Regulation 2000* and the more general guideline issued in 2001 for Commercial Fishery Management Strategies.

These guidelines only apply to commercial fisheries currently operating as Category 1 Share Management Fisheries. These guidelines prescribe the matters to be addressed in the EIS and remove the need to further consult the Director-General under clause 231 (3) of the *EP&A Regulation*.

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 *Environmental Protection and Biodiversity Conservation Act 1999* (*EPBC Act*). 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 *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*.

1. FISHERY MANAGEMENT STRATEGIES FOR COMMERCIAL ABALONE AND ROCK LOBSTER FISHERIES

1.1 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.

This guideline applies to fisheries management strategies for the abalone and lobster fisheries (both Category 1 Share Management Fisheries).

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*. 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 December 2003 exempting individual licences from the need for environmental assessment to provide DPI time to prepare fisheries management strategies for commercial fisheries. After that time, environmental assessment will be required prior to issuing each individual licence or authorisation which is not consistent with the strategy or in all fisheries where a strategy is not in place.

1.2 Purpose of a Fishery Management Strategy

A fishery management strategy is a document outlining the management goals, objectives, controls and other measures for achieving the objectives, performance measures 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; and,
- 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 Minister for DPI
 - (g) Any relevant provisions in environmental planning instrument
5. Identify performance indicators to monitor whether the objectives of the strategy are

1.3 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 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.

2. THE EIA PROCESS AND PROCEDURES

2.1 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

- Assembles information from the fisheries management plans and monitoring of the implementation of the share management for the fisheries – stock issues, habitat issues, current fishing practices and environmental impacts, threats and other issues. Audit threats and risk of the current regime, consults with the MAC and identifies alternative management regimes and develops the first version of the Draft FMS

Step 2

- 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 consult with FRCAC, EA and key stakeholders regarding the draft strategy and environmental assessment. Organise for independent peer review of key components of the draft strategy and environmental assessment.
- The EIS and the Draft FMS are displayed for public comment in a manner consistent with the relevant provisions of the *EP&A Act* and Environment Australia.
- Consult with MAC and relevant Aboriginal Land Councils.

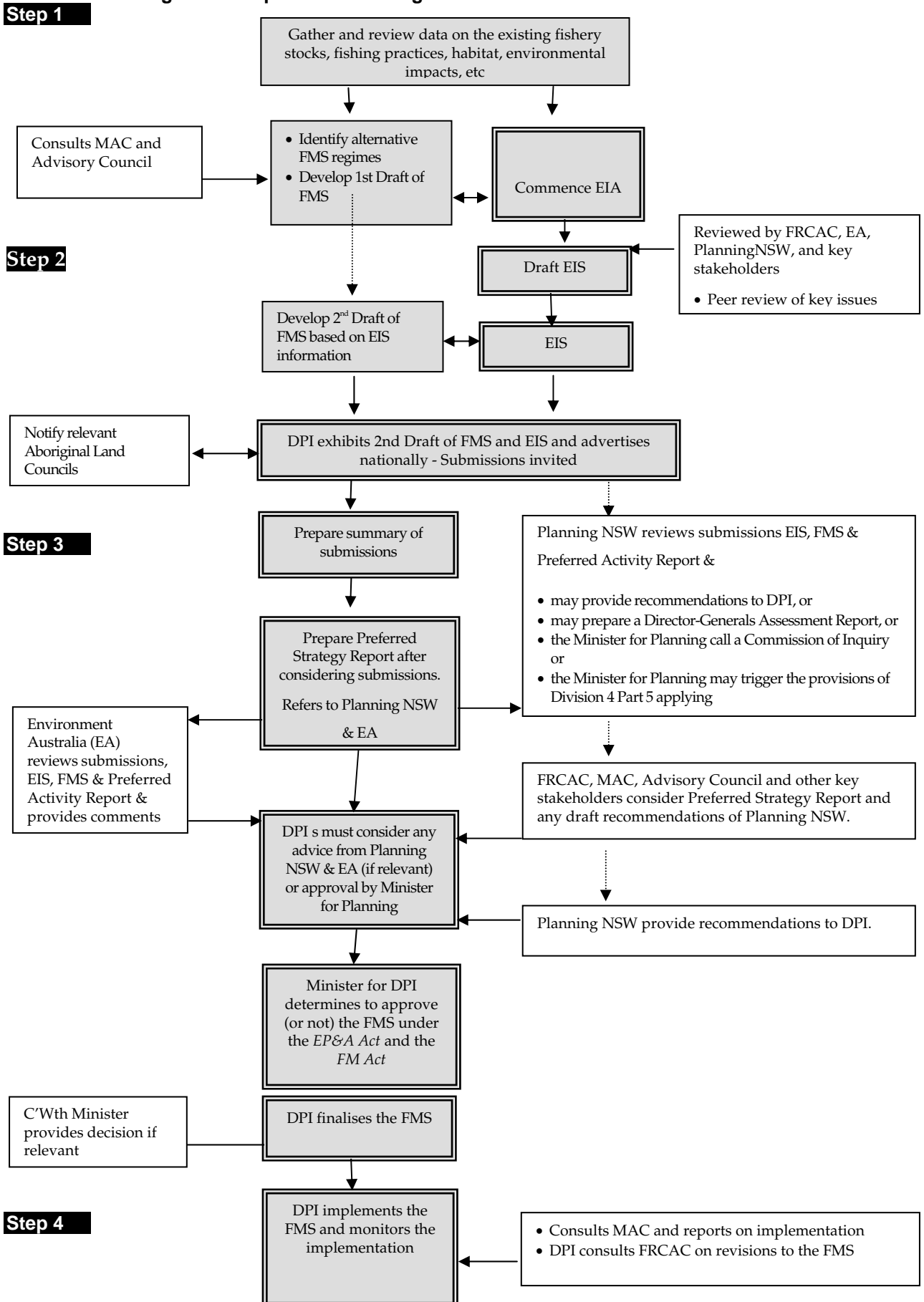
Step 3

- DPI sends submissions received as a result of exhibition to Planning NSW and EA.
- DPI reviews submissions and other advice and prepares a Preferred Strategy Report outlining the response to issues raised in submissions or by FRCAC and any proposed changes in the Draft FMS as a result to improved the sustainability of the strategy
- Planning NSW reviews submissions, EIS, Draft FMS and Preferred Strategy Report and may (i) provide recommendations to DPI, (ii) prepare a Director-General's Assessment Report with recommendations or (iii) the Minister for Planning can call a Commission of Inquiry or (iv) the Minister for Planning may trigger the provisions of Division 4 Part 5 applying. If option (i) or (ii), Planning NSW will circulate draft recommendations to DPI for consultation with the MAC, prior to finalisation of its advice.
- Environment Australia reviews the submissions, EIS, Draft FMS and Preferred Strategy Report and provides a preliminary advice.
- DPI reviews submissions and any advice received from Planning NSW or Environment Australia and determines whether the draft strategy should be recommended for the approval of the Minister for Fisheries. If an approval is required from the Minister for Planning or under C'wth legislation, the recommendation must be consistent with these approvals.
- Minister for Fisheries makes a determination under Part 5 of the *EP&A Act* and an approval of the finalised Draft FMS under the *Fisheries Management Act*.
- Commonwealth Minister makes a determination under Commonwealth legislation.

Step 4

- DPI amends any existing management plans or tools (e.g. regulations which are not consistent with the Strategy) necessary to give effect to the approved strategy. DPI 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.
- DPI monitors the implementation of the Strategy and reports to FRCAC, relevant Advisory Councils, MACs and stakeholders on the resource and environmental management performance.
- DPI reviews the Strategy or aspects of the strategy (based on triggers in the Draft FMS).

Figure 2 Steps in undertaking Environmental Assessment



2.2 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, the impacts of the fishers within these areas should be identified and assessed. The environmental assessment is to identify threats and the risk (likelihood and consequence) that those threats cause an impact.

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 also must 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 the surrounding environment to a lesser or greater extent depends on the specific nature of the fishery and 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 justify the preferred approach on biophysical, social and economic grounds.

2.3 Factors to be considered when preparing an EIS

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. 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.
- Impacts on retained, bycatch and bait species.
- Impacts on the broader aquatic ecology, habitat and the environment.
- Economic issues associated with the fishery.
- Cost effectiveness of management.
- Protection of key habitats and protected or threatened species.
- Influences of other activities on the fishery.
- Social issues associated with the fishery.

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 relevant fishery independent study, estimates of the catch of other 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 responses.
- Risk based assessment approaches incorporating the likelihood of an impact and the consequences should an impact occur should be utilised to identify risk and prioritise the need for management responses.
- 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 ecological issues (e.g. ecosystem function, species richness and evenness).
- 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 from impacts.
- In the absence of quantitative data, qualitative or Delphic impact assessments (i.e. categorisation into high, medium or low) based on best available information should be used.
- Proposed management and monitoring arrangements should be cost-effective and take into consideration costs incurred in other fisheries.
- The proposed management measures to mitigate impacts should be justified taking into consideration the principles of ESD.

The EIS should be written in a style that is succinct as possible with minimal jargon and include a glossary and a table of acronyms. The structure of the EIS should be easy to follow with minimal duplication of content. Maps should be used where possible to convey any spatial information relevant to the fishery. A reference list should be provided and the material cited should be identified in the reference list as being either from a peer-reviewed (e.g. a journal) or a non peer-reviewed source (e.g. a technical report or internal report).

2.4 Overview of the environmental impact assessment

The following matters should be addressed in the environmental assessment of a Draft Fishery Management Strategy (Draft FMS) and the designated fishing activities described in the Draft 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) and undertake a risk based assessment of existing operation to identify areas where existing practices or management should be modified or changed
2. Consider alternative regimes to minimise risks (including alternative objectives, alternative fishing methods, alternative funding of management responses or research programs)
3. Describe the proposed regime under the Draft FMS including objectives and proposed management rules and responses (including any draft management plan). Identify performance indicators, triggers for reviewing the Draft FMS and the proposed monitoring regime for measuring the likelihood of the strategy meeting the objectives of the Draft FMS, including an assessment of the adequacy or appropriateness of the indicators, triggers and monitoring regime

4. Assess the impacts of implementing the Draft FMS taking into consideration likely future performance, particularly in relation to high risk aspects/factors
5. Justify the draft commercial Draft FMS and its management arrangements in terms of biophysical, economic and social factors and the principles of ecological sustainable development.

3 THE CONTENTS OF THE EIS AND FMS

A EXECUTIVE SUMMARY

An executive summary should be provided and be available separately for public information. The summary should give a short overview of the draft fishery management strategy and the potential stock, biophysical, social and economic impacts of implementing the strategy. It should include identification of the major risks to the environment from the fishing activity, and the impacts of implementing the Draft FMS on the economic viability of operators (including identifying any potential increases in management costs to fishers). It should be written in non-technical language to facilitate understanding of the fishery by the general public.

B REVIEW OF EXISTING OPERATIONS

This aim of this section of the EIS is to provide sufficient background to understand the nature of the fishery, where it occurs and review the environmental performance of current operation of the fishery. A risk based approach should be used to identify aspects of the existing operation of the fishery to identify areas where existing practices or management should be modified or changed. The risk-based assessments take into consideration the likelihood/frequency of an environmental impact and the consequence should that impact occur.

1. General information

Using the Share Management Plan and/or TAC Committee reports as a basis outline the following:

- (a) Identify the number of fishers on a State and regional basis.
- (b) Identify the harvesting methods used in the fishery including the gear, equipment and boats
- (c) Provide maps identifying:
 - (i) The area of operation of the fishery including any regions or zones.
 - (ii) The major ports used by the fishery.
 - (iii) Any aquatic reserves, marine parks, or any other permanent closures that impact the fishery.
 - (iv) Any no-take areas containing significant populations of the target species, or other areas open to fishing where significant populations are thought to occur, but which are not currently exploited.
- (d) Describe interactions between fishers in this fishery and with other fisheries
 - (i) under NSW jurisdiction.
 - (ii) under other State or Commonwealth jurisdiction.
- (e) Describe the existing management regime and measures for the fishery including the aims and objectives of any share management plan and role and operation of the Total

Allowable Catch (TAC) Committee in setting catch levels in this fishery that incorporates harvest from all fishing sectors.

- (i) Outline current performance indicators and monitoring provisions for monitoring of the harvest of the fishery including the requirements for the reporting of catch and effort by the fishers (e.g. logbook returns), any observer programs any fisher independent information and discuss the reliability of the monitoring provisions.
- (ii) Describe the process for review and assessment of the dynamics and status of the fishery, including the nature and frequency of the review and assessment events.
- (iii) Describe any regulatory or other changes that may impact upon the Share Management Plan since its implementation (e.g. aquatic reserves)
- (iv) Outline any current major research initiatives related to management of the fishery.
- (f) Outline current administrative arrangements in relation to enforcement and compliance, cost recovery, and community contribution payments.

2. Ecological issues

2.1 The target species

Using the Share Management Plan and/or TAC Committee reports as the basis:

- (a) Identify the target stock and document the relevant biology and ecology of the target species.
- (b) Describe in detail the status of the stock, estimate the proportion of the population that is exploited by the fishery; identify how the fishery affects that stock and the likelihood that the stock is considered to be growth overfished and/or recruitment overfished. Outline the likelihood of contraction or fragmentation of the species range from the existing fishery.
- (c) Describe significant factors (e.g. recruitment dynamics, oceanographic factors, grazing by animals such as sea urchins, water quality and pollution) external to the fishery that may significantly influence the abundance and dynamics of the target species.
- (d) Describe any diseases (e.g. *Perkinsus*) that may significantly impact on the target species, the possible causes of disease outbreaks (e.g. water quality linked to sewage outfalls), and any mitigation measures.
- (e) Summarise the overall risks from the operation of the fishery on the target species taking into consideration the likelihood/frequency of impacts and the consequence of the impacts occurring.

2.2 Byproduct and bycatch species

- (a) Identify the byproduct (e.g. sea urchins and octopus) and bycatch species impacted directly by the fishery, and any management, monitoring or mitigation measures for byproduct and bycatch species.

(b) Identify the biological characteristics of the bycatch and byproduct species that may make their populations susceptible to the impacts from the fishery.

(c) Summarise the overall risks from the operation of the fishery on these species taking into consideration the likelihood/frequency of impacts and the consequence of the impacts occurring.

2.3 Bait Species

(a) Identify the species, volume and sources of bait species used in the fishery (if relevant). Identify any pests and diseases that may be introduced as a result of bait sources.

(b) Consider the likely effectiveness of any existing management regime to minimise the risk of introduction of pests and diseases in the bait organisms including procedures to ensure the measures are implemented.

(c) Summarise the overall risks from the operation of the fishery on these species taking into consideration the likelihood/frequency of impacts and the consequence of the impacts occurring.

2.4 Protected and threatened species

(a) Identify protected and threatened species, populations and ecological communities and their habitat listed under the *Threatened Species Conservation Act*, *National Parks and Wildlife Act* or *Environment Protection and Biodiversity Conservation Act* which may be affected by fishing activities.

(b) Identify information sources (e.g. surveys, studies etc.) on the level of interaction between the fishery on endangered, threatened or protected species and threatened ecological communities (and the reliability of this information).

(c) Identify measures in place to avoid impacts on endangered, threatened or protected species and threatened ecological communities.

(d) Summarise the overall risks from the operation of the fishery on these species taking into consideration the likelihood/frequency of impacts and the consequence of the impacts occurring.

2.5 Other species and species assemblages

(a) Identify any other species and species assemblages that are likely to be affected directly or indirectly by the fishing activity.

(b) Describe the possible impacts of the fishery on the species diversity of benthic invertebrate and fish assemblages and (where possible) any changes to predator and prey populations of the target, bycatch or byproduct species that may occur as a result of the activities of the fishery.

(c) Identify any organisms translocated as a result of the fishery operation (stock species, fouling organisms and other pests) including species and the likely implications. Outline a contingency plan for any pest species likely to be translocated by the fishery.

(d) Identify (where possible) the ecosystem functions that may be altered as a result of the fishery and describe how any alterations may occur.

(e) Summarise the overall risks from the operation of the fishery on these species assemblages taking into consideration the likelihood/frequency of impacts and the consequence of the impacts occurring.

2.6 Aquatic habitats

- (a) Identify the primary habitat areas of the target species impacted by the fishery.
- (b) Describe the spatial extent and scale of these impacts relative to the overall area of these habitats.
 - (i) Identify how these impacts arise and describe the nature, intensity, magnitude, frequency and duration, reversibility of impacts.
- (c) Identify any other habitat areas that may be impacted by the fishery, in particular any RAMSAR wetlands, areas registered in the National Estate or State Heritage Register, habitat issues associated with marine mammals and migratory birds (listed under JAMBA and CAMBA).
 - (i) Identify how these impacts arise and describe the nature, intensity, magnitude, frequency and duration, reversibility of impacts.
- (d) Summarise the overall risks from the operation of the fishery on habitats taking into consideration the likelihood/frequency of impacts and the consequence of the impacts occurring.

3. Physical impacts

- (a) Undertake an assessment to identify the likelihood and consequence of the current fishery operations causing impacts on:
 - Water quality.
 - Noise and light regimes.
 - Air quality or greenhouse gas emissions.
- (b) Where risk is identified as unlikely and/or not of significant consequence, this position should be justified. Where this position is identified and justified, no further discussion of that impact is necessary in this section.
- (c) Where risk is identified to be likely and/or of a significant consequence for a factor identified in the previous paragraph, the following detail should be included for that factor.
The assessment of these issues in the Estuary General or Ocean Haul EIS should contribute and the risk assessment.

3.1 Water quality

- (a) Based on the current operation of the fishery, identify sources of pollutants/contaminants from the operation of the fishery likely to affect the water quality, and outline the characteristics, magnitude and probable frequency of these events, including, the use of substrate treatments (e.g. anti-fouling agents); Identify any incidences of accidental or deliberate discharge of chemicals; fuel or bilge water discharge; and dumping of debris (plastics, gear and general waste). Identify the likely assimilation capacity of the receiving water impacted by any pollutants/contaminants.
- (b) Describe any existing management measures to mitigate any adverse impacts from the fishery on water quality. Assess the adequacy of mitigation and management measures

3.2 Noise and light regimes

(a) Based on the current operation of the fishery, identify any potential fixed and mobile noise and light sources (and the indicative hours of operation). Identify any birds or mammals whose behaviour (e.g. roosting, feeding, and migration) is likely to be significantly or permanently modified in response to noise or light from the fishery activities. Identify any residences likely to be affected by the noise or light.

3.3 Air quality, energy and greenhouse gas emissions

(a) Based on the current operation of the fishery, outline the any sources of odours or other air impacts. Identify the conditions under which any sensitive land uses are likely to be affected by odour. Outline any existing measures to manage air impacts to an acceptable level; assess the adequacy of mitigation and management measures.

4. Economic issues

(a) Outline the investment in the fishing fleet and any significant processing facilities.

(b) Outline employment including direct and indirect employment by regions or sub-regions including the proportion of fishers with income from other commercial fisheries and/or other non-fishing employment, the seasonality of employment and the demographic profile of those direct and indirect employed in the fishery

(c) Outline the economic return from the fishery including its contribution to individual, regional, and state income, the value of shares in the fishery and trends in the market value of shares held by fishers and the economic multiplier effects, economic rents and community contributions.

(d) Summarise the overall risks to the economic viability of the fishery from the current operational regime taking into consideration the likelihood/frequency of impacts and the consequence of the impacts occurring.

5. Social issues

(a) Outline the community values and views associated with the fishery (including social capital issues, skill base and transferability of skills) with a brief analysis of the basis of these views and perceptions.

(b) Health risks to fishers: Outline the health risks to fishers and related workers from current practices/methods and existing measures to minimise risks.

(c) Health risks to consumers: Identify any health risks to consumers and existing measures for minimising or removing these risks up to the point of transfer of the product to the processor or receiver.

(d) Indigenous peoples: Identify the interests of Indigenous people in the resources harvested by the fishery and in habitats that may be impacted by the fishery.

(i) Identify any important Aboriginal heritage sites/places likely to be affected by fishers operating within the fishery and outline any existing protocols/measures that aim to minimise risk of harm to these sites.

(ii) Outline how the fishery interfaces or affects traditional fishing and access to fisheries resources.

- (iii) Outline the implication of the current fishery regime on Indigenous communities' well being, including economics, employment and community viability,
- (e) Historic heritage: Identify any shipwreck sites or other sites of historic heritage that are affected by fishing activities and outline protocols/measures to minimise risk of harm to these sites.
- (f) Summarise the overall risks from the current operational regime to any social issues taking into consideration the likelihood/frequency of impacts and the consequence of the impacts occurring.

C *CONSIDERATION OF ALTERNATIVE MANAGEMENT REGIMES*

Taking into consideration the key issues identified in the review of the fishery (Section B) and the risk assessment undertaken in relation to these issues, consider alternatives to current practices in the fishery to reduce the level of risk or improve the sustainability of the fish stock or the fishery. In this context, describe and discuss the feasible alternatives, including:

- (a) The no fishery alternative.
- (b) No changes to existing management arrangements.
- (c) Alternative harvesting methods.
- (d) Alternative performance indicators and monitoring programs.
- (e) Alternative arrangements for cost recovery or funding sources for management responses or research programs.

D *DRAFT FISHERY MANAGEMENT STRATEGY*

This aim of this section is to set out the structure and content of the Draft Fishery Management Strategy for the Abalone or Lobster Fishery. It should respond to issues identified as having significant risks in the review of the current fishery operation and to alternatives evaluated to improve the management of these and other issues.

1. Objectives of the draft FMS

The objectives should be outcomes-based. The objectives of the Draft FMS should be integrated (where possible) with the objectives of any existing Share Management Plans.

2. Designated fishing activity

- (a) Identify the stock (target and by-product) to be harvested and/or affected by the fishery. Using available information, describe the status of the stock as under-fished, fully fished or overfished. Provide a table which documents the known status (and the level of certainty) for the following stock assessment and biological parameters:
 - (i) Size and age at maturity.
 - (ii) Distribution and stock structure.
 - (iii) Age and growth information.

- (iv) Natural mortality.
 - (v) Fishing mortality.
 - (vi) Spawning season.
 - (vii) Spawning areas.
 - (viii) Stock recruitment relationship.
 - (ix) Movements and migration.
- (b) Provide maps identifying the future operational areas, key environmental protection areas and areas closed to the fishery including
- (i) The area of operation of the fishery including any regions or zones.
 - (ii) The major ports used by the fishery.
 - (iii) Aquatic reserves, marine parks, or any other permanent closures that impact the fishery.

If the area of operation of the fishery as defined in the Draft FMS is not modified from that presented in section "B Review of existing operations" then cross-referencing back to that information is sufficient.

- (c) Outline the following as they affect the operation of the fishery:
- (i) Any controls under the Share Management Plan and determinations of the TAC Committee under Division 4 of Part 2 of the *FM Act*.
 - (ii) Any enforcement and compliance issues (including any Strategic Compliance Plans and the process for review of these plans).
 - (iii) Any fees, charges, cost recovery and community contribution payments.
 - (iv) Any provisions in the *FM Act* or Regulations including any fishing closures under Section 8 of the *FM Act* or policies approved by the Fisheries Minister.
 - (v) Any relevant bycatch or threatened/protected species plans or recovery programs and the measures in place to mitigate the operation of the fishery on the threatened/protected species.
 - (vi) Any provisions for ongoing consultation and participation by stakeholders in management.

3. Management responses

The Draft FMS is to identify specific management responses aimed at minimising risk to the environment and the sustainability of the fishery. Each management action should:

- (a) Describe the risk trying to be addressed by the management response.
- (b) Outline the management response itself.
- (c) Identify the timeframe for implementing the management response.
- (d) Outline the predicted outcome(s) from the management response.

4. Performance reporting and monitoring

Performance reporting should link back to the management actions and objectives of the Draft FMS. The following approach is modified from the FRDC ESD Reporting Framework

“How to Guide” which was put together under the auspices of the Standing Committee for Fisheries and Aquaculture (now the Marine and Coastal Group of NRMCA). The proponent should be guided by this framework along with risk assessments presented as part of the EIS for determining issues (e.g. bycatch, habitat impacts) that require performance reporting. Existing applications of this approach to other fisheries (e.g. Western Rock Lobster) should be referred to for identifying the level of detail required for each component.

Performance reporting shall include the following:

- (a) For each objective, an indicator is to be identified. This can be a direct measure of performance (e.g. employment numbers for employment) or a surrogate (e.g. catch per unit effort as an estimator of stock abundance).
- (b) A trigger point (=reference point) which is necessary to define how to interpret the indicator to assess whether performance against the objective is acceptable or not.
- (c) A brief discussion of the basis and justification for the selected indicator and trigger point.
- (d) The data requirements and availability of data for the indicator. This is to be depicted using a table or matrix:

Data Required Availability

Description of indicator/supporting data.

- Time period for which data are available or when data will become available.
 - Details of the existing or proposed monitoring program
- (e) The robustness of the current indicator and trigger point. The robustness of an indicator or trigger point is to be described as high, medium or low (with a brief textual justification for the assigned category).
 - (f) The action(s) that will result if a trigger point is exceeded.
 - (g) A description of any external drivers - factors that are known to potentially impact on performance of the fishery but which are outside of the responsibility of DPI.

5. Research and development plan

- (a) Describe the Strategic Plan for Research contained in the Share Management Plan.
- (b) Review and update (as appropriate) this Plan in the light of the broader objectives of the Draft FMS specifying short and long term aims of research and links with objectives of the Draft FMS.
- (c) Identify any knowledge gaps for the ecological, economic and social aspects of the fishery and incorporate appropriate research initiatives to fill these gaps into the Research and Development Plan.

E ASSESSMENT OF THE POTENTIAL IMPACTS OF IMPLEMENTING THE DRAFT FMS.

This section of the Guidelines sets out the information required for assessing the potential impacts that may occur as a result of implementing the Draft FMS. This Section should be informed by and link to the risk assessment undertaken as a component of Section B of these Guidelines. It should focus on the likely change in impacts and when those impacts are likely to be adverse, the adequacy of monitoring and management measures in the Draft FMS. The risk assessment should be used to prioritise management actions. This risk assessment approach applies throughout the relevant parts of Section E, including: E1.1. (c), E1.2. (c), E1.3.(b), E1.5.(b), and E1.6.(b).

1. Ecological issues

1.1 Target species

(a) Identify any likely changes in impacts from the fishery on target species as a result of implementing the Draft FMS compared with the current regime including in relation to their status, the likelihood that the stock will be overfished or the species range fragmented or contracted. When the impacts are likely to be adverse, consider the adequacy of monitoring and management measures in the Draft FMS and their ability to promote stock recovery if the stock is overfished.

(b) Identify any likely changes in external impacts on the fishery as a result of implementing the Draft FMS compared with the current regime including in relation to their status, the likelihood that the stock will be overfished or the species range fragmented or contracted. When the impacts are likely to be adverse, consider the adequacy of monitoring and management measures in the Draft FMS.

(c) Assess whether the risk to the sustainability of the target stock has changed (and the potential magnitude of this change) by the management responses in the Draft FMS.

1.2 Byproduct and bycatch target species

(a) Identify any likely changes in impacts on byproduct and bycatch target species as a result of implementing the Draft FMS compared with the current regime including in relation to their status, or the species range fragmented or contracted. Assess whether any risks on byproduct and bycatch are changed (and the potential magnitude of this change) by the management responses in the Draft FMS. When the impacts are likely to be adverse, consider the adequacy of monitoring and management measures in the Draft FMS

(b) Estimate the likelihood of any new markets being developed for bycatch and byproduct species and the likelihood the fishery could increasingly target these species if new markets developed.

(c) Assess whether the risk to the sustainability of the target stock has changed (and the potential magnitude of this change) by the management responses in the Draft FMS.

1.3 Bait Species

(a) Identify any likely changes in impacts on bait species (if relevant) as a result of implementing the Draft FMS compared with the current regime.

(b) Assess whether the risk to the sustainability of the bait species has changed (and the potential magnitude of this change) by the management responses in the Draft FMS.

1.4 Protected and threatened species and communities

(a) Identify any likely changes in impacts on protected and threatened species, populations and ecological communities and their habitat listed under the *Threatened Species Conservation Act*, *National Parks and Wildlife Act* or *Environment Protection and Biodiversity Conservation Act* which may be affected by fishing activities.

(b) For each species, systematically address each of the factors in The Eight-Part Test (see Appendix 3). Where one or more of the factors are not relevant to the species in question, identify this as “not applicable”.

(c) Discuss the effectiveness of any measures in the Draft FMS to protect species listed under *Threatened Species Conservation Act*, *Fisheries Management Act* or *Environment Protection and Biodiversity Conservation Act*.

1.5 Other aspects of ecosystem structure and function

(a) Identify any likely changes in impacts on other aspects of ecosystem structure and function as a result of implementing the Draft FMS compared with the current regime.

(b) Assess (where possible) the potential impacts of the proposed management measures in the Draft FMS.

1.6 Aquatic habitats

(a) Identify any likely changes in impacts on primary habitat areas of the target species or other habitat areas as a result of implementing the Draft FMS compared with the current regime.

(b) Assess whether the risks to aquatic habitats have been changed (and the potential magnitude of this change) by the management measures in the Draft FMS.

1.7 Performance reporting, monitoring and research regime

(a) Evaluate the likely effectiveness of performance reporting and monitoring regime to provide appropriate information for monitoring the impacts on the ecosystem in particular target species.

(b) Evaluate the likely effectiveness of the research plan to identify and prioritise research to meet key knowledge gaps for the sustainable management of the ecosystem aspects of the fishery.

2. Physical issues

2.1 Water quality

(a) Identify any likely changes in water quality impacts as a result of implementing the Draft FMS compared with the current regime. Describe how the management actions in the Draft FMS mitigate any adverse impacts from the fishery. Assess the adequacy of mitigation and management measures.

2.2 Noise and light regimes

(a) Identify any likely changes in noise and light impacts as a result of implementing the Draft FMS compared with the current regime. Outline measures in the Draft FMS to manage any adverse impacts to an acceptable level; assess the adequacy of mitigation and management measures.

2.3 Air quality, energy and greenhouse gas emissions

(a) Identify any likely changes in air quality impacts as a result of implementing the Draft FMS compared with the current regime. Outline measures in the Draft FMS to manage any adverse impacts to an acceptable level; assess the adequacy of mitigation and management measures.

(b) Outline measures in the Draft FMS to increase energy use efficiency and minimise greenhouse gas emissions to an acceptable level; assess the adequacy of mitigation and management measures.

3. Economic and social issues

3.1 Economic issues

(a) Outline the potential change in economic viability of operators as a result of implementing the Draft FMS with a focus on

- (i) assessing the ability of fishers to pay increased management costs in this fishery (also taking into consideration increased costs accrued in other fisheries).
- (ii) the potential market trends and developments likely to affect the fishery.
- (iii) the potential impact on the value of shares in the fishery.

3.2 Social issues

(a) Identify any likely changes in social impacts (on fishers, their families or any local communities) as a result of implementing the Draft FMS. Assess whether the risk of social impacts are changed (and the potential magnitude of this change) by the management measures in the Draft FMS.

(b) Assess the potential change in impacts on Indigenous interests and values of implementing the Draft FMS including on:

- (i) traditional fishing and access to fisheries resources and areas of cultural value
- (ii) Indigenous communities' well being, including economics, employment and community viability,
- (iii) the implementation of the NSW Indigenous Fisheries Strategy.

Identify whether the risk of impacts on Indigenous interests and values are likely to change (and the potential magnitude of this change) as a result of implementing the management responses in the Draft FMS.

(c) Identify any likely changes in impacts on heritage values as a result of implementing the Draft FMS. Assess whether the risk of impacts on heritage values are changed (and the potential magnitude of this change) by the management measures in the Draft FMS.

(d) Assess whether the risk to the economic viability of the fishery (and the potential magnitude of this change) by the management measures in the Draft FMS.

3.3 Performance reporting, monitoring and research regime

- (a) Evaluate the likely effectiveness of performance reporting and monitoring regime to provide appropriate information for monitoring the impacts on the social and economic issues.
- (b) Evaluate the likely effectiveness of any research plan to identify and prioritise research to meet key knowledge gaps for the sustainable management of the social and economic implications of the fishery.

F JUSTIFICATION FOR DRAFT FMS

Provide a clear and sufficient discussion demonstrating that the selection of the preferred options in the Draft FMS is justified. Justify in terms of the principles of ESD the selection of:

- (a) the preferred management objectives in the Draft FMS;
- (b) the preferred suite of “management responses” in the Draft FMS
- (c) the preferred resource allocation approach.

Appendix 1 Roles and Responsibilities

Act	Relevant Authority	Regulatory provisions
NSW Legislation		
<i>Fisheries Management Act 1994</i>	DPI	Fishing authorisations, fishing closures, declaration and management of aquatic reserves, protection of certain fish including threatened and protected species.
<i>Environmental Planning and Assessment Act 1979</i>	Department of Planning (PlanningNSW) 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.
<i>Marine Parks Act 1997</i>	Marine Parks Authority	Declaration and management of marine parks
<i>National Parks and Wildlife Act 1974 and Threatened Species Conservation Act 1995</i>	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
<i>Port Corporation and Waterways Management Act 1995</i>	Waterways Authority or relevant Port Corporation	Use of ports, wharfs, berths, moorings etc, licensing of vessels and maintenance of safe navigation in waterways
<i>Crown Lands Act 1989 and Rivers and Water Act 2000/ Foreshores Protection Act 1948</i>	Department of Land and Water Conservation	Use of Crown land for wharfs, berths or moorings and protection of river, estuary and coastal foreshores.
<i>Food Production (safety) Act 1998</i>	SafeFood	Fish products safe for human consumption
Commonwealth Legislation		
<i>Wildlife Protection (Regulation of Export and Imports) Act 1982</i>	Agriculture, Forestry and Fisheries Australia and Environment Australia	Licence to export protected wildlife
<i>Environment Protection and Biodiversity Conservation (EPBC) Act 1999</i>	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

Appendix 2 Glossary

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: <ul style="list-style-type: none"> • 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.
Ecologically sustainable development, ESD	<p>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).</p> <p>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.</p> <p>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</p> <p>Principles of Ecologically Sustainable Development (Intergovernmental Agreement on the Environment)</p> <ol style="list-style-type: none"> 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. <p><i>In the application of the precautionary principle, public and private decisions should be guided by:</i></p> <ol style="list-style-type: none"> (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 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, echinoderms, 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 <i>Fisheries Management Act 1994</i> , 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.
Ministerial Advisory Council	Ministerial Advisory Councils for commercial, recreational, research and aquaculture sectors are appointed by the Minister for Fisheries 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.
Protected species	are species protected under the NSW legislation (<i>FM Act</i> or <i>NPW Act</i>) or Commonwealth legislation (<i>Wildlife Protection (Regulation of Export and Imports) Act</i> or <i>Environment Protection and Biodiversity Conservation (EPBC) Act</i>)
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 <i>FM Act 1993</i> or <i>Threatened Species Conservation Act 1995</i> or <i>Environment Protection and Biodiversity Conservation (EPBC) Act</i> .

Appendix 3 Threatened Species Conservation Act

Threatened Species Conservation Act	This appendix contains an extract from the <i>Threatened Species Conservation (TSC) Act</i> 1995 and the provisions for assessing impacts on the conservation of critical habitat and threatened species, populations or ecological communities and their habitats.
What are critical habitat, threatened species, populations or ecological communities and threatening processes?	<p>Critical habitats are habitats for endangered species, population or ecological communities which are declared and threatened species, populations or ecological communities and threatening processes are prescribed by the:</p> <ul style="list-style-type: none"> • Minister for Environment in accordance with Part 3, Part 2 and Schedules 1 and 2 of the <i>TSC Act</i> of the <i>TSC Act</i> and • Minister for Fisheries under Part 7A ,Schedules 4, 5 and 6 of the <i>FM Act</i> of the <i>Fisheries Management (FM) Act</i> 1994.
When is a Species Impact Statement required?	<p>Under section 77 (3) (dI) and section 112 (IB) of the <i>EP&A Act</i>, if a proposal :</p> <ul style="list-style-type: none"> • is on land that contains "critical habitat" or • is likely to significantly affect threatened species, populations or ecological communities, or their habitats, • a species impact statement (SIS) must be prepared in accordance with Division 2 of Part 6 of the <i>TSC Act</i> and with Division 6 of Part 7 A of the <i>FM Act</i>.
Factors when deciding if an SIS is required	<p>The following factors must be taken into account in deciding whether there is likely to be a significant effect on threatened species, populations or ecological communities, or their habitats:</p> <ol style="list-style-type: none"> a) in the case of a 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, b) 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, c) 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, d) 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, e) whether critical habitat will be affected, f) 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, g) whether the development or activity proposed is of a class of development or activity that is recognised as a threatening process, h) whether any threatened species, population or ecological community is at the limit of its known distribution.
Form and content of an SIS	Under section 110 of the <i>TSC Act</i> and sections 221J and 221K of the <i>FM Act</i> , the general requirements on the form and content of an SIS are as follows.
General Information	A species impact statement must include a full description of the action proposed, including its nature, extent, location, timing and layout and, to the fullest extent reasonably practicable, the information referred to in this section.
Information on threatened species and populations	<p>A species impact statement must include the following information as to threatened species and populations:</p> <ol style="list-style-type: none"> a) a general description of the threatened species or populations known or likely to be present in the area that is the subject of the action and in any area that is likely

- to be affected by the action,
- b) an assessment of which threatened species or populations known or likely to be present in the area are likely to be affected by the action,
 - c) for each species or population likely to be affected, details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or threat abatement plan applying to it,
 - d) an estimate of the local and regional abundance of those species or populations,
 - e) a general description of the threatened species or populations known or likely to be present in the area that is the subject of the action and in any area that is likely to be affected by the action,
 - f) a full description of the type, location, size and condition of the habitat (including critical habitat) of those species and populations and details of the distribution and condition of similar habitats in the region,
 - g) a full assessment of the likely effect of the action on those species and populations, including, if possible, the quantitative effect of local populations in the cumulative effect in the region,
 - h) a description of any feasible alternatives to the action that are likely to be of lesser effect and the reasons justifying the carrying out of the action in the manner proposed, having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development,
 - i) a full description and justification of the measures proposed to mitigate any adverse effect of the action on the species and populations, including a compilation (in a single section of the statement) of those measures,
 - j) a list of any approvals that must be obtained under any other Act or law before the action may be lawfully carried out, including details of the conditions of any existing approvals that are relevant to the species or population.

Information on ecological communities

A species impact statement must include the following information as to ecological communities:

- a) a general description of the ecological community present in the area that is the subject of the action and in any area that is likely to be affected by the action,
- b) for each ecological community present, details of its local, regional and State-wide conservation status, the key threatening processes generally affecting it, its habitat requirements and any recovery plan or any threat abatement plan applying to it,
- c) a full description of the type, location, size and condition of the habitat of the ecological community and details of the distribution and condition of similar habitats in the region,
- d) a full assessment of the likely effect of the action on the ecological community, including, if possible, the quantitative effect of local populations in the cumulative effect in the region,
- e) a description of any feasible alternatives to the action that are likely to be of lesser effect and the reasons justifying the carrying out of the action in the manner proposed, having regard to the biophysical, economic and social considerations and the principles of ecologically sustainable development,
- f) a full description and justification of the measures proposed to mitigate any adverse effect of the action on the ecological community, including a compilation (in a single section of the statement) of those measures,
- g) a list of any approvals that must be obtained under any other Act or law before the action may be lawfully carried out, including details of the conditions of any existing approvals that are relevant to the ecological community.

Credentials of persons undertaking an SIS

A species impact statement must include details of the qualifications and experience in threatened species conservation of the person preparing the statement and of any other person who has conducted research or investigations relied on in preparing the statement.

State-wide

The requirements of subsections (2) and (3) [above] in relation to information concerning the State-wide conservation status of any species or population, or any

conservation status ecological community, are taken to be satisfied by the information in that regard supplied to the principal author of the species impact statement by the NPWS, which information that Service is by this subsection authorised and required to provide.

Procedures for preparing an SIS

Under section 111 of the *TSC Act*, the Director-General of National Parks and Wildlife and under section 221L of the *FM Act*, the Director of DPI must be consulted in writing for the requirements for an SIS. These requirements must be provided within 28 days from when a request is made.

Because of the circumstances of the case, the Director-General of National Parks and Wildlife/Director of DPI may limit or modify the extent of matters prescribed in sections 110 *TSC Act* and 221J and 221K *FM Act*. In other cases if the impacts are considered to be trivial or negligible, the Director-General of National Parks and Wildlife/Director of DPI may dispense with the requirements for an SIS to be prepared.

An SIS may be prepared as a separate document or incorporated in an EIS. If the SIS is separate to the EIS, it must be exhibited concurrently with the EIS.

The SIS must be in writing and be signed by the principal author of the document and the applicant/proponent.

Appendix 4 Fishery Management Tools

Limiting who has access	<i>Limited access regimes</i> 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.
	<i>Restructuring programs</i> 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	<i>Fishing closures</i> 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.
	<i>Recreational fishing havens</i> which are a form of fishing closure may give preferential fishing rights to recreational fishers and may partly or totally restrict commercial fishers
	<i>Recognised fishing grounds</i> 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	<i>Gear restrictions</i> 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
	<i>Boat controls</i> limit the size and engine capacity of boats
Output controls limiting the amount and type of fish able to be landed	<i>Total allowable catch</i> (TACs) 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.
	<i>Species size limits</i> 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);
	<i>Bag limit</i> 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.

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.

	<p><i>Possession limit</i> is the maximum quantity of fish of a specified species or specified class that a person may have in possession in any specified circumstances</p>
	<p><i>Protected fish</i> are certain species of fish completely prohibited from being in a person's possession.</p>
	<p><i>Protected fish from commercial fishing</i> are certain species of fish completely prohibited from commercial fishing and from taking for sale.</p>
	<p><i>Quality assurance controls</i> are the controls on the harvest of shellfish such as mussels and pipis to protect health</p>
<p>Protection of ecosystems</p>	<p><i>Protected or threatened species, populations and ecological communities and their habitats</i> (eg fish, aquatic vegetation, marine mammals, platypus, birds etc). listed under the <i>FM Act, NPW Act or EPBC Acts</i>.</p>

APPENDIX A3. PLANNING NSW GUIDELINES/EIS CHECKLIST

Section	Planning NSW Guideline	Applicable EIS Section	Guideline Addressed?	Comment
A	EXECUTIVE SUMMARY	Chapter A	Y	
B	REVIEW OF EXISTING OPERATIONS	Chapter B		
1	General information			
	a Number of fishers	B1.1.1	Y	
	b Method of harvest	B1.1.2	Y	
	c Existing area of operation	B1.1.3	Y	
	d Interactions with other fisheries	B1.2	Y	
	e Existing management regime and performance measures	B1.3, B1.4, App. B3	Y	
	f Existing administrative arrangements	B1.3.2, App. B3	Y	
2	Ecological issues			
2.1	The target species			
	a The target stock and biology and ecology of target species	B2.3.1	Y	
	b Status of the stock	B2.3.2	Y	
	c Significant external factors that may affect the stock	B2.3.3	Y	
	d Diseases that may affect target species	B2.3.3.2	Y	
	e Summarise risks from the fishery to target species	B2.2.3, B2.3.4, Table B2.3	Y	
2.2	Byproduct and bycatch species			
	a Byproduct and bycatch species and existing management	B1.4, B2.4	Y	
	b Characteristics of species that may make them susceptible to impact	B2.4	Y	
	c Summarise risks from the fishery to byproduct and bycatch species	B2.2.3, B2.4, Table B2.4	Y	
2.3	Bait species			
	a Identify bait	Not relevant	Not relevant	Bait is not used in the Abalone Fishery
	b Effectiveness of existing management regime for minimising pests and diseases in bait	Not relevant	Not relevant	Bait is not used in the Abalone Fishery
	c Summarise risks from the fishery from bait	Not relevant	Not relevant	Bait is not used in the Abalone Fishery
2.4	Protected and threatened species			
	a Potentially affected listed protected and threatened species	B2.5.4	Y	
	b Interaction between the fishery and listed species	B2.5.3, B2.5.4, B2.5.5	Y	

	c	Existing measures for avoiding impacts on listed species	B2.5.5	Y	
	d	Summarise risks from the fishery to listed species	B2.2.3, B2.5.4	Y	
2.5		Other species and assemblages			
	a	Other species and assemblages that may be affected	B2.6	Y	
	b	Potential impacts that may occur to other species and assemblages	B2.6	Y	
	c	Translocated organisms and contingency plans for potentially translocated pest species	B2.6.5	Y	
	d	Potential alterations to ecosystem function	B2.6	Y	
	e	Summarise risks from the fishery to other species and assemblages	B2.2.3, B2.6, Table B2.6	Y	
2.6		Aquatic habitats			
	a	Primary habitat areas of target species	B2.6.4	Y	
	b	Extent of any impacts to primary habitat of target species	B2.6.4	Y	
	c	Other habitat areas that may be impacted and the extent of any impacts	B2.6.4	Y	
	d	Summarise risks from the fishery to habitats	B2.2.3, B2.6.4, Table B2.6	Y	
3		Physical impacts			
3.1		Water quality			
	a	Sources of pollutants from the fishery and any past, current or potential impacts	B2.2.3	Y	
	b	Existing management measures for mitigating impacts	B2.2.3	Y	
3.2		Noise and light regimes			
	a	Sources of noise and light and potentially affected species and residences	B2.2.3	Y	
3.3		Air quality, energy and greenhouse gas emissions			
	a	Odours or other air impacts and any existing measures for mitigating impacts and management	B2.2.3	Y	
4		Economic issues			
	a	Investment in the fishery and processing	B3.3	Y	
	b	Employment in the fishery	B3.4	Y	
	c	Economic return	B3.5	Y	
	d	Summarise risks to the economic viability of the fishery	B3.8	Y	
5		Social issues			
	a	Community values and views	B4.3	Y	

		b	Health risk to fishers	B4.4	Y	
		c	Health risk to consumers	B4.5	Y	
		d	Indigenous interests	B4.6	Y	
		e	Historic heritage	B4.7	Y	
		f	Summarise risks of the fishery to social issues	B4.8	Y	
C			CONSIDERATION OF ALTERNATIVE MANAGEMENT REGIMES	Chapter C		
		a	The no fishery alternative	C3.1	Y	
		b	No changes to existing management arrangements	C3.2	Y	
		c	Alternative harvesting methods	C4.1	Y	
		d	Alternative performance indicators and monitoring	C4.2	Y	
		e	Alternative arrangements for cost recovery or funding sources	C4.3	Y	
D			DRAFT FISHERY MANAGEMENT STRATEGY	Chapter D		
	1		Objectives of the Draft FMS	D3	Y	
	2		Designated fishing activity			
		a	Status and characteristics of stock	D2.1	Y	
		b	Areas of operation and closures	D2.2.1	Y	
		c	Regulations and management and administrative arrangements	D2.2	Y	
	3		Management responses			
		a	Risks being addressed in each management response	B5, D2.3, D3.3	Y	
		b	Outline each management response	D3.3	Y	
		c	Timeframe for implementing each management response	App. D1	Y	
		d	Predicted outcome(s)	D3.3	Y	
	4		Performance reporting and monitoring			
		a	Identify 'performance indicators' for each objective	D4.1	Y	
		b	Identify 'trigger points' (reference points) for interpreting performance indicators	D4.1	Y	
		c	Justify the selection of performance indicators and trigger points	C4.2, D4.1	Y	
		d	Identify data requirements and availability for performance indicators	D4.1	Y	
		e	Identify the 'robustness' of performance indicators and trigger points	D4.1	Y	
		f	Identify the 'actions' resulting when trigger points exceeded	D4.1	Y	

		g	Identify 'external drivers'	B5.2, D2.3	Y	
	5		Research and development plan			
		a	Existing strategic plan	B1.6, D5.1	Y	
		b	Update existing plan in line with objectives of Draft FMS	D5.2	Y	
		c	Identify knowledge gaps for the fishery and incorporate into plan	D5.1 & 5.2	Y	
E			ASSESSMENT OF THE POTENTIAL IMPACTS OF IMPLEMENTING THE DRAFT FMS	Chapter E		
	1		Ecological issues			
	1.1		Target species			
		a	Changes in impacts to the stock from the fishery	E1.2.1	Y	
		b	Changes in impacts to the stock from external sources	E1.2.2	Y	
		c	Changes to risks to the target stock	E1.2.1, E1.2.2, Table E1.1	Y	
	1.2		Byproduct and bycatch species			
		a	Changes in impacts from the fishery to byproduct and bycatch species	E1.3	Y	
		b	Potential for new markets for byproduct and bycatch species	Not relevant	Y	Abalone is the only species allowed to be harvested
		c	Changes to risks to stocks of byproduct and bycatch	E1.3, Table E1.2	Y	
	1.3		Bait species			
		a	Changes in impacts from the fishery to bait species	Not relevant	Not relevant	Bait is not used in the Abalone Fishery
		b	Changes to risks to bait species	Not relevant	Not relevant	Bait is not used in the Abalone Fishery
	1.4		Protected and threatened species			
		a	Changes to impacts to listed protected and threatened species	E1.4.4	Y	
		b	Assessment using the 'eight-part test'	B2.5.5, App. B6, Table B2.6	Y	
		c	Effectiveness of protective measures proposed in the Draft FMS	E1.4.2	Y	
	1.5		Other aspects of ecosystem structure and function			
		a	Changes in impacts to ecosystems	E1.5	Y	
		b	Changes to risks to ecosystems	E1.5, Table E1.4	Y	
	1.6		Aquatic habitats			
		a	Changes in impacts from the fishery to primary habitats of target species or other habitats	E1.5	Y	
		b	Changes to risks to aquatic habitats	E1.5, Table E1.4	Y	
	1.7		Performance reporting, monitoring and research regime			
		a	Effectiveness in monitoring impacts on	E1.6	Y	

		ecosystem and target species			
	b	Effectiveness of research plan to meet knowledge gaps in the sustainable management of the ecosystem and target species	E1.6	Y	
2		Physical issues			
2.1		Water quality			
	a	Changes to impacts from the fishery on water quality	Not relevant	Y	The effect of the commercial fishery on water quality is considered to be negligible (see B2.2.2, B2.2.3)
2.2		Noise and light regimes			
	a	Changes to impacts from the fishery on noise and light regimes	Not relevant	Y	The effect of the commercial fishery on noise and light regimes is considered to be negligible (see B2.2.2, B2.2.3)
2.3		Air quality, energy and greenhouse gas emissions			
	a	Changes to impacts from the fishery on air quality, energy and greenhouse gas emissions	Not relevant	Y	The effect of the commercial fishery on air quality, energy and greenhouse gas emissions is considered to be negligible (see B2.2.2, B2.2.3)
	b	Measures for increasing energy use efficiency and minimising greenhouse gas emissions	B2.2.3	Y	
3		Economic and social issues			
3.1		Economic issues			
	a	Changes in economic viability of the fishery	E2	Y	
3.2	a	Changes in social impacts of the fishery	E3	Y	
	b	Changes in impacts of the fishery on Indigenous interests and values	E3.3	Y	
	c	Changes in impacts on heritage values	E3.4	Y	
	d	Changes to the risk to the economic viability of the fishery	E2	Y	
3.3		Performance reporting, monitoring and research regime			
	a	Effectiveness in monitoring impacts on the economic and social issues	E2.3, E3.6	Y	
	b	Effectiveness of research plan to meet knowledge gaps in the sustainable management of the social and economic issues	E2.3, E3.6	Y	
F		JUSTIFICATION FOR DRAFT FMS	Chapter F		
	a	Justification of preferred management objectives	F1 & 2	Y	

	b	Justification of preferred suite of 'management responses'	F1 & 2	Y	
	c	Justification of preferred approach to resource allocation	F2.2 & 2.3	Y	

APPENDIX A4. GLOSSARY

Abalone	The target species, <i>Haliotis rubra</i> .
Abalone Fishery	The commercial fishery for abalone in NSW.
ABMAC	Abalone Management Advisory Committee.
ACCF	Advisory Council on Commercial Fishing.
ACoA	Advisory Council on Aquaculture.
ACoRF	Advisory Council on Recreational Fishing.
ADC	Abalone Development Company.
ADT	Administrative Decisions Tribunal.
AQIS	Australian Quarantine Inspection Service.
Aquatic Reserves	Small areas declared under the <i>Fisheries Management Act 1994</i> where commercial and recreational fishing is restricted or not permitted.
Assemblage	A group of organisms living close together.
ABS	Australian Bureau of Statistics.
Beach price	Price payed to shareholders by processors for abalone at the point of first sale.
Bio-economic modelling	Relates the production of the fishers, and the prevailing price and costs of production with a model of the resource, in order to indicate sustainable levels of harvest, effort and profit.
Biomass	The total weight of abalone.
Biophysical	Biological and physical aspects of the environment.
Bycatch	Organisms caught incidentally to abalone.
Category 1 share managed fishery	Access rights the commercial fishery are based on shareholdings in the fishery, which are transferable. Full cost recovery and community contribution payable. Includes Abalone Fishery and Lobster Fishery.
Closures	Areas of coastline closed to commercial and recreational harvesting of abalone.
Commercial catch rate	Weight of abalone caught by commercial divers relative to the amount of time spent harvesting (effort).
Commercial fishery	Operations carried out by endorsement holders in the Abalone Fishery.
Community contribution	NSW Government policy whereby shareholders in Category 1 share managed fisheries, such as the Abalone Fishery, make a periodic cash contribution to consolidated revenue in respect of privileged access.
Compliance	Fisheries field services whose core role is to provide advisory and enforcement services.
Contestable supply	Where opportunity exists for obtaining a service from a source of suppliers.
Cost recovery	NSW Government policy for recovering the costs of managing commercial fisheries. Full cost recovery policy is applied to Category 1 share managed fisheries such as the Abalone Fishery.
CPI	Consumer Price Index.
(The) Department	Department of Primary Industries.

Deck hand	Person nominated by a shareholder to work on an abalone boat and assist the diver.
Dioecious	Sexes are separate, i.e. individuals can only be male or female, not both.
DIPNR	Department of Infrastructure, Planning and natural Resources.
Discards	Abalone that have been removed from the reef by a diver and then determined to be under the minimum legal size and replaced.
Diver	Endorsement holder in the Abalone Fishery.
DPI	Department of Primary Industries
Draft FMS	The Draft Fishery Management Strategy for the Abalone Fishery.
Ecology	Interrelationships between organisms and their environment and each other.
Economic multipliers	Relate to the flow-on impacts of expenditure in the Abalone Fishery.
Economic rent	(see 'Rent')
Economic return	Economic benefits generated by the Abalone Fishery
Ecosystem	Biological community of interacting organisms and their environment.
EIS	Environmental Impact Statement
Employment multipliers	Relate to the impacts on employment of expenditure by the Abalone Fishery.
Endorsement	Licence to harvest abalone commercially.
Environment	Includes biological, ecological, physical, economic and social conditions.
<i>EP&A Act</i>	<i>Environmental Planning and Assessment Act 1979.</i>
<i>EPBC Act</i>	<i>Environment Protection and Biodiversity Conservation Act 1999.</i>
ESD	Ecologically Sustainable Development
Existing operations	Operations of the commercial fishery under the existing share management plan.
Fisher	Person who harvests abalone.
Fisheries Investigations Unit (FIU)	A separate unit within the Department consisting of 11 people that integrates intelligence with abalone and lobster compliance functions. intelligence compliance that integrates intelligence
Fishery-independent surveys	Surveys of abundance of abalone carried out each year at a number of fixed sites.
Fishing ground	Areas where abalone are harvested.
Fishing mortality	Removal of a portion of the stock of abalone due to commercial fishing.
Fishing period	The period to which a designated TACC applies. In June 2003, the fishing period was changed from the calendar year to the financial year.
'Foot' of abalone	The muscular part of abalone that attaches to the reef.
<i>FM Act</i>	<i>Fisheries Management Act 1994.</i>
FMS	'Fishery Management Strategy'.
Fully-fished	DPI term used to define the status of exploitation of the stock of abalone as one in which 'current catches are sustainable and close to optimum levels' and where 'significant increases in fishing effort above current levels may lead to over-fishing'.
GDP	Gross domestic product
Gross return	Financial return to shareholders from the sale of abalone quota before costs have been deducted.

Growth over-fishing	This occurs when too many small abalone are taken, and therefore too few grow to a size that provides the largest yield from the fishery.
GVP	Gross value of production.
Harvesting	The process of removal of abalone from their environment.
Hookah	Apparatus used by divers to breathe air underwater. Involves a compressor or large tank containing compressed air aboard the boat which pumps air down to the diver through a hose.
IFS	Indigenous Fishing Strategy and Implementation Plan.
Illegal fishing	Harvesting of abalone that is done by commercial, recreational and Indigenous fishers that breaches regulations.
Indigenous	People with aboriginal heritage.
Indigenous fishery	The Indigenous sector of the community that harvest abalone. Indigenous fishers must harvest according to general recreational fishing rules for abalone, although special permits that allow groups to exceed the bag-limit may be granted in particular circumstances.
Indigenous Fishing Strategy and Implementation Plan	A strategy for promoting the recognition of Indigenous culture and involvement of aboriginal people in fisheries in NSW.
Industry	Refers to stakeholders in the commercial sector of the fishery.
IPART	Independent Pricing and Regulatory Tribunal.
ITQ	Individual transferable quota is a proportion of the total allowable catch held by a fisher that can be fished or transferred between fishers.
Larvae	Small, planktonic recently hatched abalone that live in the water column before settling on the reef.
Legal sized abalone	Abalone of a size above the minimum legal size.
Lobster Fishery	The commercial fishery for lobster in NSW.
Management charges	Fees paid by shareholders for the management of the Abalone Fishery. This does not include community contribution'.
Marine Parks	Large areas declared under the <i>Marine Parks Act 1997</i> where commercial and recreational fishing is restricted or not permitted.
Marine Pests and Diseases Management Plan	
Marine Protected Areas	Areas where commercial and recreational fishing is restricted or not permitted. Includes Marine Parks and Aquatic Reserves.
Mature Biomass	The total weight of abalone that are above the size at which individuals mature.
Minimum shareholding	The minimum number of shares required by a shareholder to be issued with an endorsement to take abalone (currently the minimum is 70 shares).
MLS	'Minimum legal size'- The minimum size (115 mm) at which abalone can be harvested by commercial, recreational and Indigenous fishers.
Model(ing)	Refers to outputs from the computer model(ing) used in the stock assessment of abalone.
National Docketing System	A docket system, applying to all abalone sold in Australia, that assists in reducing marketing of illegally caught abalone.
Natural mortality	Removal of a portion of the stock due to natural rates of death of abalone.

Net return	Financial return to shareholders from the sale of abalone quota after costs have been deducted.
Nominated diver	Endorsement holder nominated by a shareholder to take abalone on his behalf.
NSW	New South Wales.
OCC	Opportunity cost of capital
Opportunity costs	The cost of the next best alternative
Over-fishing	Harvesting abalone at a rate that is thought to be unsustainable.
Performance indicator	A parameter that measures whether an objectives for the Abalone Fishery is being attained.
<i>Perkinsus</i>	A single-celled protistan parasite of abalone that is thought to be responsible for large-scale mortality of abalone in parts of NSW.
Poacher	An individual who does not hold an endorsement in the fishery but harvest abalone for commercial gain.
Population	The total number of individuals in an area. In most cases it refers to the 'general' population of abalone but in some cases where it refers to smaller populations the distinction is made evident.
Post-harvest	Refers to processes that occur in operations involved with abalone after it has been landed by commercial divers.
Precautionary principle	Taking a precautionary approach to preventing environmental degradation when there is a lack of full scientific certainty.
Processor	Refers to a business that handles abalone after it has been landed by commercial divers.
Protected species	Any species of fish listed under Sections 19 or 20 of the <i>FM Act</i> .
Quota	Weight of abalone allocated to shares in the Abalone Fishery for a fishing period.
Ranching	Maintaining reseeded or wild abalone on a particular area of reef to which there are privileged access rights.
Recreational fishery	A sector of the community with legitimate access to the resource. Recreational fishers must hold a general saltwater recreational fishing licence and not exceed a bag-limit of 10 abalone per individual.
Recruitment	Refers to the total number of individuals for a year that are added to the stock of abalone.
Recruitment over-fishing	This occurs when harvesting greatly reduces the number of mature (breeding) abalone in a population, causing a decline in the reproductive output and leading to a very significant reduction in the number of young abalone recruiting to the harvesting portion of that population.
Reef	Refers to rocky reef habitat on which abalone are known to live.
Region	Stock assessment regions for the Abalone Fishery. There are 6 regions in NSW between the Queensland and Victorian borders.
Regulation	The regulations in the Abalone Share Management Plan (2000).
Rent	Rent is an economic surplus from a natural resource indicating a return above the full cost of supply.
Re seeding	Releasing hatchery-reared abalone into the wild.
Resource rent	Part of the economic surplus that is attributable to access to the resource as opposed to other components of economic surplus which may be due to a fisher's skill or information and may be competed away.

Risk analysis	A process used to identify actions with undesirable outcomes.
Section 37 Research Permit	A permit issued under the <i>FM Act</i> to research scientists and commercial fishers assisting in undertaking research programs.
Serial depletion	When harvesting systematically removes all of the stock from one area to another.
Share management plan	The share management plan for the Abalone Fishery.
Shareholders	Shareholders in the Abalone Fishery (see Appendix A1).
Shares	Shares in the Abalone Fishery (total = 3,654).
Size at maturity	The size of abalone at which the majority of individuals mature.
Spatial	Refers to area and geographical relationships.
Spawning	Refers to abalone that release eggs or sperm.
Stock	The biomass of mature abalone.
Stock assessment	A process of estimating the biomass of abalone and fishing mortality rates in a computer model that combines sources of data derived from surveys of abundance and catch and effort information from the commercial fishery.
Strategic plan	A strategy for Administration, Research or Compliance in the Abalone Fishery as detailed in the share management plan.
Subzone	An area of coast within a zone to which commercial divers in the fishery must report their catch. There are a total of 72 reporting subzones in the Abalone Fishery.
SUTS	Sea Urchin and Turban Shell Fishery.
TAC	Total Allowable Catch (includes commercial and recreational catch).
TACC	Total Allowable Commercial Catch.
TAC Committee	Total Allowable Catch Setting and Review Committee.
Target species	The species targeted by the commercial fishery (i.e. the black-lip abalone, <i>Haliotis rubra</i>).
Threatened species	Any species listed under Schedules 4 or 5 of the <i>FM Act</i> , Schedules 1 or 2 of the <i>TSC Act</i> or subdivisions C or D of the <i>EP & A Act</i> .
Trigger point	A level reached by a performance indicator that suggests a review is required.
Translocation	Movement from one area to another.
<i>TSC Act</i>	<i>Threatened Species Conservation Act 1995</i> .
VMS	Vessel monitoring system.
Zone	An area of coast within a stock assessment region. There are a total of 28 reporting zones in the Abalone Fishery.

APPENDIX B

APPENDIX B1. SECTION 8 CLOSURES, FMA (1994)

**Date of Notification: 22 November 2002
Government Gazette No.225**

F92/1820C

FISHERIES MANAGEMENT ACT 1994

Notification under Section 8

Fishing Closure – Abalone Region 1

I, Edward Obeid, prohibit the taking of abalone by all methods from the whole of the waters between Port Stephens (that is, south of a line drawn east of the point 152° 11' 09.4272" east, 32° 42' 40.032" south) and the middle of Wreck Bay Beach, Jarvis Bay, (that is, the waters bounded by the points 150° 37' 30.6192" east, 35° 10' 06.0816" south and 150° 37' 30.6192" east, 35° 12' 59.7960" south).

This notification replaces all other abalone fishing closures currently in force in the waters subject to this notification.

This notification is effective from the date of publication for a period of five (5) years.

The Hon Edward Obeid OAM, MLC
Minister for Mineral Resources
Minister for Fisheries

Appendix B1 continued: Section 8 Closures FMA (1994)**Date of Notification: 25 October 2002****Government Gazette No. 189**

F92/1820 (C)

FISHERIES MANAGEMENT ACT 1994**Notification under section 8**Fishing Closure - Abalone Commercial Fishing SubzonesF2, G4, L4, Q3, U2, Y12, Z1-Z2

I, Edward Obeid, prohibit the taking of abalone by licensed commercial fishers from the commercial abalone fishing subzones described in Column 1 being the waters described in Column 2, in the schedule below.

This notification is effective between 1 November 2002 and 1 March 2003, and between 1 November 2003 and 1 March 2004 (all dates inclusive).

The Hon Edward Obeid OAM, MLC
Minister for Mineral Resources
Minister for Fisheries

Schedule

<i>Column 1</i>	<i>Column 2</i>
Zones	Waters
F2 Anna Bay to Newcastle	The whole of the waters between a line drawn east from the point 152° 11' 09.4272" east, 32° 42' 40.0320" south (the southern end of the rocks at Anna Bay), and a line drawn east from the point 152° 07' 00.3864" east, 32° 46' 28.8192" south (the northernmost point of the southern headland of Newcastle Harbour).
G4 Terrigal to Broken Bay.	The whole of the waters between a line drawn east from the point 151° 27' 00.8532" east, 33° 26' 46.644" south, and a line drawn east from the point 151° 19' 43.8888" east, 33° 34' 40.7532" south.
L4 Northern Tip of Bowen Island to Wreck Bay	The whole of the waters between a line drawn east from the point 150° 46' 06.0456" east, 35° 06' 43.9920" south (the northernmost point of Bowen Island), and a line drawn south from 150° 37' 30.6192" east, 35° 10' 06.0816" south (point A), to 150° 37' 30.6192" east, 35° 12' 59.7960" south (point B), and a line drawn east from that point. (the waters bounded by the points (A) the middle of Wreck Bay and (B) eastwards of the line joining these two points) .

Schedule (continued)

Column 1 Zones	Column 2 Waters
Q3 Lilli Pilli Beach to Malua Bay	The whole of the waters between a line drawn east from the point 150° 13' 32.0700" east, 35° 46' 14.4624" south (the rocks at the south end of Lilli Pilli Beach, inclusive), and a line drawn east from the point 150° 13' 51.1356" east, 35° 47' 34.5696" south (the northern end of the rocks at the south end of Malua Bay (i.e. exclusive)).
U2 Cuttagee to Thibbul Inlet	The whole of the waters between a line drawn east from the point 150° 03' 18.2196" east, 36° 29' 16.6056" south (the northernmost point of the headland at Cuttagee Point), and a line drawn east from the point 150° 03' 27.1296" east, 36° 31' 32.7576" south (the northernmost point of the southern headland of Thibbul Inlet, Murrah).
Y12 Red Point to Leatherjacket Beach	The whole of the waters between a line drawn east from the point 149° 57' 13.8672" east, 37° 06' 02.7792" south (the northernmost point of Red Point), and a line drawn east from the point 149° 58' 06.9312" east, 37° 07' 31.0368" south (the northernmost point of the southern headland of Leatherjacket Bay).
Z1-Z2 Wonboyn to Black Head Anchorage	The whole of the waters between a line drawn from the point 149 58' 01.2900" east, 37° 15' 02.8692" south (point A), to 149° 58' 01.2900" east, 37° 16' 44.5512" south (point B) and a line drawn east from that point (the waters bounded by the points (A) the northern most point of the entrance to Wonboyn Lake and (B) eastwards of the line joining these two points) and a line drawn east from the point 149° 58' 21.5148" east, 37° 26' 26.3580" south, (the rocks at the southern end of Nadgee Beach).

Date of Notification: 8 November 2002
Government Gazette No. 210

F92/1820C

FISHERIES MANAGEMENT ACT 1994
Section 8 Notification - Fishing Closure
Commercial Abalone Seasonal Fishing Closure

I, Edward Obeid, prohibit the taking of abalone for sale from all waters of NSW, in the period between 25 December 2002 and 1 January 2003 (inclusive), and 1 February 2003 and 28 February 2003 (inclusive).

The Hon Edward Obeid OAM, MLC

Minister for Mineral Resources

Minister for Fisheries

APPENDIX B2. NSW COMMERCIAL ABALONE FISHERY REPORTING SUBZONES

Catch Subzones for the NSW Abalone Fishery				
Sub-zone	Northern Boundary		Southern Boundary	
A Tweed Heads to Ballina	153° 33' 07.2612"	28° 09' 52.3404"	153° 35' 25.0512"	28° 52' 38.3232"
B1 Ballina to Sandon	153° 35' 25.0512"	28° 52' 38.3232"	153° 19' 57.9648"	29° 40' 25.8456"
B2 Sandon to Red Rock	153° 19' 57.9648"	29° 40' 25.8456"	153° 14' 03.4764"	29° 58' 52.014"
B3 Red Rock to Coffs Harbour	153° 14' 03.4764"	29° 58' 52.014"	153° 09' 11.6064"	30° 18' 31.8888"
C1 Coffs Harbour to SW Rocks	153° 09' 11.6064"	30° 18' 31.8888"	153° 01' 43.7268"	30° 52' 24.6072"
C2 SW Rocks to Pt Macquarie	153° 01' 43.7268"	30° 52' 24.6072"	152° 55' 02.7192"	31° 25' 36.0984"
D1 Pt Macquarie to Harrington	152° 55' 02.7192"	31° 25' 36.0984"	152° 41' 27.8952"	31° 52' 39.8424"
D2 Harrington to Tuncurry	152° 41' 27.8952"	31° 52' 39.8424"	152° 30' 43.9632"	32° 10' 25.1724"
E2 Foster to Seal Rocks	152° 30' 43.9632"	32° 10' 25.1724"	152° 32' 09.9384"	32° 26' 02.3964"
E3 Seal Rocks to Hawks Nest Beach	152° 32' 09.9384"	32° 26' 02.3964"	152° 11' 14.118"	32° 40' 07.0356"
E4 Yacaaba Head and Islands	152° 11' 14.118"	32° 40' 07.0356"	152° 11' 09.4272"	32° 42' 40.032"
E1 Broughton Island	152° 17' 43.5840"	32° 35' 25.0044"	152° 17' 43.5840"	32° 38' 38.7872"
F1 Port Stephens to Anna Bay	152° 11' 09.4272"	32° 42' 40.032"	152° 07' 00.3864"	32° 46' 28.8192"
F2 Anna Bay to Newcastle	152° 07' 00.3864"	32° 46' 28.8192"	151° 47' 57.5844"	32° 55' 03.9936"
F3 Newcastle to Burwood Beach	151° 47' 57.5844"	32° 55' 03.9936"	151° 45' 43.9128"	32° 56' 42.108"
F4 Burwood Beach to Swansea	151° 45' 43.9128"	32° 56' 42.108"	151° 39' 57.6648"	33° 05' 13.1604"
G1 Swansea to Norah Head	151° 39' 57.6648"	33° 05' 13.1604"	151° 34' 36.1236"	33° 16' 44.8428"
G2 Norah Head to The Entrance	151° 34' 36.1236"	33° 16' 44.8428"	151° 30' 15.4908"	33° 20' 35.0484"
G3 The Entrance to Terrigal	151° 30' 15.4908"	33° 20' 35.0484"	151° 27' 00.8532"	33° 26' 46.644"
G4 Terrigal to Broken Bay	151° 27' 00.8532"	33° 26' 46.644"	151° 19' 43.8888"	33° 34' 40.7532"
H1 Broken Bay to Sydney Harbour	151° 19' 43.8888"	33° 34' 40.7532"	151° 16' 51.2508"	33° 49' 58.152"
H2 Sydney Harbour to Bondi Beach	151° 16' 51.2508"	33° 49' 58.152"	151° 16' 37.146"	33° 53' 30.9696"
H3 Bondi Beach to Botany Bay	151° 16' 37.146"	33° 53' 30.9696"	151° 13' 19.992"	34° 00' 05.364"
J1 Botany Bay to Port Hacking	151° 13' 19.992"	34° 00' 05.364"	151° 10' 08.8788"	34° 04' 29.5032"
J2 Port Hacking to Marley Beach	151° 10' 08.8788"	34° 04' 29.5032"	151° 08' 28.788"	34° 06' 57.8916"
J3 Marley Beach to Garie Beach	151° 08' 28.788"	34° 06' 57.8916"	151° 04' 06.816"	34° 10' 14.2464"
J4 Garie Beach to Stanwell Park	151° 04' 06.816"	34° 10' 14.2464"	151° 59' 27.5388"	34° 13' 48.6264"
J5 Stanwell Park to Wollongong Hbr	151° 59' 27.5388"	34° 13' 48.6264"	151° 54' 24.5016"	34° 25' 08.958"
K1 Wollongong Hbr to Shellharbour	151° 54' 24.5016"	34° 25' 08.958"	150° 52' 35.7672"	34° 34' 44.2416"
K2 Shellharbour to Bombo Beach	150° 52' 35.7672"	34° 34' 44.2416"	150° 51' 23.0616"	34° 39' 26.8092"
K3 Bombo Beach to Werri Beach	150° 51' 23.0616"	34° 39' 26.8092"	150° 50' 06.702"	34° 44' 04.182"
K4 Werri Beach to Shoalhaven Heads	150° 50' 06.702"	34° 44' 04.182"	150° 46' 10.686"	34° 53' 51.6264"

Appendix B2 continued: NSW Abalone Commercial Fishery Sub-zones (GPS points taken in WGS 84)

Catch Sub-zones for the NSW Abalone Fishery				
Sub-zones	Northern Boundary		Southern Boundary	
L1 Shoalhaven Heads to Currarong	150° 46' 10.686"	34° 53' 51.6264"	150° 49' 20.4636"	35° 00' 49.5396"
L2 Currarong to Pt Perpendicular	150° 49' 20.4636"	34° 58' 58.6668"	150° 48' 16.236"	35° 05' 39.9084"
L3 Inside Jarvis Bay	150° 48' 16.236"	35° 05' 39.9084"	150° 46' 06.0456"	35° 06' 43.992"
L4 Nth tip Bowen Island to Wreck Bay	150° 46' 06.0456"	35° 06' 43.992"	150° 37' 30.6192"	35° 10' 06.0816"
M1 Wreck Bay to Bendalong	150° 37' 30.6192"	35° 10' 06.0816"	150° 32' 43.4652"	35° 14' 54.8016"
M2 Bendalong to Ulladulla	150° 32' 43.4652"	35° 14' 54.8016"	150° 28' 43.5864"	35° 21' 20.6568"
N1 Ulladulla to Termeil Point	150° 28' 43.5864"	35° 21' 20.6568"	150° 23' 44.3148"	35° 27' 37.6272"
N2 Termeil Point to Brush (excl. Island)	150° 23' 44.3148"	35° 27' 37.6272"	150° 24' 27.1728"	35° 31' 45.7356"
N3 Brush Island	150° 24' 37.2060"	35° 31' 18.6672"	150° 24' 37.2060"	35° 32' 19.4604"
P1 Brush (excl. Island) to Pretty Beach	150° 24' 27.1728"	35° 31' 45.7356"	150° 21' 55.9548"	35° 34' 12.9864"
P2 Pretty Beach to Sth Durras	150° 21' 55.9548"	35° 34' 12.9864"	150° 17' 46.986"	35° 39' 09.4428"
P3 Sth Durras to North Head	150° 17' 46.986"	35° 39' 09.4428"	150° 16' 34.7772"	35° 43' 23.1924"
P4 North Head to Batemans Bay	150° 16' 34.7772"	35° 43' 23.1924"	150° 10' 54.1416"	35° 42' 26.5284"
Q1 Batemans Bay to Lilli Pilli Beach	150° 10' 53.9760"	35° 42' 34.6428"	150° 13' 32.07"	35° 46' 14.4624"
Q2 Tollgate Islands	150° 15' 00.0000"	35° 44' 00.0000"	150° 15' 00.0000"	35° 46' 00.0000"
Q3 Lilli Pilli Beach to Malua Bay	150° 13' 32.07"	35° 46' 14.4624"	150° 13' 51.1356"	35° 47' 34.5696"
Q4 Malua Bay to Burrewarra Point	150° 13' 51.1356"	35° 47' 34.5696"	150° 14' 07.7244"	35° 50' 06.0324"
Q5 Burrewarra Point to Moruya River	150° 14' 07.7244"	35° 50' 06.0324"	150° 09' 06.9732"	35° 54' 23.238"
R1 Moruya River to Black Rock	150° 09' 06.9732"	35° 54' 23.238"	150° 09' 10.3464"	35° 59' 01.2876"
R2 Black Rock to Tuross Lake	150° 09' 10.3464"	35° 59' 01.2876"	150° 08' 03.642"	36° 04' 01.7472"
S2 Tuross Lake to Dalmeny	150° 08' 03.642"	36° 04' 01.7472"	150° 07' 37.8804"	36° 09' 43.956"
S3 Dalmeny to Narooma	150° 07' 37.8804"	36° 09' 43.956"	150° 08' 01.3956"	36° 12' 39.096"
S1 Montague Island	150° 12' 58.7304"	36° 14' 13.7328"	150° 12' 58.7304"	36° 16' 00.9048"
T1 Narooma to Corunna Lake	150° 08' 01.3956"	36° 12' 39.096"	150° 07' 54.2136"	36° 17' 23.7228"
T2 Corunna Lake to Bermagui	150° 07' 54.2136"	36° 17' 23.7228"	150° 04' 26.4072"	36° 25' 17.8788"

Appendix B2 continued: NSW Abalone Commercial Fishery Sub-zones (GPS points taken in WGS 84)

Catch Sub-zones for the NSW Abalone Fishery				
Sub-zones	Northern Boundary		Southern Boundary	
U1 Bermagui to Cuttagee Inlet	150° 04' 26.4072"	36° 25' 17.8788"	150° 03' 18.2196"	36° 29' 16.6056"
U2 Cuttagee to Thibbul Inlet (Murrrah)	150° 03' 18.2196"	36° 29' 16.6056"	150° 03' 27.1296"	36° 31' 32.7576"
U3 Thibbul to Bunga Head (Goalen and Pressure)	150° 03' 27.1296"	36° 31' 32.7576"	150° 03' 20.3508"	36° 33' 17.4264"
U4 Bunga Head to Mimosa Rocks (Bunga)	150° 03' 20.3508"	36° 33' 17.4264"	150° 03' 16.7112"	36° 35' 04.8624"
V1 Mimosa Rocks to Bithry Inlet	150° 03' 16.7112"	36° 35' 04.8624"	150° 01' 12.2052"	36° 37' 46.8768"
V2 Bithry Inlet to Barounda Inlet	150° 01' 12.2052"	36° 37' 46.8768"	149° 59' 41.7444"	36° 41' 09.3264"
V3 Barounda Inlet to Tathra	149° 59' 41.7444"	36° 41' 09.3264"	149° 59' 28.0212"	36° 43' 29.1864"
W1 Tathra to Wallagoot Lake	149° 59' 28.0212"	36° 43' 29.1864"	149° 57' 26.3844"	36° 47' 23.4816"
W2 Wallagoot Lake to Short Point Beach	149° 57' 26.3844"	36° 47' 23.4816"	149° 55' 57.3996"	36° 52' 04.720"
W3 Short Point Beach to Merimbula	149° 55' 57.3996"	36° 52' 04.720"	149° 54' 29.1924"	36° 54' 27.4104"
X1 Merimbula to Long Beach	149° 54' 29.1924"	36° 54' 27.4104"	149° 55' 39.864"	36° 59' 00.2796"
X2 Long Beach to Eden Wharf	149° 55' 39.864"	36° 59' 00.2796"	149° 54' 27.5904"	37° 04' 26.7456"
Y11 Eden Wharf to Red Point	149° 54' 27.5904"	37° 04' 26.7456"	149° 57' 13.8672"	37° 06' 02.7792"
Y12 Red Point to Leatherjacket Beach	149° 57' 13.8672"	37° 06' 02.7792"	149° 58' 06.9312"	37° 07' 31.0368"
Y13 Leatherjacket Beach to Mowarry Point	149° 58' 06.9312"	37° 07' 31.0368"	150° 00' 16.5996"	37° 08' 29.1552"
Y21 Mowarry Point to Saltwater Beach	150° 00' 16.5996"	37° 08' 29.1552"	150° 00' 11.484"	37° 10' 10.8336"
Y22 Saltwater Beach to Long Point	150° 00' 11.484"	37° 10' 10.8336"	150° 01' 14.97"	37° 11' 09.1824"
Y23 Long Point to Bittangabee Bay	150° 01' 14.97"	37° 11' 09.1824"	150° 01' 05.6892"	37° 12' 54.0364"
Y24 Bittangabee Bay to Green Cape	150° 01' 05.6892"	37° 12' 54.0364"	150° 03' 07.2072"	37° 15' 45.0324"
Y31 Green Cape to City Rock	150° 03' 07.2072"	37° 15' 45.0324"	150° 00' 46.4400"	37° 15' 19.7964"
Y32 City Rock to Wonboyn	150° 00' 46.4400"	37° 15' 19.7964"	149° 58' 01.2900"	37° 15' 02.8692"
Z1 Wonboyn to Jane Spiers Beach	149° 58' 01.2900"	37° 15' 02.8692"	149° 57' 23.1372"	37° 21' 13.2300"
Z2 Jane Spiers Beach to Black Head Anchorage	149° 57' 23.1372"	37° 21' 13.2300"	149° 58' 21.5148"	37° 26' 26.358"
Z3 Black Head Anchorage to Nadgee Lake	149° 58' 21.5148"	37° 26' 26.358"	149° 58' 21.1764"	37° 27' 54.9648"
Z4 Nadgee Lake to Howe Beach	149° 58' 21.1764"	37° 27' 54.9648"	149° 58' 26.8788"	37° 29' 51.1224"
Z5 Howe Beach to Cape Howe	149° 58' 26.8788"	37° 29' 51.1224"	149° 58' 34.5468"	37° 30' 19.152"

APPENDIX B3. REGULATIONS AND LICENCE CONDITIONS UNDER THE ABALONE SHARE MANAGEMENT PLAN (2000)

1 Name of Regulation

This Regulation is the Fisheries Management (Abalone Share Management Plan) Regulation 2000.

2 Abalone Share Management Plan

The *Abalone Share Management Plan* set out in the Appendix to this Regulation has effect.

3 Amendment of Fisheries Management (General) Regulation 1995

The Fisheries Management (General) Regulation 1995 is amended by inserting at the end of clauses 130B and 134A the following subclause (with appropriate subclause numbering):

() This clause ceases to have effect in respect of the abalone share management fishery on the commencement of the management plan for that fishery.

4 Notes

The explanatory note, table of contents and notes in the text of this Regulation (including the Appendix) do not form part of this Regulation.

Appendix

Abalone Share Management Plan

Part 1 Preliminary

1 Name of Plan

This is the *Abalone Share Management Plan*.

2 Definitions

In this Plan:

abalone offence means an offence against this Plan or an offence against the Act or the regulations under the Act relating to the taking or sale of abalone.

abalone processor means a person who receives abalone, for resale or other commercial use, from an endorsement holder or shareholder, or from any person transporting the abalone on behalf of the endorsement holder or shareholder.

approved means approved by the Director.

endorsement means an endorsement on a commercial fishing licence that authorises the taking of abalone in the fishery.

endorsement holder means a person who holds a commercial fishing licence that has an endorsement.

endorsement holder offence—see clause 38.

fishery means the abalone fishery (as described in Schedule 1 to the Act).

fishing period has the meaning given by clause 14.

nominated fisher means a commercial fisher nominated by a shareholder to take abalone in the fishery on behalf of the shareholder.

quota means a shareholder's allocation of the total allowable catch for the fishery.

serious fisheries offence means any of the following offences:

- (a) an offence against section 121 of the Act,
- (b) an offence against section 124 of the Act,
- (c) an offence against section 247 of the Act,
- (d) an offence against clause 107 of the *Fisheries Management (General) Regulation 1995*,
- (e) an offence arising from the theft of fishing gear.

shareholder means a holder of shares in the fishery.

the Act means the *Fisheries Management Act 1994*.

Part 2 Objectives of Plan

3 Objectives, performance indicators and triggers for review

- (1) The objectives of this Plan are set out in Column 1 of the Table to this clause.
- (2) For the purposes of section 57 (2) (a) of the Act, the performance indicator in relation to each objective of this Plan is set out in Column 2 of the Table to this clause next to the objective concerned.
- (3) For the purposes of section 57 (2) (b) of the Act, a review of this Plan is required if the Minister is satisfied of the existence of a matter referred to in Column 3 of the Table to this clause (in relation to the objective and performance indicator set out next to that matter in the Table)

Table: Objectives, Performance Indicators and Triggers for Review in the Abalone Share Management Plan.

Column 1	Column 2	Column 3
Objective	Performance indicator	Trigger for review
1 Promote commercial fishing practices for abalone that do not adversely impact on the broader ecosystem	Commercial fishing practices for abalone do not have an adverse environmental impact on the broader ecosystem	Research conducted by or on behalf of DPI indicates that commercial fishing for abalone is having an adverse environmental impact on the broader ecosystem
2 Maintain or increase the biomass of mature and legal sized abalone (ie abalone that is not a prohibited size fish (as specified in clause 7 of the <i>Fisheries Management (General) Regulation 1995</i>))	Biomass of mature and legal sized abalone increase or do not change in any area to which a total allowable catch applies (using a model based assessment, with survey of abalone stock conducted by DPI in 1994 to be used as a benchmark)	(a) The biomass of mature or legal sized abalone in an area in which a total allowable catch applies falls below the 1994 benchmark by more than 15 percent (b) There is a more than 50 percent chance of (a) occurring in the next 5 years if the total allowable catch is unchanged
3 Ensure management arrangements for the fishery do not have a significant impact on the cost of taking abalone for sale	Management charge for the fishery (under section 76 of the Act) does not increase significantly, disregarding any increase that is attributable to the provision of additional resources by DPI (eg the provision of additional compliance officers)	Management charge for the fishery increases in any year at a rate that exceeds the rate of inflation (as measured by the consumer price index), disregarding any increase that is attributable to the provision of additional resources by DPI after the commencement of this Plan
4 Promote cost efficient management of the fishery	Independent review of the management arrangements for the fishery, conducted periodically at the request of the Minister, determines that management arrangements are appropriate	Independent review determines that the management arrangements for the fishery are inappropriate
5 Ensure that the fishery remains economically viable	Standardised commercial catch rates remain relative to 1994	Standardised commercial catch rates fall by more than 15 percent from 1994 benchmark
	There is a buying market for quota	20 percent (or more) of quota available for trading cannot be traded
	There is a buying market for shares in the fishery	15 percent (or more) of shares available for trading cannot be sold
	Value of shares in the fishery is maintained or increased	Value of share packages for a fishing period decreases by more than 10 percent (using 1999 value as a benchmark)
6 Ensure appropriate research and monitoring in relation to the fishery	Necessary data is available for assessment of abalone stocks	Insufficient data is available for the purpose of setting the total allowable catch for abalone

7 Minimise the number of offences committed by fishers in relation to abalone	Number of offences relating to abalone committed by fishers annually, as indicated by quality inspections conducted by DPI, indicates substantial compliance with the Act, this Plan and the other regulations under the Act	Overall rate of compliance with the Act, this Plan and the other regulations under the Act (estimated annually by the Director) is less than 70 percent
8 Ensure that the number of persons authorised to take abalone for sale does not increase significantly	There is no significant increase in the number of persons eligible for an endorsement after the commencement of this Plan	Number of persons eligible for an endorsement exceeds 42

4 Operational plans and strategies

The Minister may develop and implement operational plans and strategies for the purpose of achieving the objectives of this Plan.

Part 3 Dealings in shares

5 Minimum shareholding

The minimum shareholding in the fishery is 70 shares.

Note. A person who holds shares in the share management fishery is not entitled to take fish in the fishery or to nominate another person to do so on the shareholder's behalf unless the shareholder has the minimum shareholding for the fisher (see sections 66 and 67 of the Act).

6 Maximum shareholding

The maximum shareholding in the fishery is 210 shares.

7 Dealings in shares—general

(1) Shares in the fishery may be transferred, assigned, transmitted or mortgaged only as provided for by the following:

(a) a shareholder may transfer, transmit or mortgage a package of shares or any number of packages of shares, or such other number of shares as may be approved by the Minister, to one person,

(b) a shareholder may transfer, transmit, mortgage or assign all shares held by the shareholder to one person,

(c) a shareholder may assign shares only if the assignment transfers to the person to whom the shares are assigned all of the interests of the shareholder in the shares concerned.

(2) This clause does not prevent a transfer referred to in section 71 (2) of the Act (ie a transfer for the purpose of enabling 2 or more shareholders to hold their shares jointly).

(3) In this clause, a *package of shares* means a group of 10 shares held by the same shareholder.

Note. A transaction that purports to have the effect of transferring, assigning, transmitting or mortgaging a share does not have effect until it is registered in the Share Register (see section 91 of the Act).

8 Special provisions relating to transfers and assignments

(1) In addition to the restrictions imposed by clause 7, shares in the fishery may be transferred or assigned only with the approval of the Director.

(2) The Director may refuse to approve a transfer or assignment of shares if:

(a) the transaction would contravene the Act or this Plan, or

(b) the person to whom the shares are to be transferred or assigned is a person who:

(i) is prohibited from holding shares, or

(ii) is a natural person who may not be nominated by a shareholder to take abalone on behalf of the shareholder under clause 10, or

(iii) is a commercial fisher who could be refused an endorsement under clause 11, or

(c) the Director is satisfied that the purpose of the transaction is to avoid share forfeiture, or

(d) any fee, contribution or other amount owing under the Act in respect of the shares has not been paid, or

(e) any assignment or mortgage that applies to the shares has not been discharged or cancelled, or

(f) there is a nominated fisher in respect of the shares and the nomination has not been revoked by the shareholder transferring the shares.

(3) If shares in the fishery are transferred or assigned with the approval of the Director, any unused quota that was allocated in respect of those shares is to be transferred to the person who acquires the shares.

(4) An application for the Director's approval under this clause:

(a) is to be made jointly by the shareholder and the person to whom the shares are to be transferred or assigned, and

(b) is to be in an approved form, and

(c) is to be accompanied by the share certificate (or certificates) of the shareholder and the person to whom the shares are to be transferred or assigned (if that person is a shareholder).

(5) The approved form of application under this clause may include or be comprised of the approved form of application for registration of the transaction under section

91 of the Act, so as to enable the applications for approval and registration to be dealt with together.

(6) A shareholder who proposes to transfer or assign shares may request that the Minister review a determination of the Director under this clause in relation to the transfer or assignment within 30 days after notice of the determination is given to the shareholder.

(7) The Director is to give effect to any determination made by the Minister in respect of that review.

9 Registration of share transactions

(1) For the purposes of section 90 (1) (d) of the Act, an entry in the Share Register in relation to a share is to include the identification number assigned to the share by the Minister.

(2) For the purposes of section 91 (3) (d) of the Act:

(a) the fee for an application for registration of a transaction that purports to have the effect of transferring, assigning or transmitting a share in the fishery is \$221, and

(b) the fee for an application for registration of a transaction that purports to have the effect of mortgaging a share in the fishery is \$388.

Part 4 Endorsements and nominated fishers

10 Nominated fishers

(1) A person may not be nominated by a shareholder to take abalone on behalf of the shareholder if:

(a) the person has been convicted, within the period of 5 years before the nomination is made, of an abalone offence or a serious fisheries offence, or

(b) the person has been charged with or summoned for an abalone offence or a serious fisheries offence and proceedings in respect of that offence are pending.

(2) No more than one person may be nominated to take abalone on the shareholder's behalf at any one time.

(3) A shareholder is not entitled to nominate a person to take abalone on behalf of the shareholder for less than a 4 week period, unless otherwise approved by the Director.

(4) The Minister may refuse to endorse the commercial fishing licence of a person nominated by a shareholder to take abalone on the shareholder's behalf if the nomination is made in contravention of this clause.

(5) If the Minister endorses the commercial fishing licence of a nominated fisher of a shareholder, and the shareholder already holds an endorsed commercial fishing licence, the shareholder's endorsement is void.

(6) If the shareholder revokes his or her nomination, as provided for by section 69 (7) of the Act, the Minister may endorse the licence of the shareholder again or endorse the licence of another commercial fisher nominated by the shareholder.

(7) A nomination is to be accompanied by an administrative fee of \$332.

Note. A nomination of a commercial fisher is to be made in writing and served on the Director. The nomination is to be accompanied by the written consent of the nominee to the nomination. The Director is to record the nomination, and any revocation of the nomination, in the Share Register. The nomination (and any revocation of the nomination) has effect when it is recorded in the Share Register. (See section 69 of the Act.)

Under section 69 of the Act, a shareholder may nominate a commercial fisher who is a shareholder in the same fishery. However, the shares of the nominated fisher do not, while the fisher is so nominated, confer any entitlement to take fish in the fishery.

11 Eligibility for endorsement

The Minister may refuse to endorse the commercial fishing licence of a commercial fisher if:

- (a) the commercial fisher has been convicted of an abalone offence, or a serious fisheries offence, within the period of 5 years before the application for endorsement is made, or
- (b) the commercial fisher is nominated by a shareholder who has been convicted of a serious fisheries offence within the period of 5 years before the application for endorsement is made.

Note. Section 68 of the Act provides that an application for endorsement is to be made in the form and manner approved by the Minister.

12 Grounds for suspension or cancellation of endorsement

(1) The Minister may suspend or cancel an endorsement of a nominated fisher if:

- (a) the fisher does anything that would be grounds for cancellation or suspension of the fisher's commercial fishing licence, or
- (b) the Minister is satisfied that the fisher has contravened a provision of this Plan, or
- (c) the shareholder who nominated the fisher:
 - (i) revokes the nomination, or
 - (ii) nominates another commercial fisher to take abalone in the fishery on the shareholder's behalf, or
 - (iii) is convicted of an abalone offence or a serious fisheries offence, or
 - (iv) becomes the nominated fisher of another shareholder in the same fishery.

(2) The Minister may suspend or cancel an endorsement of a commercial fisher who is a shareholder if:

- (a) the shareholder is convicted of an abalone offence or a serious fisheries offence, or
- (b) if the Minister is satisfied that the shareholder has contravened a provision of this Plan, or
- (c) the shareholder becomes the nominated fisher of another shareholder in the same fishery.

(3) The Minister may suspend an endorsement for a specified period of no less than 4 weeks at the request of the holder of the endorsed licence. The suspension period may be shortened or lengthened by the Minister on request of the holder of the endorsement.

Note. An endorsement may be suspended or cancelled if the holder of the licence ceases to be eligible to have the licence endorsed, for instance, because the holder holds less than the minimum shareholding in the fishery. The endorsement may also be cancelled or suspended if the shareholder fails to pay any community contribution, management charge or other amount due under Part 3 of the Act. (See section 68 (7) of the Act.) If an endorsement of a shareholder is suspended or cancelled, the shareholder is not entitled to nominate another person to take abalone on the shareholder's behalf (see section 68 (8) of the Act).

13 Nominated fisher to notify shareholder of alleged offence

(1) A nominated fisher must notify the shareholder who nominated him or her to take abalone in the fishery on the shareholder's behalf if the person is charged with or summoned for an offence against this Plan, the Act or the regulations under the Act.

(2) The notice must be given to the shareholder within 24 hours after the nominated fisher is charged with the offence.

(3) Contravention of this clause is an endorsement holder offence.

Part 5 Total allowable catch and quota allocations

14 Total allowable catch

(1) The TAC Committee is to determine a total allowable catch for abalone.

(2) The determination is to be made in respect of each fishing period.

(3) In this clause, *fishing period* means each period of 12 months commencing on 1 July and ending on 30 June in the following year or such other period as the Minister may determine after consultation with the Management Advisory Committee.

Note. Under section 29 of the Act, the Minister may direct the TAC Committee as to the matters to be taken into account when determining total allowable catch.

15 Determination of quota

(1) The total allowable catch is to be allocated among shareholders as provided for by section 78 of the Act.

Note. Section 78 of the Act provides that the Minister is to allocate the whole of the total allowable catch among shareholders in proportion to their shareholdings.

(2) If the TAC Committee recommends that the total allowable catch be allocated to a particular area or areas of the fishery, or be taken in particular periods, the Minister may, after consultation with the Management Advisory Committee, determine:

(a) the areas in which the total allowable catch may be taken, and

(b) the amount or proportion of quota that may be taken by or on behalf of a shareholder during a specified part or parts of the fishing period.

(3) Such a determination must not be made so as to prevent shareholders from taking the whole of the total allowable catch in a fishing period.

(4) The Minister may adjust the quota of a shareholder to take account of a mistake in the calculation of the shareholder's quota in the fishing period or in a previous fishing period.

(5) The Director is to ensure that each shareholder, and any nominated fisher of the shareholder, is notified of the shareholder's quota and any adjustments to that quota, and of any determination as to the periods in which that quota may be taken.

16 Contravention of quota

(1) A person, being a shareholder or a nominated fisher for a shareholder, must not:

(a) take abalone for sale in contravention of the shareholder's quota, or

(b) take abalone for sale in contravention of a determination by the Minister under clause 15 (2).

(2) For the purposes of section 65 of the Act, contravention of this clause is an offence.

(3) Contravention of this clause is also an endorsement holder offence.

(4) Any abalone that are seized by a fisheries officer do not cease to be considered to have been taken for sale just because they have been seized.

17 No carry over or borrowing of quota

(1) Shareholders are not authorised to transfer to the next fishing period any part of their quota for the current fishing period that is not taken during the current fishing period.

(2) Shareholders are not authorised to borrow any part of their quota from a future fishing period.

18 Transfer of quota

- (1) Quota is transferable, but only with the approval of the Director.
- (2) Quota may be transferred only in lots of 100 kilograms or as otherwise approved by the Director.
- (3) Subclause (2) does not prevent a shareholder from transferring the whole of his or her quota in a single lot.
- (4) Quota may be transferred only within the fishing period to which the quota relates.
- (5) A shareholder may not acquire by any such transfer more than twice the amount of the shareholder's initial quota for the fishing period.

19 Application for approval of quota transfer

- (1) An application for approval of a transfer of quota is to be made to the Director jointly by the shareholder who proposes to transfer quota and the shareholder who proposes to acquire that quota.
- (2) The application:
 - (a) is to be in an approved form, and
 - (b) is to be accompanied by a fee of \$166.
- (3) The Director may approve the application or refuse to approve the application.
- (4) If approved, the transfer takes effect when the Director gives notice of that approval to the shareholder who transferred the quota.
- (5) The Director is also to give notice of that approval to the shareholder who acquired the quota and any person who is nominated to take abalone for sale on behalf of either the shareholder who transferred the quota or the shareholder who acquired the quota.
- (6) A shareholder may request the Minister to review a determination of the Director under this clause and the Director is to give effect to the determination of the Minister in respect of that review.

Part 6 Provisions relating to crew, boats, records and other matters

20 Definitions

- (1) In this Part:

daily log sheet means a form known as the "Abalone Daily Catch Register" provided to endorsement holders by DPI.

docket book means a booklet issued by DPI containing daily log sheets.

monthly reconciliation form means a form known as the "Abalone Non-Fishing & Reconciliation Form" provided to endorsement holders by DPI.

(2) In this Part, *hanging* abalone refers to the practice of storing abalone that has been taken for sale in a bin or other container that is in the water, without landing the abalone.

21 Registration of crew

(1) A person may apply to the Director to be registered as an abalone fishery crew member.

(2) A person is not entitled to be registered as a abalone fishery crew member unless:

(a) the person holds first aid qualifications of an approved standard, and

(b) the registration of the person is recommended by a person who holds a current endorsement in the fishery.

(3) The Director may refuse to register a person as an abalone fishery crew member if the person has been convicted of any of the following offences, within the period of 5 years before the application for registration is made:

(a) an offence under the Act or the regulations under the Act or an offence relating to commercial fishing operations under a law of the Commonwealth, another State, a Territory or New Zealand,

(b) an offence relating to theft of fish, fishing gear or a boat,

(c) an offence relating to an assault on a fisheries official.

(4) An application for registration as an abalone fishery crew member is to be in an approved form.

(5) This clause does not affect any requirement to be registered as a crew member under section 110 of the Act. However, the approved form of application for registration as an abalone fishery crew member may be comprised of or include an application for registration as a crew member under section 110 of the Act, so as to enable the applications to be dealt with together.

Note. Under section 110 of the Act crew members of licensed fishing boats must be registered by the Director. The fee for such an application is \$111.

(6) Registration as an abalone fishery crew member remains in force for a period of one year from the date of registration or such other period as may be notified by the Director when the crew member is registered.

22 Limited use of unauthorised crew

(1) An endorsement holder must not take or attempt to take abalone for sale more than 2 times in any calendar month while using a fishing boat that has a crew member who is not an authorised crew member, except with the approval of the Director.

(2) An endorsement holder must not take or attempt to take abalone for sale while using a fishing boat that has a crew member who is not an authorised crew member

unless the endorsement holder has notified a local fisheries officer, before leaving port, of his or her intention to do so.

(3) Contravention of this clause is an endorsement holder offence.

(4) In this clause:

authorised crew member means any crew member who is registered as an abalone fishery crew member under this Part or who holds a commercial fishing licence.

23 Crew details to be recorded on daily log sheet

(1) An endorsement holder who takes or attempts to take abalone for sale on any day must include in the daily log sheet the names and registration or licence details of all members of the crew of the boat (if any) used by the endorsement holder to take abalone in the fishery.

(2) Subclause (1) applies in addition to any requirement that applies in relation to the endorsement holder under clause 157 of the *Fisheries Management (General) Regulation 1995* (which requires the holder of a fishing boat licence to keep a record on the boat regarding crew members).

(3) A contravention of subclause (1) is an endorsement holder offence.

24 Measuring device to be carried

(1) An endorsement holder must not take or attempt to take abalone for sale unless the endorsement holder has on his or her person an instrument suitable for measuring abalone.

(2) A contravention of this clause is an endorsement holder offence.

Note. Clause 7 of the *Fisheries Management (General) Regulation 1995* prescribes a minimum size of 11.5 centimetres for abalone.

25 Scales and weights to be carried

(1) An endorsement holder must not take or attempt to take abalone for sale unless the endorsement holder has in his or her possession scales suitable for weighing abalone.

(2) An endorsement holder must not take or attempt to take abalone for sale unless the endorsement holder has in his or her possession a 10 kilogram trade weight for the purpose of testing the scales used by the endorsement holder to weigh abalone.

(3) On any day that abalone is taken, the endorsement holder must use the 10 kilogram trade weight to test the scales for accuracy before weighing the abalone.

(4) A contravention of this clause is an endorsement holder offence.

26 Display of operating information on boat

(1) An endorsement holder must not use any licensed fishing boat in connection with taking abalone for sale unless there is displayed on the outside of both sides of the

bow of the boat and on the outside of the top of the wheelhouse of the boat in clearly visible letters (in a colour which contrasts with that of the background) the letter "A" and the home port initials of the boat and those letters are:

(a) in the case of a boat that is more than 7.5 metres long—not less than 300 millimetres in height and 150 millimetres in width, or

(b) in any other case—not less than 150 millimetres in height.

(2) The *home port initials* of a boat are the initials of the port from which the boat usually operates.

(3) This clause applies in addition to the requirements of clause 145 (1) (b) of the *Fisheries Management (General) Regulation 1995* (which requires the letters "LFB" and other licence details to be displayed on a licensed fishing boat).

(4) A contravention of a subclause (1) is an endorsement holder offence.

27 Use of boat for recreational purposes

(1) An endorsement holder must not permit any licensed fishing boat that is used by the endorsement holder in connection with the taking of abalone in the fishery to be used to take abalone for recreational purposes (ie for purposes other than sale):

(a) while there is commercial abalone fishing gear on the boat, or

(b) while there is any functioning underwater breathing apparatus on the boat.

(2) A contravention of this clause is an endorsement holder offence.

(3) In this clause:

commercial abalone fishing gear means fishing gear that may lawfully be used for taking abalone only by a commercial fisher.

28 Fishers to fish only while in possession of docket book

(1) An endorsement holder must ensure that when taking or attempting to take abalone the endorsement holder has in his or her possession or control a docket book issued for use by the endorsement holder in the current fishing period.

(2) An endorsement holder must keep the docket book in a safe place.

(3) An endorsement holder must not give, sell or lend to another person, or otherwise make available for use by another person, a daily log sheet or docket book that was issued for use by the endorsement holder.

(4) Subclause (3) does not prevent an endorsement holder from giving a form to a fisheries officer authorised to take possession of the form.

(5) If a docket book issued for use by an endorsement holder is lost, stolen, destroyed or damaged, the endorsement holder must notify the Director of that fact within 24 hours after becoming aware of that fact.

(6) If the endorsement of an endorsement holder is suspended or cancelled, the endorsement holder must immediately return to the Director the docket book issued for use by the endorsement holder in the current fishing period, together with any unused daily log sheets in his or her possession or control.

(7) A contravention of this clause is an endorsement holder offence.

29 Catch not to be transferred between boats

(1) An endorsement holder must not transfer any abalone from one licensed fishing boat to another without the approval of a fisheries officer.

(2) A contravention of this clause is an endorsement holder offence.

30 Hanging of daily catch

(1) An endorsement holder who hangs any abalone must, as soon as practicable after coming ashore (and in any case before moving more than 50 metres from the point at which the endorsement holder came ashore) record in his or her daily log sheet for that day:

(a) the validated weight of the abalone (being the weight determined by weighing the abalone with accurate scales), and

(b) the number of bins or containers used for the purpose of hanging the abalone, and

(c) the number of abalone in each bin or container.

(2) If more than one day's catch of abalone is hung, the catch for each day must be recorded as provided for by subclause (1) in the relevant part of the daily log sheet.

(3) A bin or container used for the purpose of hanging abalone must be clearly identified and securely sealed.

(4) An endorsement holder must, within 1 hour after hanging any abalone, provide the nearest office of DPI with the following information:

(a) the name of the endorsement holder,

(b) the location of the abalone,

(c) the validated weight of the abalone (being the weight determined by weighing the abalone with accurate scales),

(d) the number of bins or containers used for the purpose of hanging the abalone.

(5) A contravention of this clause is an endorsement holder offence.

31 Steps to be taken after landing abalone

(1) An endorsement holder must, as soon as practicable but not later than 30 minutes after landing abalone:

(a) weigh the abalone using accurate scales, and

- (b) place the abalone in a container of a kind suitable for the transport of abalone, and
 - (c) complete Part A on all copies of the daily log sheet for that day, and
 - (d) insert the original and duplicate copy of the completed daily log sheet (*the relevant documentation*) in a waterproof envelope of an approved kind and attach the envelope to the container in which the abalone, or any part of the abalone, is placed.
- (2) The endorsement holder must take all reasonable steps to ensure that:
- (a) any abalone landed is not moved more than 50 metres from the point of landing until subclause (1) has been complied with, and
 - (b) the abalone is transported together with the relevant documentation, attached to the container as required by subclause (1), and
 - (c) the relevant documentation remains attached to the container until it reaches the premises of an approved abalone processor.
- (3) An endorsement holder must not be in possession of abalone for sale on land unless the abalone is in a container to which the relevant documentation is attached.
- (4) Subclause (3) does not apply if the endorsement holder is less than 50 metres from the point of landing the abalone.
- (5) A contravention of this clause is an endorsement holder offence.

32 Nil returns

- (1) An endorsement holder who attempts to take abalone for sale on any day, and does not take any abalone on that day, must complete the appropriate sections of the daily log sheet for that day in accordance with the instructions provided on the log sheet immediately after returning to shore and before entering any premises, and before moving more than 50 metres from the point at which the endorsement holder came ashore.
- (2) The endorsement holder must ensure that the original copy of the daily log sheet is lodged with the Director, or is sent by facsimile transmission to the Director, in accordance with the instructions on the daily log sheet, within 24 hours after the end of the day concerned. If facsimile transmission is used, the original copy itself must be sent to the Director as soon as practicable after the facsimile transmission.
- (3) A contravention of this clause is an endorsement holder offence.

33 Monthly reconciliation

- (1) An endorsement holder must, within 7 days after the end of each month:
 - (a) complete a monthly reconciliation form for that month in accordance with the instructions provided on the form, and
 - (b) forward the original copy of the completed form to the Director.

(2) An endorsement holder must not give, sell or lend to another person, or otherwise make available for use by another person, a monthly reconciliation form that was issued for the use of the endorsement holder.

(3) Subclause (2) does not prevent an endorsement holder from giving a form to a fisheries officer authorised to take possession of the form.

(4) A contravention of this clause is an endorsement holder offence.

34 False or misleading information

(1) An endorsement holder must not, in connection with a requirement under this Part, make any statement or provide any information that the person knows is false or misleading in a material particular.

(2) A contravention of this clause is an endorsement holder offence.

Part 7 General

35 Share forfeiture offences

(1) For the purposes of section 75 (1) of the Act, the following offences are share forfeiture offences in respect of a shareholder:

(a) an offence arising from a contravention of clause 16 of this Plan (Contravention of quota) by the shareholder or a nominated fisher of the shareholder, if the shareholder has a record of contravening the clause,

(b) an offence arising from a contravention of clause 31 of this Plan (Steps to be taken after landing abalone) by the shareholder or a nominated fisher of the shareholder, if the shareholder has a record of contravening the clause,

(c) an offence arising from a contravention of clause 33 of this Plan (Monthly reconciliation) by the shareholder or a nominated fisher of the shareholder, if the shareholder has a record of contravening the clause,

(d) an offence arising from a contravention of clause 107 of the *Fisheries Management (General) Regulation 1995* (Interference with set fishing gear) by the shareholder or a nominated fisher of the shareholder,

(e) an offence committed by the shareholder against the Act or the regulations under the Act that is punishable by imprisonment.

(2) An offence is not a share forfeiture offence if it was committed by a nominated fisher of a shareholder, and the court that convicts the nominated fisher is satisfied that the nominated fisher committed the offence without the knowledge or permission of the shareholder.

(3) For the purposes of this clause, a shareholder has a *record of contravening a clause* if the shareholder has contravened the clause on at least 2 previous occasions and those contraventions have been proved. A contravention of the clause by a nominated fisher of the shareholder is to be counted as a contravention by the shareholder, as long as the contravention has been proved.

(4) A contravention of this Plan is *proved* if the contravention gives rise to a conviction for an offence or if a court finds the contravention proved but does not proceed to a conviction.

(5) Following the sale of any forfeited shares by public tender, as provided for by section 75 (5) of the Act, and after deduction of the expenses reasonably incurred in connection with the sale, the Minister is authorised to pay any person (other than the shareholder or shareholders) who had an interest in the shares such part of the purchase price as the Minister considers approximate to the value of the person's interest in the shares.

Note. Clause 133 of the *Fisheries Management (General) Regulation 1995* also provides for share forfeiture for a failure to pay a community contribution or other amount due under Part 3 of the Act.

36 Management charge

(1) The management charge payable under section 76 of the Act by shareholders in the fishery is not to exceed \$325 per share.

(2) Interest is payable on late payments at the rate payable from time to time in respect of judgments of the Supreme Court.

(3) The management charge may, with the approval of the Minister, be paid by instalments on such terms as the Minister approves.

Note. Section 76 of the Act provides that if an instalment is not paid by the due date, the balance then becomes due and payable (together with any interest for late payment prescribed by this Plan).

The management charge may be affected by the introduction of a goods and services tax (or GST).

37 Community contribution

(1) For the purposes of section 77 of the Act, the community contribution is payable by each shareholder for each fishing period.

(2) The community contribution is payable 2 months after the end of the fishing period, or on such later date as may be determined by the Minister.

(3) The community contribution is calculated as follows:
where:

CC is the community contribution.

S is the number of shares in the fishery held by the shareholder on the last day of the fishing period.

TS is the total number of shares in the fishery.

TAC is the total allowable catch for abalone (in kilograms) for the fishing period.

P is the average beach price for abalone (in kilograms) during the fishing period, determined by the Minister on the basis of records kept by the Director.

(4) The Director is to calculate the community contribution for each shareholder at the end of each fishing period and advise shareholders of the amount that they are liable to pay.

(5) Interest is payable on late payments of the community contribution at the rate payable from time to time in respect of judgments of the Supreme Court.

(6) The community contribution may, with the approval of the Minister, be paid by instalments on such terms as the Minister approves.

(7) If an instalment is not paid by the due date, the balance then becomes due and payable (together with the interest payable for late payment).

(8) The period from 1 January 2003 to 30 June 2003 is taken to be a fishing period for the purpose of calculating the community consultation contribution payable in respect of that period.

38 Endorsement holder offences

An endorsement holder is guilty of an offence if the endorsement holder contravenes a provision of this Plan and the contravention is designated by this Plan as an endorsement holder offence.

Maximum penalty: 100 penalty units.

39 Plan does not affect other restrictions on fishing

(1) This Plan does not affect any restriction on the taking of abalone that has effect by virtue of the Act or the *Fisheries Management (General) Regulation 1995*.

(2) In particular, the following provisions apply to the taking of abalone by an endorsement holder, unless otherwise provided for by those provisions:

(a) the provisions of any fishing closure under section 8 of the Act that prohibits or restricts the taking of abalone in any waters,

(b) the provisions of the *Fisheries Management (General) Regulation 1995* with respect to the prohibited size for abalone.

Note. At present there is a minimum size for abalone of 11.5 centimetres (see clause 7 of the *Fisheries Management (General) Regulation 1995*). It is an offence under the Act to take abalone that are less than the minimum size.

40 Amendment of Plan

For the purposes of section 64 of the Act, any amendment to this Plan is authorised.

Part 8 Savings and transitional

41 Continuation of quota arrangements for first fishing period

- (1) For the purposes of this Plan, the period commencing on 1 January 2000 and ending on 31 December 2000 is taken to be the first fishing period for the fishery.
- (2) The total allowable catch for that fishing period is the total allowable catch determined by the TAC Committee for that period before the commencement of this Plan, subject to any further determination that may be made by the TAC Committee under clause 14.
- (3) Any determination made by the Minister before the commencement of this Plan in respect of the allocation of that total allowable catch for that period has effect as if it had been made under this Plan.
- (4) Any transfer of quota in respect of that period that was duly made before the commencement of this Plan has effect as if it had been made under this Plan.

42 General saving

- (1) A reference in this Plan to an endorsement includes an endorsement given before the commencement of this Plan that had effect immediately before the commencement of this Plan.
- (2) A nomination of a fisher to take abalone from the fishery on behalf of a shareholder that had effect immediately before the commencement of this Plan continues in force despite that commencement, and may be revoked at any time by the shareholder. A reference in this Plan to a nominated fisher includes a person who is the subject of such a nomination.
- (3) A person who was registered by the Director as an abalone fishery crew member before the commencement of this Plan is taken to have been registered under this Plan.

Abalone Share Management Fishery: Licence Conditions

The licence holder shall:

- a) Not take or attempt to take live abalone in excess of the quota allocated to the shareholder.
- b) Contravene this condition if the catch exceeds the amount of quota held at any time regardless of any transfer action underway which has not been approved by the Director of Fisheries. Quota must be transferred in lots of 100 kilograms unless otherwise approved.
- c) Not permit his/her licensed fishing boat to be used in connection with any underwater diving operation by any person other than a holder of an abalone endorsement.
- d) Display on the upper deck and both sides of the bow of the boat used to take abalone the letter "A" plus the initial of their home port before their LFB number in the same fashion as prescribed for the LFB.
- e) Before commencing fishing ensure that a docket book is in his/her possession.
- f) Not loan, give or make available in any fashion to any other person/s docket books issued to him/her.
- g) At all times keep abalone dockets in a safe place.
- h) In the event of any docket books or used dockets being stolen, lost, destroyed, damaged, immediately notify the Director of Fisheries in writing.
- i) In the event of an abalone endorsement being cancelled or suspended, immediately return to the Director of Fisheries all docket books and/or used dockets in his/her possession or under his/her control.
- j) Carry a suitable measuring device when in possession of, or when attempting to take abalone to facilitate compliance with the prescribed minimum size of abalone.
- k) Not, within the waters to which the Act applies or in or on any waters adjacent thereto transfer abalone from one boat to another boat.
- l) On any day abalone is taken have in his/her possession a 10 kilogram stamped trade weight to facilitate accurate testing of scales. The endorsement holder shall test his/her scales for accuracy using the trade weight each day abalone is taken.
- m) On the day taken land in NSW all abalone taken under this endorsement and, using accurate scales weigh all abalone on the shore within 30 minutes of the time of landing the abalone ashore, before the landed abalone are taken more than 50m from the point of landing or associated car park.
- n) Upon landing abalone, accurately and legibly complete all sections of Part A on all copies of the docket for the day on which the catch is landed. Upon completion of Part A of the docket the original and the duplicate copies are to be placed in a DPI approved waterproof envelope and affixed to the outside of a bin in which the landed abalone, or any part of the landed abalone is contained. This must be done prior to the catch being taken more than 50 metres from the point of landing or associated car park.
- o) Upon landing abalone, record on the daily docket, the number of abalone in each bin, regardless of whether there is a specified space on the pocket.
- p) Ensure that all abalone taken on that day are transported together with the affixed documentation for that day.
- q) Ensure that the affixed documentation remains in place on the bin until such time as it reaches the premises of a DPI approved abalone processor.

- r) Not on any day be in possession of any abalone after such abalone have been taken more than 50 metres from the point of landing ashore in NSW or the associated car park, unless these abalone are accompanied by a completed docket in a waterproof envelope affixed in the required manner.
- s) Ensure that completed daily dockets, or copies of, are returned to the abalone section, DPI within 24 hours of the abalone being landed.
- t) For any day on which abalone are not landed complete the appropriate lines of all copies of the monthly docket for that month.
- u) Return to DPI the completed monthly summary sheet no later than seven days after the end of that month.
- v) Not while using any apparatus to facilitate breathing underwater, or whilst functioning underwater breathing apparatus is on board any vessel, take or attempt to take rock lobsters by any method, nor have any rock lobster in his/her possession in on or adjacent to any waters.
- w) Not have in his/her possession any prohibited size abalone in or on any water other than 10 prohibited size abalone which may be in possession on the licensed fishing boat while abalone diving operations are underway. All undersized abalone must be returned to the seabed by hand before the end of the diving day.
- x) At all times comply with the requirements of the Fisheries Management Act, 1994 and the regulations made under that Act.
- y) Abalone shall not be taken under this endorsement unless the licence is current and all fees due and payable in respect of the endorsement have been paid.

APPENDIX B4. NSW ABALONE FISHERY CODE OF PRACTICE

NB. The Code of Practice in its current form lacks specific detail in some areas. To fulfil its purpose as a supporting document for the FMS it will respond appropriately as management actions in the FMS are implemented.

DRAFT ABALONE FISHERY CODE OF PRACTICE

Background

An unwritten code of handling has been developed in parallel with the development of live markets over the past decade because exporters of live abalone have demanded an unmarked, undamaged, vibrant product. As such, quality control practices have involved divers carefully removing the abalone without damaging the meat or shell, deckhands carefully cleaning abalone shell of weed and debris and live packing in special crates which prevent post-harvest damage to abalone. In addition, Industry currently recommends harvesting procedures to minimise disturbance to undersize abalone and other species in the marine environment. Industry has agreed to extend these practices into other areas and formalise them into The Abalone Fishery Code of Practice.

In adopting a code of Practice for the NSW Abalone Fishery, industry recognises the need to protect, promote and improve the vital resource which provides food, employment and economic benefits to NSW. Despite the Abalone Fishery being one of the most ecologically sound in terms of the impact of harvesting on the environment, having limited by-catch and almost no impact on the marine habitat or environment, there are a number of issues that could threaten the industry if not managed appropriately. Foremost among these are the threat of *Perkinsus* to the sustainability of the stock and quality assurance, environmental effects of harvesting, Indigenous issues and illegal harvesting. An inappropriate single action by an industry member could have lasting consequences to the fishery. A code of practice brings together the appropriate information regarding particular issues in the form

of agreed protocols for employees in each of the sectors of the industry to follow in order to prevent inappropriate actions occurring.

The Abalone Fishery has a long history of divers and shareholders working closely with processors, managers and researchers to develop and implement best practice management techniques for the fishery and the environment. The development of the Code will formalise best practice management techniques for continued sustainability of the industry and to ensure that product delivered to the processor is of the highest possible quality. The Code is based on the Australian Seafood Industry Council (ASIC) Code of Practice for the Australian Seafood Industry and adapted to meet specific Abalone Industry requirements. It has links to training and accreditation schemes, NSW Food Authority and it is anticipated that it may include a penalty points scheme and a diver observation scheme. The Code could encourage shareholders to enter into formal contract arrangements with nominated fishers prior to their engagement. Such arrangements would clarify both shareholder and nominated fisher expectations and increase the certainty associated with such arrangements, providing security to individual fishing businesses.

The Code is presently in its initial stages and has been written to respond to current issues in the fishery and to assist with the implementation of particular management responses proposed in the Draft FMS for the Abalone Fishery. The Code is to be adaptive to the changing needs of the fishery and is expected to evolve as the needs in the fishery change.

The Scope of the Code

- This Code is voluntary.
- This Code is directed towards the NSW commercial abalone divers, deckhands.
- It is envisaged that processors, and the marketing and aquaculture sector of the abalone industry will also adopt the principles of the Code.

- The Code may be revised from time to time, as a result of changes in the abalone industry or the seafood industry as a whole.

The Objectives of the Code

The objectives of the Code are to:

- Promote the ecologically sustainable development of the seafood industry and the sustainable use of living aquatic resources and their environments;
- Establish principles and practices, in accordance with the relevant regulations for responsible fishing and seafood processing activities, taking into account their relevant biological, technical, economic, social, environmental and commercial factors and customer requirements;
- Diving and boating safety (NB: detail for this section will be added in development of the code)
- Facilitate and promote technical, financial and other cooperation between and within the abalone industry and others in the conservation of living aquatic resources and their management and development;
- Promote the trade in abalone and seafood products in conformity with relevant regulations, customer requirements and conservation principles;
- Provide standards of practice for all persons involved in the abalone industry;
- Promote world's best practice in all sectors of the abalone;
- Identify and promote technological advances relevant to the abalone industry.

The Principles of the Code

Underlying this Code of Practice are the following general principles applying across the seafood industry.

- The abalone seafood industry will strive to conserve and protect aquatic ecosystems.
- The abalone seafood industry will participate in and comply with management regimes to ensure sufficient seafood resources for present and future generations

in the context of ecologically sustainable development.

- The abalone seafood industry will comply with all applicable laws and regulations governing their harvest and post-harvest activities.
- The abalone seafood industry will strive to implement cleaner production principles including minimising any wastage of resource.
- The abalone seafood industry will harvest, handle, process and distribute seafood in a manner, which will maintain the health and nutritional value, quality and safety of the products.
- The abalone seafood industry will endeavour to ensure transportation and storage methods are environmentally sound and in this regard will facilitate the development and transfer of appropriate technologies, and provide incentives to ensure their widespread adoption.[SAFEFOOD requirements will apply]
- The abalone seafood industry will cooperate in developing and applying relevant new methods and technologies, which progress the industry towards greater ecological sustainability and minimise negative environmental impacts.
- The abalone seafood industry will strive to resolve all disputes relating to harvest and post-harvest management schemes and practices in a timely, peaceful and cooperative manner.
- The abalone seafood industry will promote the consumption of seafood by recognising and meeting customer requirements.
The abalone seafood industry will not tolerate damage to the sustainable productivity of fisheries by the illegal acts of others.

1. Training and Accreditation

- 1.1 Familiarisation with the Code;
- 1.2 Boating (NB: detail for this section will be added in development of the code)
- 1.3 Diving (NB: detail for this section will be added in development of the code)

2. Minimising Impacts on Stocks of Abalone and the Marine Environment

- 2.1 Support conservation and management measures which ensure the long-term sustainability of relevant abalone resources at optimal levels;
- 2.2 Participate, with researchers and managers, in the collection of timely, complete and reliable statistics needed for the conservation and management of fisheries;
- 2.3 Support actions (e.g. DPI policy and recovery programs) to encourage the conservation of essential fish habitats and the rehabilitation of fish populations and habitats;

- 2.4 Minimise the impact on the natural resource and habitat by imposing and adhering to size limits, closed areas or closed seasons as appropriate;
- 2.5 Minimise all discards, waste and pollution associated with abalone fishing activities;
- 2.6 Ensure the appropriate monitoring of all fishing apparatus when in use;
- 2.7 Ensure catch levels are kept within the catch and storage capacity of the vessel;
- 2.8 Avoid the abandonment of fish at sea, except where the safety of the crew or vessel is threatened;
- 2.9 Record and report the loss and recovery of fishing gear;
- 2.10 As practical as possible, retain material such as derelict fishing gear and other garbage that may be recovered during routine operations for disposal on shore. For example, if lost pots or traps are recovered and space is not available for storage, operators are encouraged to remove and transport any line and webbing to port for disposal and return the bare frames to the water, or at least cut open traps to keep them from continuing to trap marine life;
- 2.11 Minimise the taking aboard of potential garbage through proper provisioning practices; retain any rubbish for disposal on land e.g. drink bottles, lunch wrappers;
- 2.12 Ensure the transference of information on new developments and requirements to all members of the abalone industry (NB. Details as to how this would be done are described in the FMS);
- 2.13 ensure that their vessels and gear are marked in accordance with NSW Fisheries specifications,
- 2.14 ensure that fishing operations are conducted with due regard to the safety of other fishers,
- 2.15 ensure compressors are muffled sufficiently to avoid excess noise generation
- 2.16 Be aware of, and abide by, NPWS regulations relating to marine mammals;
- 2.17 Be aware of, and abide by, NSW Waterways regulations at all times and particularly in the vicinity of port facilities where speed restrictions may apply;
- 2.18 Encourage the use of four stroke outboard engines to reduce fuel emissions;
- 2.19 Be aware of, and abide by, all boundaries pertinent to the fishery, such as state borders, Marine Park boundaries and zonings, and any other closures or restricted areas;
- 2.20 As practicable as possible, any abalone found by the deckhand to be undersized, along with any living organisms found on the abalone shell (e.g. chitons) are to be returned to the bottom by the diver into the same habitat as they were removed from.

3 Threatened and Protected Species

- 3.1 Be aware of, and abide by, NSW Fisheries regulations relating to fishing, boating and diving protocols to be followed when operating in the vicinity of critical habitat for grey nurse sharks or any other critical habitat as it is declared;

- 3.2 Be aware of, and abide by, NPWS regulations relating to boating operations within the vicinity of marine mammals;
- 3.3 Participate in a reporting program for identifying areas where threatened species occur;
- 3.4 When threatened species are known to be present in an area, carry out fishing operations in a manner that is unlikely to cause adverse disturbance;

4 Minimising the Potential for the Spread of *Perkinsus* and Other Diseases

- 4.1 Be aware of and adhere to any relevant Marine Pest and Disease management plans (e.g. the Plan of Management for *Caulerpa taxifolia*)
- 4.2 When harvesting abalone in areas where *Perkinsus* is known to have infected abalone, or in areas adjacent to these, drain all sea water from the boat at the ramp and crates containing abalone, in order to avoid the spread of *Perkinsus* that may be potentially be present in the seawater to other locations or to processor holding tanks.
- 4.3 Report any incidence of the potential occurrence of *Perkinsus* to NSW Fisheries

5 Illegal Fishing

- 5.1 Report observations of illegal fishing, preferably in a notebook provided by NSW Fisheries, and, where appropriate, call the designated 'hot line' to pass on information if immediate compliance is required;

6 Minimise Potential Impacts of Harvesting on Indigenous People

- 6.1 Beware of the known location of items and sites of significance to Indigenous people, and become aware of newly discovered locations as they are made available;
- 6.2 Harvest around the location of items and sites of significance to Indigenous people in an appropriate manner that respects the value of the items and sites to Indigenous people.

7 Minimise Potential Impacts of Harvesting on Heritage

- 7.1 Beware of the known location of items and sites of European significance (e.g. shipwrecks, and become aware of newly discovered locations as they are made available;
- 7.2 Harvest around the location of items and sites of European significance according to regulations.

8 Seafood Quality Assurance and Food Safety

Seafood handling, quality assurance and food safety are now under the auspices of the NSW Food Authority. The following summary set of principles should be read in association with NSW Food Authority requirements.

The abalone industry will:

- 8.1 promote the implementation of appropriate quality assurance systems within the industry;
- 8.2 implement cleaner production methods and food safety principles when handling seafood;
- 8.3 comply with all relevant environmental standards, State and national;
- 8.4 encourage the appropriate handling and transport of fish to port;
- 8.5 ensure seafood does not come into contact with water unless that water is clean sea water or potable water;
- 8.6 provide safe and wholesome products which meet consumer requirements.

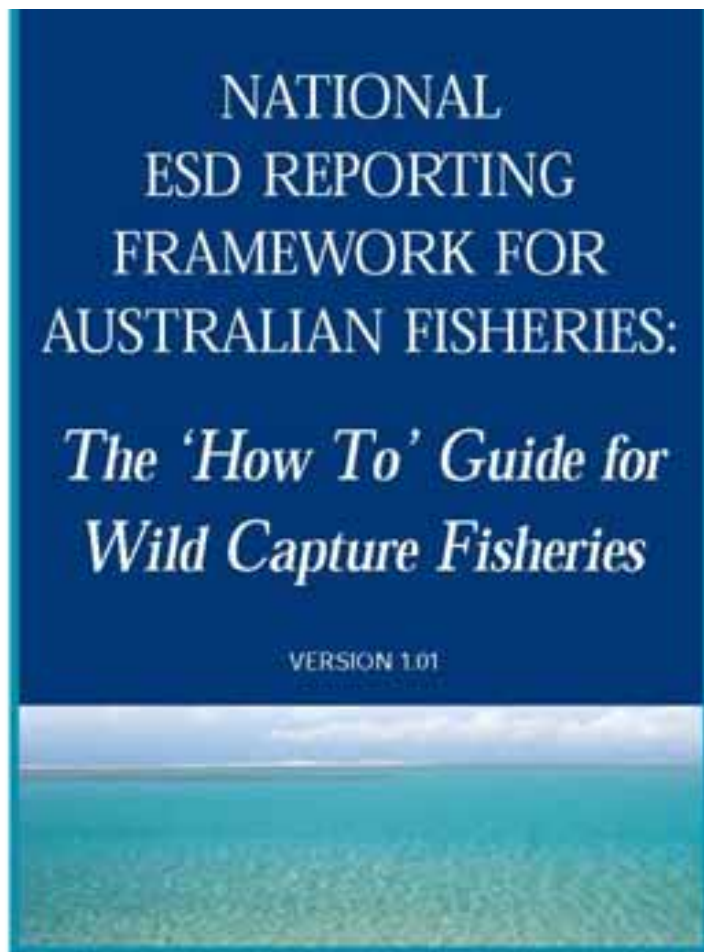
- 8.7 At all times during harvesting operations ensure careful removal of abalone from reef, so that every effort is made not to damage the meat and/shell.

APPENDIX B5. RISK ANALYSIS ACCORDING TO THE 'HOW TO' GUIDE FOR WILD CAPTURE FISHERIES

The following section describes details of the risk analysis process (as used in the abalone EIS) described in Section 5 of:

Fletcher, W.J., Chesson, J., Fisher M., Sainsbury, K.J., Hundloe, T., Smith, A.D.M. and B.

Whitworth (2002). *National ESD Reporting Framework for Australian Fisheries: The 'How To' Guide for Wild Capture Fisheries*. FRDC Project 2000/145, Canberra, Australia.



May 2002

This 'How To' Guide for ESD reporting on fisheries is part of an on-going process to develop a reporting framework for ESD and fisheries within Australia. This edition will not be the final version, changes are expected to be made at regular intervals when further information indicates that significant improvements can be made.

The material may be copied for use in completing assessments and reports as long as appropriate acknowledgement of the source is given.

Whilst this project was originally conducted under the auspices of the SCFA, and is now a project endorsed by the Marine and Coastal Committee of the Natural Resources Management Committee (NRMC), it should not be taken as being the policy of any individual fisheries management agency.

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Correct Citation

Fletcher, W.J., Chesson, J., Fisher M., Sainsbury, K.J., Hundloe, T., Smith, A.D.M. and B. Whitworth (2002) *National ESD Reporting Framework for Australian Fisheries: The 'How To' Guide for Wild Capture Fisheries*. FRDC Project 2000/145, Canberra, Australia.

This report forms Publication No. 1 of the FRDC - ESD Reporting and Assessment Subprogram.

The latest version of this report and other material related to the ESD Subprogram may be downloaded from the web site
www.fisheries-esd.com

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SECTION 5 HOW TO PRIORITISE ISSUES

5.1 Background

The process of identifying the relevant issues for a fishery - by the modification of the eight generic component trees - can often result in a large number of potential topics being identified. The importance of each of these may vary, from the relatively insignificant to the vitally important.

If an issue is relatively insignificant, it is unlikely to require specific management arrangements and monitoring programs. However, those issues that are important may need strong management intervention if unacceptable outcomes are to be avoided.

Given the variation of levels in the importance of issues, and the scarcity of resources to address all of them at equal levels, there will generally be a requirement to prioritise the identified issues, so that management actions and monitoring systems are only implemented where appropriate.

To assist in prioritising the issues, features of the Risk Analysis methodology have been adopted as a tool to help the decision-making process. This involves using the Risk Assessment component of Risk Analysis to provide a disciplined and consistent approach for the calculation of the relative level of 'risk' associated with each issue.

This relative level of risk can be used as a way of determining the appropriate level of management response and reporting.

How is Risk Assessment used?

The Risk Assessment, completed as part of the ESD Reporting Framework on each of the identified issues for the fishery, is done as an initial screening exercise that may be just the first step in a hierarchical process for determining what actions need to be taken. Those issues found to be of relatively high risk may require a more detailed analysis.

5.2 Risk Analysis

5.2.1 Overview

Given that readers of this *Guide* may not have been exposed to Risk Analysis techniques previously, it is important to understand how the process works in general before embarking on the detailed version developed for the analysis of fisheries issues.

The formal evaluation and management of risk via Risk Analysis is generally accepted as one of the basic instruments of good management practice. Risk Analysis involves:

- identifying the hazards/components;
- analysing those that pose a risk;
- determining appropriate management options;
- implementing the best of these options; and
- reviewing their effectiveness (see Figure 14 for details).

Many companies and government agencies now use this approach to assist in the development of their business plans. Consequently, there are now a large number of associations, consultants and institutes that specialise in completing and researching Risk Analyses¹⁰. Probably the industry with the longest history and most sophisticated approaches in this field is the insurance industry.

The processes that could be used for risk analysis/management are, in reality, a description of what should be done to effect the management of fisheries resources, but this has rarely been referred to in this manner.

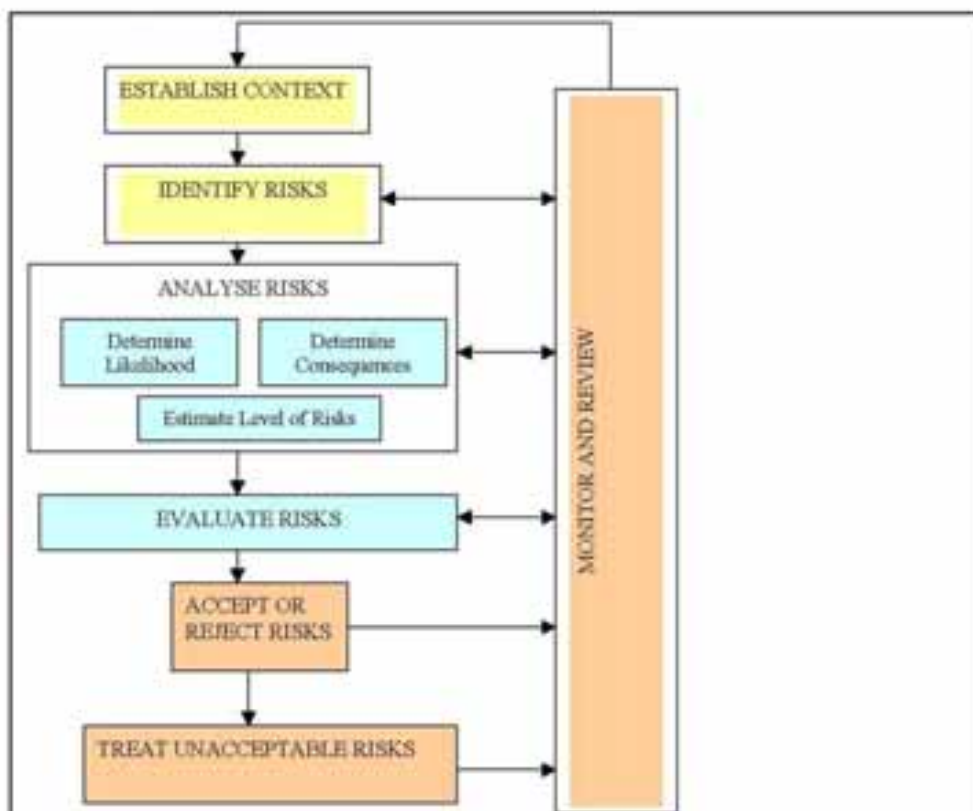


Figure 14 Outline of the Risk Management Process – adapted from the AS/NZS 4360: 1999

Note – issues in the 'Establish Context' and 'Identify Risks' boxes are covered in the previous section (Section 4 - Issue Identification), issues in the 'Analyse Risks' and 'Evaluate Risks' boxes are covered in this section (Section 5 - Prioritisation) and the 'Accept or Reject Risks', 'Treat Unacceptable Risks' and 'Monitor and Review' boxes are covered in the following section (Section 6 - Reporting Methods).

Not surprisingly, therefore, the ESD reporting framework outlined in this *Guide* are, to a large extent, merely a refined application of risk assessment principles.

The previous section on developing the component trees was merely a structured way of identifying the 'hazards' associated with a fishery – except that we called them by the less emotive term of 'sub-components'. What this current chapter describes is how to assess the risk associated with each of these sub-components, while the following chapter outlines how the management and monitoring of these risk should be generated.

5.2.1 Risk Analysis in the Fisheries Context

What is Risk?

"Risk is the chance of something happening that will have an impact on objectives (AS/NZS 4360- 1999)".

For a fisheries agency/department, 'risk' is associated with the chance of something affecting the agency/department's performance against the objectives in their relevant legislation. In contrast, for the commercial fishing industry, the term 'risks' generally relates to the potential impacts on their long-term profitability, while for the general community, 'risk' could relate to a possible impact on their enjoyment¹¹ of the marine environment.

The aim for each of these groups should be to ensure that the 'risk' of an unacceptable impact is kept to an acceptable level¹².

The calculation of a risk in the context of a fishery may be determined within a specified time frame (e.g. the life of the management plan, the generation time of the target species, the term of the current government) or 'for the foreseeable future'.

The management of risk is a sensible approach to take within the fisheries context because of the large number of potential issues and the impossibility of gaining a perfect understanding for any of these. The recent shift by many fisheries management committees to link their actions to the probability that stock assessment projections will meet agreed levels of performance is a good example of the application of techniques that acknowledge these uncertainties.

While not all elements of fisheries management will be able to use quantitative simulation modelling to predict the probabilities of performance given a set of proposed management arrangements, there is still value in utilising these principles across all relevant issues. The methods outlined below, developed to support the ESD reporting framework, use a formal risk assessment process that is consistent with the

¹¹ This enjoyment could include non-extractive and non-direct uses.

¹² In some cases there may be the opportunity to measure the 'risk' of having a beneficial outcome, particularly for social and economic issues.

Australian Standard AS/NZS 4360:1999 Risk Management and the companion paper on Environmental Risk Management – Principles and Process (HB 203:2000).

5.3 The Risk Assessment Process

5.3.1 General

What is Risk Analysis?

“Risk analysis involves consideration of the sources of risk, their consequences and the likelihood that those consequences may occur.”
AS/NZS 4360 – 1999

As stated above, the major objective for using a risk assessment technique is to assist in separation of the minor acceptable risks from the major unacceptable risks. This assessment requires the determination of two factors for each issue – the potential consequence arising from the activity on this sub-component, and the likelihood that this consequence will occur¹³.

The combination of the level of consequence and the likelihood of this consequence is used to produce an estimated level of risk associated with the particular hazardous event/issue in question.

Determining the levels of consequence and likelihood should involve an assessment of the factors that may affect these criteria, but this should be done in the context of what existing control measures - management arrangements - are already in place. For example, in determining the risks from fishing for the spawning biomass of a species of prawn, you would need to take into account the current management regime (such as whether there are any restrictions on boat numbers, closed seasons and areas, etc.) in assigning the appropriate likelihood and consequence values.

You should come up with very different values depending upon whether management is, or is not, included (if not, either you don't need management or your current management is having little effect). However, as the whole point of this exercise is to see whether current management is acceptable or not, the assessment *must* include the arrangements that are currently being used.

Consequence

The process of risk assessment begins by assessing the possible consequence level of an issue. The criteria used to assign a level of consequence can be:

- *Qualitative* – using a descriptive scale to describe the magnitude of potential consequences.

¹³ Consequence and likelihood are sometimes described as impact and probability

- *Semi-quantitative* – in these cases the qualitative scales are given values. However, these numbers may not be an accurate reflection of the actual magnitude of the consequence.
- *Quantitative* – uses numerical values alone to assign the level.

In a qualitative system, the number of consequence levels used generally varies between four and six. The lowest level of consequence is usually assigned a value of zero or one, which should indicate a negligible consequence.

At the other end of the spectrum is the highest category, which should be a catastrophic/irreversible consequence, with the score being related to the number of categories. The assessment of the potential consequence of a hazard should be based upon the judgment of individuals or a group that collectively have sufficient expertise in the areas examined to provide credible assessments.

Likelihood

The likelihood of the consequence occurring is then assigned to one of a number of levels. Most systems use between four and six categories, varying from 'remote' to 'likely'.

In doing so, the participants should consider the likelihood of the 'hazardous' *event* (i.e. the consequence) actually occurring, - *not* the likelihood of the activity occurring. For example, in determining the likelihood of having a fatal car accident, you do not use the likelihood of driving a car. Instead, it is the likelihood that whilst driving a car you will have a fatal accident - i.e. likelihood is a *conditional probability*.

As with the consequence tables, the likelihood tables can use qualitative categories through to quantitative probabilities, depending upon the level of analysis needed and the level of data available.

Risk

The overall risk level for each hazard is generally calculated as the mathematical product of the consequence and likelihood levels ($\text{Risk} = \text{Consequence} \times \text{Likelihood}$). From this product, which is called the *Risk Value*, each issue can be assigned a *Risk Ranking*, depending upon where a risk value falls within one of a number of predetermined categories.

In this *Guide*, five levels of risk have been suggested: 'Extreme', 'High', 'Moderate', 'Low' and 'Negligible'.

The cut-off values between the Risk Rating levels, and the management actions that flow from the different rankings, may be: "*based on operational, technical, financial, legal, social, humanitarian or other criteria*" (AS/NZS 4360). In particular, you need to ensure that the outputs of the risk analysis correspond to the types of risks present and the outcomes that would be expected to occur.

5.3.2 Scope of Assessments

Risk assessment can be undertaken at a number of different levels of sophistication and detail. The level chosen greatly affects their complexity and cost to complete. Qualitative assessments are usually the least expensive, while quantitative are generally the most expensive.

Sophistication

The use of qualitative criteria for assigning consequence and likelihood is, according to the AS/NZS manual, common as an initial screening activity to identify risks that require more detailed analyses. This is the purpose for which the risk assessment process is being used in this ESD Reporting Framework.

Therefore, this *Guide* will outline the qualitative tables that have been developed to help assign the level of consequence and likelihood for use in the fisheries context. For some issues, the initial qualitative assessments may need to be followed up with more detailed semi-quantitative or fully quantitative assessments.

Detail

The issues assessed may be completed at very different levels of detail - from the very broad (e.g. impacts of the entire fishery) down to an assessment of the risk at a micro-level (e.g. rates of compliance for abalone bag limits in zone C).

For the purposes of this framework, we need to take a relatively high level approach, based on asking what is the risk to each issue of 'having a fishery'. In doing this, we need to recognise that this is actually integrating a large number of elements into an overall estimate of risk for the fishery.

If the overall level of risk for an issue were low, it would be unnecessary to complete a finer scale assessment. However, if the overall level of risk is high enough for specific management to be required, a second-phase risk assessment may be necessary, in order to identify the relative risks associated with each of the specific elements that led to the overall rating.

This finer scale analysis should assist in the development of appropriate management actions. These more detailed assessments may be needed as part of the process for completing the ESD component reports (see next section).

5.3.3 The Risk Assessment Process – Application to Fisheries

The value of any Risk Assessment depends upon the clarity and applicability of the consequence and likelihood tables that are used to classify each of the issues. When the development of the ESD framework began, no appropriate tables for the assessment of fisheries issues were available. Accordingly, one of the tasks has been to generate suitable tables by adapting those used for environmental impacts and by the adoption of first principles.

These range from developing the levels of consequence required to determining the appropriate scale to assess the issues.

For target species, the consequence of being caught during the process of a fishery needs to be assessed on the scale of the population of the species affected, not at the individual level. Obviously catching one fish is generally catastrophic for the individual caught, but usually not for a population.

Similarly, when assessing possible ecosystem impacts, this should be done at the level of the whole ecosystem or at least in terms of the entire extent of the habitat, not at the level of an individual patch or an individual of a non-target species.

Consequence Tables

With the Risk Assessment methodology recommended in this *Guide* largely being used as a first stage filtering process, only qualitative criteria¹⁴ have been developed for the consequence and likelihood tables. In addition, it was recognised that more than one type of consequence table would be needed because the variety of issues - and the possible outcomes - differ both amongst the different component trees and, in some cases, within the same component tree.

Thus, a series of Consequence Tables, each with six levels of impact ranging from negligible to catastrophic, has been generated to cover:

1. General (described below);
2. Target species/major non-retained species;
3. By-product/minor non-retained species;
4. Protected Species (a category under both State and Commonwealth environmental Acts);
5. Habitat issues;
6. Ecosystem/trophic level effects; and
7. Political/Social effects

Tables 2 - 7 are described in Appendix 1.

¹⁴ It is envisaged that this may develop into a semi-quantitative procedure over the coming years as we determine what numbers relate to the qualitative categories identified.

Table 2 The General Consequence Table for use in ecological risk assessments related to fishing (needs to be adapted to specific issue being assessed).

Level	General
Negligible (0)	Very insignificant impacts. Unlikely to be even measurable at the scale of the stock/ecosystem/community against natural background variability.
Minor (1)	Possibly detectable but minimal impact on structure/function or dynamics.
Moderate (2)	Maximum appropriate/acceptable level of impact (e.g. full exploitation rate for a target species)
Severe (3)	This level will result in wider and longer term impacts now occurring (e.g. recruitment overfishing)
Major (4)	Very serious impacts now occurring with relatively long time frame likely to be needed to restore to an acceptable level
Catastrophic (5)	Widespread and permanent/irreversible damage or loss will occur – unlikely to ever be fixed (e.g. extinctions)

The six more detailed Consequence Tables are described in full in Appendix 1.

Likelihood Table

The Likelihood Table that was developed also has qualitative criteria that range from 'remote' to 'likely'. Only one of these has been necessary so far (see Table 3)

Table 3 Likelihood Definitions

Level	Descriptor
Likely (6)	It is expected to occur
Occasional (5)	May occur
Possible (4)	Some evidence to suggest this is possible here
Unlikely (3)	Uncommon, but has been known to occur elsewhere
Rare (2)	May occur in exceptional circumstances
Remote (1)	Never heard of, but not impossible

Table 4 Risk Matrix – numbers in cells indicate risk value, the colours/shades indicate risk rankings (see Table 5 for details)

		Consequence					
		Negligible	Minor	Moderate	Severe	Major	Catastrophic
Likelihood		0	1	2	3	4	5
Remote	1	0	1	2	3	4	5
Rare	2	0	2	4	6	8	10
Unlikely	3	0	3	6	9	12	15
Possible	4	0	4	8	12	16	20
Occasional	5	0	5	10	15	20	25
Likely	6	0	6	12	18	24	30

Risk Rating Table

The matrix shown in Table 4 shows the resultant risk values, based upon the arithmetical calculation of the Consequence x Likelihood (0-30). These risk values have been separated into five risk ranking categories (See Table 5 for separation points) from 'negligible' risk to 'extreme' risk.

It is suggested that only issues of sufficient risk or priority (i.e. 'moderate', 'high' or 'extreme' risk), need to have a full performance reports completed. This should identify all those issues that require specific management actions.

Output from the Risk Assessment

The actual risk assessment is not just the scores generated during the assessment process but needs to include the appropriate level of documentation/justification for the categories selected.

For the negligible and low risk issues whilst full performance reports are not needed, a necessary element of the ESD Reporting framework is to document the rationale for classifying issues in these categories. These should form part of the ESD report so that stakeholders can see why these issues were accorded these ratings (and potentially supply additional or alternative information to affect subsequent assessments).

The level of justification required should be appropriate for 'low' compared to 'negligible' risk issues. It should be noted that if a full performance report is not needed, this by definition means that there are no specific management actions being taken.

If you need to take management actions, then you need to develop a performance report to assess the performance of this management. However, if you are not going to directly manage something, then having performance reporting is probably not a priority.

Finally, for issues that were rated as either having a 'high' or (especially) an 'extreme' risk, it is likely that extra management measures in addition to those already being applied may be necessary, or it may be indicated that further information is needed to more accurately quantify the risks. These suggested outcomes are summarized in Table 5.

Table 5 Suggested Risk Rankings and Outcomes

Risk Rankings	Risk Values	Likely Management Response	Likely Reporting Requirements
Negligible	0	Nil	Short Justification Only
Low	1-6	None Specific	Full Justification needed
Moderate	7-12	Specific Management Needed	Full Performance Report
High	13-18	Possible increases to management activities needed	Full Performance Report
Extreme	> 19	Likely additional management activities needed	Full Performance Report

Operational Example

An example of how the process operates is as follows. If, given current management arrangements of a fishery, the greatest consequence that may happen to a particular harvested stock was that it could become recruitment overfished (which is a 'severe' consequence with a score of 4), but the likelihood of this occurring was 'unlikely' (which is a score of only 3).

This combination would generate a risk rating of 12. Using the Risk Ranking table, a score of 12 would be considered a 'moderate' risk – suggesting that continued management was required to ensure the risk was maintained at an acceptable level.

If the next time the fishery was assessed (or another stock is assessed) with the same potential consequence but this time the likelihood of recruitment overfishing was a higher – with this now being 'occasional' (perhaps due to an increase in the level of illegal fishing) this would increase the risk value to 15, which is a Risk Ranking of 'high'. This would identify the need for a probable increase in management actions to reduce this likelihood.

APPENDIX 1 DETAILS OF THE RISK ASSESSMENT CONSEQUENCE TABLES

A1.1 General

The six detailed Consequence Tables were designed to assist in the process of rating issues. Because of the current priority to deal with the environmental issues (i.e. to meet the Environment Australia requirements for *Environment Protection and Biodiversity Conservation Act 1999* assessments), most of the tables created so far only cover these types of issues.

The criteria within each level of the tables are qualitative, based on the general table presented above, although in one instance (the Habitat Table), suggestions are presented about what quantitative levels may be relevant to the qualitative levels – but these are only suggestions.

To realistically assess the ecological impacts (not the social impacts, e.g. community attitudes to an activity), as stated above, the assessments must be completed at the level of the relevant local population (unit stock), habitats, and ecosystems within the local bioregion - not at the level of an individual or 'patch'.

The consequences must also be scaled appropriately - from virtually 'nil' through to 'widespread' and 'irreversible'.

The temptation to shift the assessment across into social issues, such as the wastage of non-retained species, beyond any true environmentally-based assessment of ecosystem impact, needs to be recognised and allocated to the appropriate section. Such social/political and other non-ecological issues are likely to be just as important to assess as ecological impacts and may alter what happens to the priority of an issue, but it is important to distinguish whether something is a social/moral rating or whether it is an environmentally-based rating.

The suggested Consequence Tables that have been developed for use in the risk assessment do not mimic exactly the eight categories for ESD. This situation has occurred for a number of practical reasons.

In assessing the retained species, it was clear that there needed to be separate Consequence Tables generated for target species and by-product species. In contrast, the categories for major non-retained species are identical to those of target species, because they are both needed to assess the impacts of fishing on fish populations, so the same Consequence Table applies to both.

The 'Protected Species' (not threatened species) table was generated because the public's expectation for many of the species in this category requires that a 'higher' level of protection is expected for them than for other species. As a result, there are some categories of non-retained species that have been categorised according to social values. It is recognised that there may be some

inconsistency in this approach, but it is matter of trying to categorise species in a manner that is as 'realistic' as possible.

Ecosystem issues generally fall into two categories - those that may affect the habitat in a rather direct fashion and those that may impact on the ecosystem function in a more indirect manner. Hence two tables were developed.

For, both of these tables, the use of IMCRA-style definitions or other scientifically determined scales (e.g. for World Heritage Area listings) may be useful.

No tables have been generated for the broader environmental impacts (which include impacts on air quality and water quality). Many of these types of issues are already subject to other legislation/standards and over time these will be added to later versions of the *Guide*.

For the social and economic components, at the moment the only Consequence Table generated covers the political outcomes, and this has largely been included only to demonstrate that the concept can be used within these areas. Methods to determine the relative levels of social dependence and sensitivity to change are available from the Bureau of Rural Sciences (using ABS statistics) and these values can be used to identify which towns/communities/regions may be at significant risk following changes to management arrangements.

The following sections will explain each of the six tables in detail. This will include suggestions on how the assessments could be completed/utilised.

A1.2 Retained Species (Primary)

Table A1 Suggested consequence categories for the Major Retained/Non-Retained Species

Level	Ecological (Retained: target/Non-retained: major)
Negligible (0)	Insignificant impacts to populations. Unlikely to be measurable against background variability for this population.
Minor (1)	Possibly detectable, but minimal impact on population size and none on dynamics.
Moderate (2)	Full exploitation rate, but long-term recruitment/dynamics not adversely impacted.
Severe (3)	Affecting recruitment levels of stocks/or their capacity to increase.
Major (4)	Likely to cause local extinctions, if continued in longer term (i.e. probably requiring listing of species in an appropriate category of the endangered species list (e.g. IUCN category).
Catastrophic (5)	Local extinctions are imminent/immediate

A1.2.1 Scale of Assessment

The risk should be assessed at the level appropriate to the relevant reproducing population – or unit stock of the species, not some arbitrary spatially based unit.

A1.2.2 General Description

This qualitative table describes the suite of potential consequences that may occur to a population due to fishing. This extends from virtually no impact to complete extinction. This is the appropriate spread of consequences for this type of interaction.

The average target stock of a fishery will probably have at least a moderate level of consequence – this results from most fisheries having objectives related to fully harvesting species but not overfishing them. For those stocks where there is a chance that recruitment overfishing may occur, a higher consequence level should be chosen.

For example, abalone fisheries will often have values in the ‘severe’ to ‘major’ categories, depending upon the effectiveness of management controls and compliance because they are especially prone to overfishing. Species with more robust dynamics, such as prawns, are unlikely to ever get past a ‘severe’ consequence.

A1.2.3 Suggestions

In assessing the risk of the fishery on each of the target species, the risk assessment should integrate/incorporate the following elements (which themselves may have a number of more detailed factors):

- *The removals, by all sectors (i.e. commercial fishing, recreational fishing, indigenous, illegal and discards).*

How many fisheries capture this species? Do you know what these amounts are? The greater the relative amounts of catch being removed and the larger the number of other sectors catching the species, the higher the possible consequence is likely to be. This would be increased as the level of uncertainty about the quantum of catch (not the exact amount) by each sector increases.

- *Species biological characteristics/dynamics*

Does the biology of the species make it more likely to be susceptible to over fishing? For example, is it long-lived and low fecundity, short lived and high fecundity, widely dispersed, local populations only?. Thus, as suggested above, abalone are far more susceptible to over fishing than prawns or many finfish species.

- *The current knowledge and understanding available on these issues (including distribution versus area fished)*

Do you have a large amount of data on the species and the sources of mortality? The less data available, the higher the risk is likely to be.

- *Current management arrangements - their effectiveness and problems*

Are the current management arrangements, including compliance with rules and effort limitation methods, working? If not, then the potential consequence and/or the likelihood of an unacceptable consequence are likely to be higher. Obviously each of these elements interacts with each other. For example, you may be able to have a relatively large catch on a susceptible species if appropriate management arrangements are imposed combined with effective monitoring that enables external parties to see that these arrangements are working successfully.

A1.3 Retained Species (By-Product)

Table A2 Suggested consequence categories for the By-Product Species/Minor Non-retained species

Level	Ecological (RETAINED: By-product/Non-retained: other)
Negligible (0)	The area where fishing occurs is negligible compared to where the relevant stock of the species resides (< 1%).
Minor (1)	Take in this fishery is small (< 10%), compared to total take by all fisheries and these species are covered explicitly elsewhere. Take and area of capture by this fishery is small, compared to known area of distribution (< 20%).
Moderate (2)	Relative area of, or susceptibility to capture is suspected to be less than 50% and species do not have vulnerable life history traits.
Severe (3)	No information is available on the relative area or susceptibility to capture or on the vulnerability of life history traits of this type of species. Relative levels of capture/susceptibility suspected/known to be greater than 50% and species should be examined explicitly.
Major (4)	N/A Once a consequence reaches this point it should be examined using Table A1.
Catastrophic (5)	N/A (See Table A1).

A1.3.1 Scale of Assessment

This should be assessed at the level of a locally reproducing population – unit stock (if known).

A1.3.2 General Description

The species relevant to this table are those in the by-product branches or minor elements of the non-retained species, where there may not be a large amount of specific data available. This table was designed to produce reasonably robust consequence levels up to the point where this was appropriate – i.e. the moderate level. Anything higher than this must be assessed separately using the previous Consequence Table or by the collection of more information to determine if a lower consequence values is valid.

A1.3.3 Suggestions

Assessing the risk of having this fishery for each component should integrate/incorporate

- only the species affected by the fishery being examined,
- the relative impact of this fishery compared to the distribution of the species and other impacts on the stocks.
- the biological characteristics and dynamics of the species captured, and
- the current knowledge and understanding available on these issues and current management arrangements.

A1.4 Protected Species

Table A3 Suggested consequence levels for the impact of a fishery on Protected species.

Level	Ecological
Negligible (0)	Almost none are impacted
Minor (1)	Some are impacted but there is no impact on stock
Moderate (2)	Levels of impact are at the maximum acceptable level
Severe (3)	Same as target species
Major (4)	Same as target species
Catastrophic (5)	Same as target species

A1.4.1 Scale of Assessment

This is assessed at the level of a locally reproducing population – unit stock (if known).

A1.4.2 General

This table was generated because the criteria for assessing the impact on the species on the protected list appear to be more stringent than merely using ecological criteria. Thus, there appears to be a level of social/moral add-on attached to these species and therefore the criteria are different than species not on the list.

A1.5 Habitat Issues

Table A4 Suggested consequence levels for the impacts of a fishery on habitats.

Level	Ecological (HABITAT)
Negligible (0)	<p>Insignificant impacts to habitat or populations of species making up the habitat – probably not measurable levels of impact. Activity only occurs in very small areas of the habitat, or if larger area is used, the impact on the habitats from the activity is unlikely to be measurable against background variability.</p> <p><i>(Suggestion- these could be activities that affect < 1% of original area of habitat or if operating on a larger area, have virtually no direct impact)</i></p>
Minor (1)	<p>Measurable impacts on habitat(s) but these are very localised compared to total habitat area.</p> <p><i>(Suggestion – these impacts could be < 5% of the original area of habitat)</i></p>
Moderate (2)	<p>There are likely to be more widespread impacts on the habitat but the levels are still considerable acceptable given the % of area affected, the types of impact occurring and the recovery capacity of the habitat.</p> <p><i>(Suggestion – for impact on non-fragile habitats this may be up to 50% [similar to population dynamics theory] - but for more fragile habitats, to stay in this category the percentage area affected may need to be smaller, e.g. 20%)</i></p>
Severe (3)	<p>The level of impact on habitats may be larger than is sensible to ensure that the habitat will not be able to recover adequately, or it will cause strong downstream effects from loss of function.</p> <p><i>(Suggestion - Where the activity makes a significant impact in the area affected and the area > 25 - 50% [based on recovery rates] of habitat is being removed)</i></p>
Major (4)	<p>Substantially too much of the habitat is being affected, which may endanger its long-term survival and result in severe changes to ecosystem function.</p> <p><i>(Suggestion this may equate to 70 - 90% of the habitat being affected or removed by the activity)</i></p>
Catastrophic (5)	<p>Effectively the entire habitat is in danger of being affected in a major way/removed.</p> <p><i>(Suggestion: this is likely to be in range of > 90% of the original habitat area being affected).</i></p>

A1.5.1 Scale of Assessment

Habitat (attached species – e.g. seagrass/coral) assessed at the regional habitat level, defined as the entire habitat equivalent to that occupied by the exploited stock. The real extent against which impacts should be judged is not the current distribution, but what is considered the best estimate of the original extent of the habitat.

General

There should be some inverse relationship between the relative level of potential impact on a habitat from an activity and the relative extent of the habitat over which the activity can be allowed to occur. For example, the real extent over which dredging, which is usually classed as one of the most destructive forms of fishing, should be allowed, would be much smaller than that for less destructive methods such as line fishing.

Determining what is an acceptable level of loss or disruption to a habitat may involve examining the impacts on the dynamics of the habitat species, but also the indirect impacts of the species reliant on the habitat. Obviously, some habitats are more fragile than others, which will affect the levels of disturbance they can withstand sustainably. Furthermore, some habitats form important functions such as juvenile fish habitats and this may need to be included in the determination of the levels of acceptable disturbance for each region/activity.

A1.6 Ecosystem Issues

Table A5 Suggested consequence levels for the impact of a fishery on the general ecosystem/trophic levels.

Level	Ecological (ECOSYSTEM)
Negligible (0)	General - Insignificant impacts to habitat or populations, Unlikely to be measurable against background variability Ecosystem: Interactions may be occurring but it is unlikely that there would be any change outside of natural variation
Minor (1)	Ecosystem: Captured species do not play a keystone role – only minor changes in relative abundance of other constituents.
Moderate (2)	Ecosystem: measurable changes to the ecosystem components without there being a major change in function. (no loss of components).
Severe (3)	Ecosystem: Ecosystem function altered measurably and some function or components are locally missing/declining/increasing outside of historical range &/or allowed/facilitated new species to appear. Recovery measured in years.
Major (4)	Ecosystem: A major change to ecosystem structure and function (different dynamics now occur with different species/groups now the major targets of capture) Recovery period measured in years to decades.
Catastrophic (5)	Ecosystem: Total collapse of ecosystem processes. Long-term recovery period may be greater than decades.

A1.6.1 Scale of Assessment

The indirect impacts due to flow-on effects of food chain interactions should be assessed at the regional/bioregional level – this is equivalent to the 'species'/unit stock scale. Thus, this assessment should not be completed just for the area where the fishery operates, unless this is the entire extent of this community/bioregion.

A1.6.2 General

The changes to the ecosystem from the removal of prey/predators on the food chain are, in most cases, a difficult concept to even define. The qualitative criteria presented in the table are there to be functionally equivalent to the criteria generated for a species – i.e. from no measurable impacts through to extinction.

Unlike the impacts on target species or even impacts on habitats, documented examples of these effects are both fewer and more varied in their outcomes. In general, flow-on trophic-related effects only occur *after* the collapse of the target stock(s) - not before.

The only circumstances where these trophic-related effects may possibly occur before a collapse would be restricted to situations where the target stock plays a keystone role in the ecosystem – either as a ‘predator’ – (e.g. sea otters, urchins and macroalgae – leading to either kelp beds or barren grounds, depending upon whether sea otters are present or not), or the sole ‘prey’ of a predator.

APPENDIX B6. INDIVIDUAL THREATENED SPECIES ASSESSMENTS

Eight-Part Tests for Scheduled Marine Reptiles

Loggerhead Turtle

a) In the case of a 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.

The loggerhead sea turtle (*Caretta caretta*) occurs throughout the temperate and tropical regions of the Atlantic, Pacific, and Indian Oceans. Loggerheads nest on ocean beaches and occasionally on estuarine shorelines with suitable sand. Nests are typically made between the high tide line and the dune front (Internet Reference 1). The species life cycle is not likely to be placed at risk by the Abalone Fishery.

b) 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.

No endangered population of loggerhead turtles has been listed in NSW.

c) 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.

Abalone fishing is a low impact target fishery, which has little effect on the physical environment or other species. No loggerhead turtle habitat would be modified or removed.

d) 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.

Abalone fishing within NSW has little effect on the physical environment or other species and would not lead to any area of loggerhead turtle habitat becoming isolated or fragmented.

e) Whether a critical habitat will be affected.

No critical habitat for loggerhead turtles have has listed in NSW.

f) 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.

Due to their geographical range, it is difficult to provide conservation areas for this species; however the NSW marine reserves would provide conservation areas for this species. For example habitat protection zones account for approximately 72 per cent (15,600 hectares) of the Jervis Bay marine park. This zone type provides for a high level of environmental protection and prohibits high impact activities such as fish and prawn trawling. All estuarine systems not already protected within sanctuary zones are protected within habitat protection zones. In Solitary Islands Marine Park 12 per cent (8 650 hectares) is allocated to sanctuary zones and 54 per cent (38 860 hectares) as habitat protection zones

g) Whether the action proposed is of a class of action that is recognised as a threatening process.

Activities associated with the NSW Abalone Fishery are not recognised as threatening processes.

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

The loggerhead turtle is widely distributed within its range. It may be found hundreds of miles out to sea, as well as inshore areas such as bays, lagoons, salt marshes, creeks, ship channels, and the mouths of large rivers. Coral reefs, rocky places, and ship wrecks are often used as feeding areas. Loggerheads nest on ocean beaches and occasionally on estuarine shorelines with suitable sand. This species is not considered to be at the limit of its known distribution

Conclusion: The NSW Abalone Fishery is unlikely to have significant effects on loggerhead turtles, hence no SIS is recommended. However, there is a risk of disturbance to some individuals during fishing and it is recommended that possible effects of abalone fishing (e.g. boat strike, noise from vessels and diver disturbance) be incorporated into the Fisheries Management Strategy.

Green Turtle

a) In the case of a 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.

The green turtle (*Chelonia mydas*) is the largest of the hard-shelled turtle and can grow up to one metre in length, and reach a weight of up to 180 kilograms. In Australia, it is found on in shallow northern coastal waters from Shark Bay, in Western Australia to Bundaberg, in Queensland. On the East Coast it is commonly found on the Great Barrier Reef and adjacent coastal areas where it nests on sandy beaches. There have also been scattered sightings around Sydney (The Ecology Lab, Personal Observation) however the Green Turtle does not nest in NSW.

b) 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.

No endangered population of the green turtle is listed in NSW.

c) 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.

Abalone fishing in NSW is not considered to remove or modify any known green turtle habitat.

d) 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.

Abalone fishing in NSW would not cause any Green Turtle habitat to become isolated.

e) Whether a critical habitat will be affected.

No habitat critical for green turtles has been declared in NSW.

f) 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.

Only scattered sightings of Green Turtles have been made in NSW. Individuals have been recorded in North Harbour Aquatic Reserve, Botany Bay, Long Reef beach, Lake Macquarie and Lake Tuggerah, Jervis Bay

g) Whether the action proposed is of a class of action that is recognised as a threatening process.

Activities associated with the NSW Abalone Fishery are not recognised as threatening processes.

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

The green sea turtle is found throughout the world's tropical oceans (Internet Ref 2). NSW is the southern limit of its distribution on the east coast of Australia.

Conclusion: The NSW Abalone Fishery is unlikely to have significant effects on green turtles, hence no SIS is recommended. However, there is a risk of disturbance to some individuals during fishing and it is recommended that possible effects of abalone fishing (e.g. boat strike, noise from vessels and diver disturbance) be incorporated into the Fisheries Management Strategy.

Leathery Turtle

a) In the case of a 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.

The leathery turtle (*Dermochelys coriacea*) is found in all oceans of the world. Their feeding grounds are mainly in temperate areas but they breed in tropical areas. Leathery turtles are oceanic and are rarely found close to the shore in Australia (Internet Ref 3). Leathery turtles are known to feed and nest within the Great Barrier Reef World Heritage Areas with nesting recorded at Wreck Rock and adjacent beaches near Bundaberg, and sporadic nesting at other widely scattered sites in Queensland.

Leathery turtles are most commonly found in temperate waters feeding primarily on macroplankton (jellyfish, salps). Foraging leatherbacks have been recorded as far south as Bass Strait and through the Gulf of Carpentaria.

b) 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.

No endangered population of leathery turtles is listed in NSW.

c) 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.

This species does not nest in NSW and feeds on macroplankton. Abalone fishing is not considered to remove or modify any known leathery turtle habitat.

d) 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.

Abalone fishing in NSW would not cause any leathery turtle habitat to become isolated.

e) Whether a critical habitat will be affected.

No habitat critical for leathery turtles has been declared in NSW.

f) 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.

In NSW leathery turtles are rarely found close to shore and distribution is scattered. Therefore it is difficult to provide conservation areas for this species.

g) Whether the action proposed is of a class of action that is recognised as a threatening process.

Activities associated with the Abalone Fishery are not recognised as threatening processes in NSW.

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

The leathery turtle (*Dermochelys coriacea*) is found in all oceans of the world. The leathery turtles observed in NSW probably represent strays with the survival of the population dependent upon the large nesting population's tropical and subtropical locations. Leathery turtles have been recorded as far south as Bass Strait so NSW cannot be considered the limit of known distribution (Internet Ref 3).

Conclusion: The NSW Abalone Fishery is unlikely to have significant effects on leathery turtles, hence no SIS is recommended. However, there is a risk of disturbance to some individuals during fishing and it is recommended that possible effects of abalone fishing (e.g. boat strike, noise from vessels and diver disturbance) be incorporated into the Fisheries Management Strategy.

Eight-Part Tests for Scheduled Marine Mammals

Blue Whale

a) In the case of a 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.

The Blue Whale (*Balaenoptera musculus*) is considered to be the largest mammal ever to live, (Menkhorst and Knight, 2001). It has a worldwide distribution and has been recorded in all Australian States. It usually occurs singly or as widely spaced small groups. It feeds on krill and other plankton.

The Abalone Fishery would have little interaction with this species as it rarely swims close to the coast where abalone vessels operate and would be unlikely to have its life cycle disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

b) 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.

No endangered population of blue whales has been listed in NSW.

c) 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 major habitats of blue whales are the feeding areas of the Southern Ocean, the mating and birthing areas principally adjacent to coastal sandy beaches between Victoria to South Australia and some areas along the east and west coasts of Australia. Blue whales migrate along the NSW coast and during migration may move into embayments.

No area of Blue whale habitat would be modified or removed through abalone fishing.

d) 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.

Abalone fishing in NSW would not lead to isolation of any areas of habitat (see above).

e) Whether a critical habitat will be affected.

No critical habitat for blue whales has been declared in NSW.

f) *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.*

Due to their vast geographical range, it is difficult to provide conservation areas for many cetaceans, particularly large baleen whales such as the blue whale. Under the EPBC Act, whales are protected within the Australian Whale Sanctuary, which includes all Commonwealth Waters.

g) *Whether the action proposed is of a class of action that is recognised as a threatening process.*

No activities associated with the NSW Abalone Fishery are recognised as a threatening process.

h) *Whether any threatened species or ecological community is at the limit of its known distribution.*

The Blue Whale has a worldwide distribution and has been recorded in all Australian States, therefore it is not at the limit of its known distribution in NSW.

Conclusion: Although the NSW Abalone Fishery may interact occasionally with Blue whales it is unlikely to have significant effects on the species, hence no SIS is recommended. Notwithstanding this, it is recommended that the Fisheries Management Strategy incorporates measures to safeguard against disturbance to this species.

Southern Right Whale

a) *In the case of a 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.*

Southern right whales (*Eubalaena australis*) occur around the world in sub-polar and temperate waters. They have been observed as far north as the NSW Central Coast during the winter months (Jefferson *et al.* 1993). They range over a vast area and their population has increased rapidly since they became protected from hunting. They are slow moving and there is some evidence that they are susceptible to vessel strike. Females travel to temperate waters to give birth and mother and calf sightings are becoming more common in the Sydney region as the species' population increases.

The Abalone Fishery would have little interaction with this species apart from the general potential for boat strike which is common to all boating activities. The risk of this occurring is small and hence the Abalone Fishery would be unlikely to disrupt the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

b) *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.*

No endangered population of southern right whales has been listed in NSW.

c) *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 major habitats of southern right whales are the feeding areas of the Southern Ocean, the mating and birthing areas of southern Australia (e.g. Great Australian Bight) and some birthing areas along the east and west coasts, principally adjacent to coastal sandy beaches. Southern right whales migrate along the NSW coast and at times may move into embayments.

No area of southern right whales habitat would be modified or removed through abalone harvesting.

d) 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.

Abalone fishing in NSW would not constitute any habitat that would become isolated (see above).

e) Whether a critical habitat will be affected.

No critical habitat for southern right whales has been declared in NSW.

f) 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.

Due to their vast geographical range, it is difficult to provide conservation areas for many cetaceans, particularly large baleen whales such as the southern right whale. Under the EPBC Act, whales are protected within the Australian Whale Sanctuary, which includes all Commonwealth Waters.

g) Whether the action proposed is of a class of action that is recognised as a threatening process.

Activities associated with the NSW Abalone Fishery are not recognised as threatening processes.

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

Southern right whales reportedly occur as far north as the North West Cape of Western Australia and southern Queensland on the East Coast. In practical terms, however, the species does not venture far beyond the NSW Central Coast or Perth (Menkhorst and Knight, 2001), therefore southern right whales could be considered close to the northern limit of their distribution in NSW.

Conclusion: Although the NSW Abalone Fishery may interact occasionally with southern right whales it is unlikely to have significant effects on the species, hence no SIS is recommended. Notwithstanding this, it is recommended that the Fisheries Management Strategy incorporates measures to safeguard against disturbance to this species.

Humpback Whale

(a) In the case of a 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.

The life cycle of humpback whales in the Southern Hemisphere involves feeding and advancement to maturity in the Southern Ocean during the summer months, followed by northward migration during winter to mate and give birth in subtropical and tropical waters (Jefferson *et al.* 1993). The East Coast population of humpbacks migrate along the Victorian, NSW and Queensland coasts to the Coral Sea from late autumn to winter and back along the coast in spring and early summer. During the annual migration, humpbacks swim through NSW coastal areas, and at times enter bays for short periods. Often on the return trip, adults are accompanied by new-born calves and pairs may rest in large embayments such as Jervis Bay and Twofold Bay.

Although abalone vessels may operate in areas where humpback whales migrate through or rest, there would only be a small risk of boat strike and disturbance as pods of humpback whales are obvious and easily avoided. Hence the Abalone Fishery would be unlikely to

disrupt the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

b) *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.*

There is no endangered population of humpback whales listed in NSW.

c) *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.*

Major habitats for humpback whales include the feeding/growth and breeding/mating areas in the south and north of their range, respectively, and the migration corridors which extend at least the width of the continental shelf. In addition, some large embayments such as Jervis Bay and Twofold Bay may be used during migration. Given the large range of the humpback whale compared to the range of the NSW Abalone Fishery, and there would be only minimal disturbance to migrating whales from abalone vessels, it is most unlikely that a significant area of known humpback habitat would be affected by the fishery.

d) *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 major corridors for migrating humpbacks occur on the continental shelves of east and west Australia. The Abalone Fishery would not isolate interconnecting areas of habitat for humpback whales.

e) *Whether a critical habitat will be affected.*

No critical habitat for humpback whales has been declared in NSW.

f) *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.*

As for the southern right whale, humpback whales are protected under the EPBC Act within the Australian Whale Sanctuary.

g) *Whether the action proposed is of a class of action that is recognised as a threatening process.*

Activities within the Abalone Fishery are not recognised as threatening processes.

h) *Whether any threatened species or ecological community is at the limit of its known distribution.*

The distribution of humpback whales is by no means at its limit in NSW, as the population utilises the whole of the east coast of Australia; north to the Coral Sea and south to the Southern Ocean.

Conclusion: Although the NSW Abalone Fishery may interact occasionally with humpback whales it is unlikely to have significant effects on the species, hence no SIS is recommended. Notwithstanding this, it is recommended that the Fisheries Management Strategy incorporates measures to safeguard against disturbance to this species.

Sperm Whale

a) *In the case of a 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.*

The sperm whale (*Physeter macrocephalus*) is the largest cetacean to have teeth. Sperm whales are widely distributed in all the oceans of the world. In Australia, sperm whales have been

recorded in all states and are considered the most abundant of the great whales (Menkhorst and Knight, 2001). This species travels slowly when at the surface and can descend to 3000 m. As the whales rarely come close to the coast, the NSW Abalone Fishery is unlikely to disrupt the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

b) *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.*

There are no endangered populations of sperm whales listed in NSW.

c) *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.*

No sperm whale habitat would be removed or modified by the Abalone Fishery.

d) *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.*

Sperm whales occur mostly on the edge of the continental shelves of east and west Australia. The Abalone Fishery would not isolate any areas of habitat for sperm whales.

e) *Whether a critical habitat will be affected.*

No critical habitat for sperm whales has been declared in NSW.

f) *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.*

As for the southern right whale and humpback whales, sperm whales are also protected under the TSC Act in NSW and within the Australian Whale Sanctuary.

g) *Whether the action proposed is of a class of action that is recognised as a threatening process.*

No activities associated with the Abalone Fishery in NSW are recognised as a threatening process.

h) *Whether any threatened species or ecological community is at the limit of its known distribution.*

The distribution of sperm whales is by no means at its limit within NSW. Sperm whales are widely distributed in all the oceans of the world. In Australia sperm whales have been recorded in all states (Menkhorst and Knight 2001).

Conclusion: The NSW Abalone Fishery would rarely interact with sperm whales, if ever, and hence is unlikely to have significant effects on the species. No SIS is recommended.

Dugong

a) *In the case of a 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 Australia, dugongs (*Dugong dugon*) swim in the shallow coastal waters of northern Australia where they find protection from large waves and storms. Dugongs surface only to breathe. They like to live in large herds, but due to declining numbers are often now found in smaller "family" groups of between one to three dugongs.

The largest remaining dugong population in the world, in 1991 was the northern Australian population, which was estimated at approximately 70,000 with 12,500 in the Torres Straits

and 1,700 in the northern Great Barrier Reef (Internet Reference 4). Dugongs observed in NSW are thought to be non-breeding vagrants.

Dugongs are protected in Australia, but can be hunted by Aborigines for traditional purposes. Dugongs only live where there is seagrass, on which they feed. These shallow habitats make dugongs susceptible to vessel strikes.

As dugongs rarely occur in NSW it is unlikely that the life cycle of this species is disrupted so that a viable population is placed at risk of extinction.

b) 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.

No endangered population of dugongs has been listed in NSW.

c) 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.

Dugongs have been reported feeding in seagrass beds of the North Coast of NSW. Mating and birthing areas are normally in northern Australian waters between Shark Bay in Western Australia and Moreton Bay in Queensland.

Abalone harvesting does not occur on seagrass beds and no area of the dugong habitat would be modified or removed through abalone fishing.

d) 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.

Abalone fishing within NSW would not lead to any habitat becoming isolated

e) Whether a critical habitat will be affected.

No critical habitat for dugongs has been declared in NSW.

f) 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.

Dugongs in NSW are considered to be non-breeding vagrants. Seagrass habitats (i.e. the food source of dugongs) are protected in NSW. The species has been sighted around Byron Bay Marine Park on the NSW North Coast (Internet Reference 5).

g) Whether the action proposed is of a class of action that is recognised as a threatening process.

No activities associated with the NSW Abalone Fishery are recognised as a threatening process.

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

Dugongs occur in sheltered coastal seas of mainly Northern Australia and Torres Strait, from Shark Bay in Western Australia to Moreton Bay and South East Queensland. Vagrants have been recorded in NSW (Internet Reference 4), which may be considered to represent the extreme southern limit of its distribution.

Conclusion: Although the NSW Abalone Fishery may interact occasionally with dugongs it is unlikely to have significant effects on the species, hence no SIS is recommended. Notwithstanding this, it is recommended that the Fisheries Management Strategy incorporates measures to safeguard against disturbance to this species.

Australian fur seal

a) In the case of a 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.

Australian fur seals (*Arctocephalus pusillus doriferus*) are coastal mammals that range from the continental slope and shelf waters of Victoria, Tasmania and NSW. Australian fur seals eat pelagic and mid-water fish and cephalopods and can dive to approximately 200 m whilst chasing food. They breed on 10 islands in the Bass Strait. Pregnant females return to colonies in late October /early November to give birth to a single pup (Menkhorst and Knight, 2001). Pregnant females feed intensively at sea in early spring before returning to give birth. Australian fur seals are reported to have bred in the past in NSW (prior to commercial sealing) at Seal Rocks and Montague Is but they no longer do so. There are other non-breeding colonies between Kangaroo Island in South Australia and Jervis Bay in NSW. These are Green Cape, Montague Is and Steamers Beach near Jervis Bay. In addition, other various locations along the NSW coast are used irregularly as haul-out sites (Smith 2001). Although the species no longer breeds in NSW, habitat and resources within the state remain important to non-breeding individuals.

Fisheries can affect seals by competing with seals for prey, by entangling them in fishing gear and because of the noise and visual disturbance associated with fishing operations (Shaughnessy 1999). As seals are not known to prey upon abalone and there is no potential for entanglement of seals in abalone fishing gear, the potential threat to seals from abalone diving comes only from associated noise and visual disturbance. Disturbance from vessels is known to cause seals on rocks to flee to sea. This can be disruptive during the breeding season and pups may be squashed by adults in the process (Shaughnessy 1999). As no breeding colonies occur in NSW, however, this is not considered a problem.

As such, although abalone divers may work adjacent to non-breeding colonies of Australian fur seals on occasion (i.e. colonies at Green Cape, Montague Is and Jervis Bay), it is considered that disturbance to the seals is minor and would not disrupt the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

b) 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.

No endangered population of Australian fur seals is listed in NSW.

c) 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.

Abalone fishing is relatively benign and is not considered to remove or modify any known Australian fur seal habitat.

d) 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.

Abalone fishing in NSW would not cause any area of fur seal habitat to become isolated.

e) Whether a critical habitat will be affected.

No critical habitat for the Australian fur seal has been declared in NSW.

f) 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.

Fur seals occur within Jervis Bay Marine Park (Menkhorst and Knight, 2001) and Montague Is Nature Reserve.

g) Whether the action proposed is of a class of action that is recognised as a threatening process.

Activities associated with the NSW Abalone Fishery are not recognised as threatening processes in NSW.

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

Australian fur seals are at the northern limit of their distribution at the north coast of NSW but the majority of operations in the Abalone Fishery occur predominantly on the south coast of NSW.

Conclusion: The NSW Abalone Fishery is unlikely to have significant effects on Australian fur seals, hence no SIS is recommended. However, as there is some potential for abalone fishing vessels and associated noise to cause minor disturbance to individuals and colonies of Australian fur seals it is recommended that this be considered in the Fisheries Management Strategy.

New Zealand fur seal

a) In the case of a 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.

New Zealand fur seals (*Arctocephalus pusillus doriferus*) are coastal mammals that occur in Australian and New Zealand waters. In Australian waters, New Zealand fur seals have been recorded in all of the southern states as well as in Queensland (south of Fraser Is). It eats fish and cephalopods and to a lesser extent on birds such as penguins, both in shallow waters and around the margins of the continental shelf. In Australia, breeding colonies are known from islands off WA, SA and Tasmania, including Macquarie Is. Although the species does not breed in NSW, habitat and resources within the state remain important to non-breeding individuals. Montague Is is a regular haul-out site in NSW (Shaughnessy *et al.* 2001), although other infrequently used sites have been recorded along the NSW coast.

Fisheries can affect seals by competing with seals for prey, by entangling them in fishing gear and because of the noise and visual disturbance associated with fishing operations (Shaughnessy 1999). As seals are not known to prey upon abalone and there is no potential for entanglement of seals in abalone fishing gear, the potential threat to seals from abalone diving comes only from associated noise and visual disturbance. Disturbance from vessels is known to cause seals on rocks to flee to sea. This can be disruptive during the breeding season and pups may be squashed by adults in the process (Shaughnessy 1999). As no breeding colonies of New Zealand fur seals occur in NSW, however, this is not considered a problem.

As such, although abalone divers may work adjacent to haul out sites of New Zealand fur seals on occasion (i.e. Montague Is), it is considered that disturbance to the seals is minor and would not disrupt the life cycle of this species such that a viable local population of the species is likely to be placed at risk of extinction.

b) 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.

No endangered population of New Zealand fur seals is listed in NSW.

c) *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.*

Abalone fishing is not considered to remove or modify any known New Zealand fur seal habitat.

d) *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.*

Abalone fishing in NSW would not cause any area of fur seal habitat to become isolated.

e) *Whether a critical habitat will be affected.*

No critical habitat for the New Zealand fur seal has been declared in NSW.

f) *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.*

The largest haul-out site for New Zealand fur seals in NSW occurs within Montague Is Nature Reserve (Menkhorst and Knight, 2001).

g) *Whether the action proposed is of a class of action that is recognised as a threatening process.*

Activities associated with the NSW Abalone Fishery are not recognised as threatening processes in NSW.

h) *Whether any threatened species or ecological community is at the limit of its known distribution.*

New Zealand fur seals in NSW are not at the northern limit of their distribution, which extends to Queensland.

Conclusion: The NSW Abalone Fishery is unlikely to have significant effects on in New Zealand fur seals, hence no SIS is recommended. However, as there is some potential for abalone fishing vessels and associated noise to cause minor disturbance to individuals and colonies of New Zealand fur seals it is recommended that this be considered in the Fisheries Management Strategy.

Eight-Part Tests for Scheduled Fish

Grey Nurse Shark

a) *In the case of a 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.*

Grey nurse sharks (*Carcharias taurus*) typically occur on shallow rocky reefs along the NSW coast (Last and Stevens 1994) although there have been reports in the past of grey nurses occasionally occurring in embayments. Young are born live and also occur on shallow rocky reefs, often segregated from the adults. Grey nurse shark populations have declined worldwide. In Australia, the grey nurse shark is now restricted to two populations; one on the east coast from southern Queensland to southern NSW and the other around the south west coast of Western Australia.

The grey nurse shark population in eastern Australia is under serious threat. Its abundance in NSW and QLD waters declined dramatically prior to 1984 because it was killed in large numbers by hook and line, and spear fishing. Since then numbers have not recovered despite being protected and they have continued to die mainly as a result of accidental catch by: hook and line fishers; in bather protection nets; and due to illegal fishing and spear

fishing. Recent surveys indicate that the grey nurse shark population in NSW is between 300 and 500 individuals and there are serious concerns that without proper protection the species may become extinct within the next 40 years (Internet Reference 6).

In NSW, grey nurse sharks are often found in daylight aggregating at a small number of sites relatively close to the shore. As these specific sites appear to be important areas to the sharks, many of them have been given protection status, so that some forms of fishing are no longer permitted and divers must follow rules to prevent the disturbance of grey nurse sharks (see also (e and f)). A small number of these recognised grey nurse shark aggregation sites overlap with, or are nearby to, areas where abalone diving occurs (i.e. Brush Island near Ulladulla, Montague Is and Tollgate Islands). Abalone divers may occasionally swim through these sites while searching for abalone or moving between areas. As such, there is some potential for abalone divers to disturb grey nurse sharks.

Grey nurse sharks may alter their behaviour in the presence of divers (Hayward 2003). Changes to behaviour depend on how close divers come to the sharks, with sharks exhibiting more active behaviour when divers come within 4 m of sharks (Hayward 2003). There is no evidence, however, that the presence of divers affect the numbers of sharks over time at aggregations (Hayward 2003).

As abalone divers would only occasionally pass through recognised grey nurse shark aggregation sites and there is no evidence that divers affect the numbers of sharks at such aggregations, it is considered that the life cycle of the species is unlikely to be disrupted such that a viable local population of the species is likely to be placed at risk of extinction.

b) 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.

Under both the EPBC and FM Acts, the whole population of grey nurse sharks in eastern Australia is considered to be endangered. As described above in (a), abalone divers are likely to interact with grey nurse sharks at only the three southern known aggregation sites and only occasionally. Further, the work by Hayward (2003) indicates that divers are likely to have a negligible effect on grey nurse sharks. As such, it is most unlikely that the Abalone Fishery would compromise the endangered east coast population.

c) 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 major habitat utilised by grey nurse sharks comprises rocky reefs, with small sandy gutters within the reef matrix being often preferred microhabitat. There is some likelihood that the species ranges away from reefs to feed at night, but the extent of this range is unknown. Moreover, no areas of grey nurse shark habitat are to be modified or removed by abalone divers.

d) 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.

There is some likelihood that grey nurse sharks migrate along the NSW coast. Since abalone fishing is not likely to result in any appreciable impact on grey nurse shark habitat, however, there is no potential for it cause isolation of any grey nurse shark habitat or for it to restrict migration.

e) Whether a critical habitat will be affected.

Many of the known aggregation sites for grey nurse sharks in the eastern Australian population have been declared critical habitat for the species and are protected by legislation administered by DPI. As noted in (a), some of these sites would be visited on occasion by abalone divers. Abalone diving, however, has very little potential to alter the critical habitat of grey nurse sharks as hand-gathering of abalone has very little effect on other biota or the environment. Therefore, although the critical habitat for grey nurse sharks would be affected by the fishery, the effect would be negligible.

f) 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.

Grey nurse sharks are protected from all forms of fishing. They occur within the Jervis Bay and Solitary Islands Marine Parks and are protected at ten (critical habitat) sites that span the range of the species distribution in NSW. The current review of grey nurse shark protection may also add to the areas listed as critical habitat. Given their potential mobility, however, it is unlikely that grey nurse populations are confined to the relatively small spatial scale of these reserves. Notwithstanding this, the species is represented within conservation areas and its protected status provides it with a broad level of protection within NSW waters.

g) Whether the action proposed is of a class of action that is recognised as a threatening process.

Activities associated with the commercial Abalone Fishery are not recognised as threatening processes.

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

Grey nurse sharks occur along the NSW coast and extend into southern Queensland and northern Victoria. They also occur in Western Australia and several other parts of the world (e.g. South Africa). The species is therefore not at the limit of its known distribution within NSW.

Conclusion: Abalone can be taken in many of the designated critical habitats for grey nurse sharks but the effect would be negligible as hand-gathering of abalone has very little effect on other biota or the environment. Overall, the Abalone Fishery is unlikely to have a significant effect on grey nurse sharks; hence no SIS is required for this species. However, as there is some potential for abalone divers to interact with grey nurse sharks at some areas where sharks are known to aggregate it is recommended that this be considered in the Fisheries Management Strategy.

Great White Shark

(a) In the case of a 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.

Great white sharks are large, predatory animals whose life cycle is poorly understood. They occur from cold temperate to tropical waters worldwide and generally frequent coastal waters, often close to shore. Great white sharks are live bearers and do not generally appear to be attached to specific habitats. The exception is when they take up residence adjacent to rocky shores, particularly where seals or sea lions are present. Hence, they potentially occur in the same habitat where abalone divers work, although encounters are rare. Emerging evidence suggests that both juveniles and adults can be wide ranging, with one tagged individual moving from Tasmania along the NSW coast into southern Queensland. There is also anecdotal evidence that the species follow large schools of migrating fish (e.g. sea

mullet, Australian salmon) and migrating whales, particularly with calves (The Ecology Lab, 2002).

Based on our limited knowledge of the life cycle of the species, it is most unlikely that the Abalone Fishery would affect great white sharks so that a viable local population is placed at risk of extinction.

(b) 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.

There are no endangered populations of great white sharks listed in NSW.

(c) 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.

If great white sharks do prefer a particular habitat, it is likely to be rocky shores with seals or sea lions and this type of habitat would not be modified or removed by the Abalone Fishery. The sharks may also follow schools of fish along the coast, but any disruption of schools due to abalone boats would be minor in comparison with other boating activities.

(d) 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.

No habitat for great white sharks is likely to become isolated due to the Abalone Fishery.

(e) Whether a critical habitat will be affected.

No critical habitat for great white sharks has been declared in NSW.

(f) 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.

No aquatic reserves in NSW have been established specifically to protect Great White Sharks. Given the huge range of this species, it is difficult to manage its conservation using marine reserves.

(g) Whether the action proposed is of a class of action that is recognised as a threatening process.

No activities associated with the NSW commercial Abalone Fishery are recognised as threatening processes.

(h) Whether any threatened species or ecological community is at the limit of its known distribution.

As this species ranges throughout coastal NSW and throughout all the oceans of the world, it is clearly not at the limit of its distribution when within the are of operation of the Abalone Fishery.

Conclusion: The Abalone Fishery is most unlikely to affect great white sharks, hence no SIS is required, nor should the fishery be modified with respect to conservation of this species

Whale Shark

(a) In the case of a 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.

The whale shark (*Rhincodon typus*) is closely related to the bottom-dwelling sharks, which include the wobbegong. It is a filter-feeding shark feeding on minute organisms including krill, crab larvae and jellyfish. It is at present not known where whale sharks breed (Internet

Reference 7). There have been very few juvenile whale sharks seen at any location throughout their range. Australia is one of the most reliable locations to find whale sharks; regular sightings have also been recorded from many other regions including India, the Maldives, South Africa, Belize, Mexico, the Galapagos Islands, Southeast Asia and Indonesia. Few sightings have been made in NSW, particularly close to the coast where the Abalone Fishery operates.

Due to its vast distribution and rare sightings in NSW it is unlikely that the Abalone Fishery would disrupt the life cycle so that a viable local population is at risk of extinction.

(b) 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.

There are no endangered populations of whale sharks listed in NSW.

(c) 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 NSW commercial Abalone Fishery would not modify and remove any known habitat and the sharks are likely to move away if disturbed by fishing vessels.

(d) 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.

No area of known whale shark habitat is likely to become isolated due to the Abalone Fishery.

(e) Whether a critical habitat will be affected.

No critical habitat for whale sharks has been declared in NSW.

(f) 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.

Given the huge range of this species, it is difficult to manage its conservation using conservation reserves. However, the whale sharks are identified as migratory species in the EPBC Act, 1999. The whale shark is listed on the Bonn Convention for the Conservation of Migratory Species. This identifies the whale shark as a species whose conservation status would benefit from the implementation of international agreements. Australia has nominated the whale shark on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendix II (Internet Ref 7).

(g) Whether the action proposed is of a class of action that is recognised as a threatening process.

Activities associated with the NSW commercial Abalone Fishery is not recognised as a threatening process with respect to whale sharks.

(h) Whether any threatened species or ecological community is at the limit of its known distribution.

As this species has a broad distribution in tropical and warm temperate seas, usually between latitudes 30°N and 35°S it is not considered at the limit of its distribution when within the Abalone Fishery zones.

Conclusion: The Abalone Fishery is most unlikely to affect whale sharks, hence no SIS is required, nor should the fishery be modified with respect to conservation of this species.

Green Sawfish

a) In the case of a 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.

Green sawfish occur in shallow, sedimentary marine habitats. The species occurs from the northern Indian Ocean and south-eastern Africa, through Indonesia and tropical Australia (Last and Stevens 1994). It occurs as far south as Sydney on the East Coast, with one record from South Australia. If there were sawfish within the NSW abalone grounds, some individuals may be disturbed, but it is unlikely that it would cause local extinctions. Green sawfish would be able to swim away if disturbed.

b) 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.

No endangered population of green sawfish has been listed in NSW.

c) 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.

Green sawfish occur over a large geographical range and appear to have relatively broad habitat requirements. Habitat of green sawfish is unlikely to be modified or removed by abalone vessels and divers.

d) 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.

Abalone fishing would not isolate any areas of habitat.

e) Whether a critical habitat will be affected.

No critical habitat for green sawfish has been declared in NSW.

f) 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.

Broadly, green sawfish populations would be provided with some protection within parts of the Great Barrier Reef Marine Park and possibly some of the shoreline sections of the Solitary Islands Marine Park. More locally, there is an abundance of shallow, sandy habitat within the Towra Point Aquatic Reserve and Jervis Bay Marine Park. Therefore, it is likely that green sawfish have the potential to be well represented in protected areas, although the extent to which they are abundant and protected is unknown.

g) Whether the action proposed is of a class of action that is recognised as a threatening process.

None of the activities associated with abalone fishing are recognised as threatening processes.

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

The core distribution of green sawfish is within tropical and sub-tropical waters, extending into the warm temperate. Any green sawfish occurring in Eden would be at the limit of their distribution.

Conclusion: The fishing of abalone within coastal NSW may cause some localised disturbance to green sawfish, but they are highly mobile species and can move away from any short term disturbance, hence no SIS or any special management measures are recommended.

Black Cod

a) In the case of a 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.

Black cod, also known as black rockcod and saddled rockcod, occur from southern Queensland to Kangaroo Island (South Australia) as well as Lord Howe Island, Norfolk Island, Kermadec islands and the North Island of New Zealand (Heemstra and Randall 1993). They occur on relatively shallow coastal and estuarine rocky reefs. Juveniles may recruit to rock pools; adults are highly territorial, usually adopting a cave as a core territory. The life cycle of the species revolves around rocky reefs and possibly rock pools with pelagic dispersal of eggs and larvae.

Within NSW, it is likely that there would be black cod occurring on natural reef and on artificial breakwaters and rock walls. Individuals are often sighted by recreational divers on coastal headlands. Therefore, there is likely to be some interaction between abalone divers and this species. It is considered most unlikely, however, that the life cycle of the species would be disrupted such that a viable local population would be placed at risk. This is because abalone divers would only temporarily disturb individuals, which could easily swim away or hide in caves.

b) 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.

No endangered population of black cod is listed in NSW.

c) 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.

No extensive areas of natural rocky reef suitable for black cod to inhabit would be added, or removed or otherwise modified by abalone fishing.

d) 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.

No area of habitat for black rock cod is likely to become isolated as a result of the activities of the Abalone Fishery.

e) Whether a critical habitat will be affected.

No critical habitat for black cod has been declared in NSW.

f) 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.

In NSW Black cod are completely protected from fishing, which is the main threat to this species. There are numerous protected areas for the species, including aquatic reserves at Bushrangers Bay (Illawarra), Ship Rock (Pt Hacking), Middle Harbour Aquatic Reserve (Sydney), Fly Point and Halifax Park (Pt Stephens), Jervis Bay Marine Park, Solitary Islands Marine Park and Lord Howe Island.

g) Whether the action proposed is of a class of action that is recognised as a threatening process.

No activities associated with abalone fishing are listed as key threatening processes.

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

Black cod occurs from Southern Queensland to South Australia and therefore is not at the limit of its range in NSW.

Conclusion: Although abalone divers would occasionally interact with this species, disturbance would be minimal. Hence, no SIS is recommended, nor any special management required.

Eight-Part Tests for Scheduled Birds

Sooty Oystercatcher

a) In the case of a 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.

Sooty oystercatchers live on the coast all around Australia but are concentrated in areas such as the Bass Strait Islands and the Illawarra. The Southern Ocean Seabird Association (SOSSA) has been studying sooty oystercatchers in NSW for the last 20 years and estimates the total population to be between 200 and 300 individuals. Sooty Oystercatchers feed on the intertidal area of large basaltic rock platforms that offer a range of food items such as limpets, chitons, cunjevoi (sea squirts), mussels. They roost in adjacent areas above the high tide mark.

The species nests on offshore islands that are free from predators such as foxes, cats, dogs and people. Important breeding sites for sooty oystercatchers on the south coast of NSW are the Five Islands off Port Kembla, Bowen Island in Jervis Bay, Brush and Belowla Island off Kioloa and the Tollgate Islands at Batemans Bay (Internet Reference 8). Abalone vessels may operate close to shore on these islands but it is unlikely that this would adversely affect sooty oystercatchers, as disturbance would be minimal compared to general recreational boating traffic. Hence, it is unlikely that the Abalone Fishery, which targets subtidal abalone would disrupt the life cycle of these species.

b) 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.

There are no endangered populations of sooty oystercatchers listed in NSW.

c) 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 Abalone Fishery would not modify or remove any area of known habitat of the sooty oystercatcher.

d) 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.

Abalone fishing is unlikely to isolate any areas of habitat for this species.

e) Whether a critical habitat will be affected.

No critical habitat for the sooty oyster catcher has been declared in NSW.

f) 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.

The sooty oystercatcher is protected in a species is potentially benefiting from protection within the Jervis Bay Marine Park. NSW National Parks and Wildlife Service have recorded sightings of three birds in the Marine Park (Internet Reference 9). Some of the offshore islands on which the species breeds are protected from disturbance.

g) Whether the action proposed is of a class of action that is recognised as a threatening process.

Activities associated with the Abalone Fishery are not recognised as threatening processes.

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

The sooty oystercatcher occurs from northern Australia to Tasmania and South Australia and is not at the limit of its distribution in NSW.

Conclusion: The Abalone Fishery is unlikely to have any effect on sooty oyster catchers, hence no SIS is recommended, and no special management measures are required.

APPENDIX D

APPENDIX D1. IMPLEMENTATION TABLES FOR MANAGEMENT RESPONSES FOR THE ABALONE FISHERY

The following implementation tables outline the time periods within which each management response is to be implemented. The table also provides information for who has the responsibility for carrying out the action(s). A general description of the terms used in the table with respect to timeframes is as follows.

Term	Description
Immediate	Upon the date of approval of the strategy
Short term	Within 12 months of the date of approval of the strategy
Medium term	Within 3 years of the date of approval of the strategy
Long term	In excess of 3 years of the date of approval of the strategy
As required	Whenever the circumstances warrant action
Ongoing	Continuing into the future

Where an implementation date (e.g. a particular month) has been included for a management response instead of the terms above, the date represents a specific target time within which the management response is to be implemented.

Goal 1: Manage commercial harvesting of abalone to promote the conservation of biological diversity in the coastal environment.				
OBJECTIVES	MANAGEMENT RESPONSES	CONTRIBUTE TO GOALS	TIMEFRAME	RESPONSIBILITY
1.1 Increase knowledge and minimise any adverse impacts of harvesting abalone on bycatch species, associated habitats and ecosystems.	a) Continue to develop and implement a program to increase knowledge of the effects of abalone harvesting on bycatch species and associated habitat and ecosystems.	1, 2, 5, 6	Medium term and then ongoing	Shareholders, DPI Other Institutions
	b) Develop and implement a NSW Abalone Fishery Code of Practice to minimise the impact of harvesting abalone on bycatch species, associated habitats and ecosystems	1, 2, 5, 6	Short term	Shareholders
	b) Implement, in consultation with the ABMAC, the provisions of any relevant threatened species recovery plan, threat abatement plan, or other similar management arrangements designed to protect critical habitat areas.	1, 6	As required	DPI Shareholders

Goal 2: Maintain or rebuild the biomass of abalone to ensure stock sustainability.				
OBJECTIVES	MANAGEMENT RESPONSES	CONTRIBUTE TO GOALS	TIMEFRAME	RESPONSIBILITY
2.1 To maintain the spawning and exploitable biomass of abalone at or above the level observed in 1994.	a) Continue to implement a state-wide TACC for abalone, determined by the TAC Committee, and develop a more complete harvest strategy for the fishery.	1, 2, 4, 5, 8	Ongoing	Shareholders DPI
	b) Continue to apply the state-wide minimum legal size of 115 mm.	1, 2, 4, 5	Ongoing	Shareholders DPI
	c) Continue the collection of fishery-dependent information to contribute to the abalone stock assessment.	1, 2, 4, 5	Ongoing	DPI
	d) Continue the collection of fishery-independent information to contribute to the abalone stock assessment.	1, 2, 4, 5	Ongoing	DPI
	e) Continue an annual stock assessment of the abalone resource.	1, 2, 4, 5	Ongoing	DPI

2.2. To improve the efficiency of harvesting and investigate the potential of techniques to rebuild populations of abalone.	a) Develop a plan to investigate the feasibility of implementing different size limits on a variety of spatial and temporal scales, with provision to implement longer term actions.	1, 2, 4, 5	Medium term	Shareholders DPI
	b) [Note: A management response to manage the spatial distribution of fishing effort is to be inserted into the final FMS in accordance with the determination made by the Minister for Fisheries in response to the associated EIS for this designated fishing activity].	[To be added]	[To be added]	[To be added]
	c) Develop and implement a framework for closing and re-opening areas to commercial abalone harvesting.	1, 2, 4, 6	Short term	Shareholders DPI
	d) Implement reseeding experiments in up to 1% of reef in water depths of less than 20 m in NSW waters.	1, 2, 4, 6	As required	Shareholders DPI
	e) Implement experiments on the effects of translocating abalone within 1 km distances, in up to 1% of reef in water depths of less than 20 m in NSW waters.	1, 2, 4, 6	As required	Shareholders DPI
	f) Continue to investigate the potential and effects of restoring abalone populations through sea urchin harvesting in up to 1% of reef in water depths of less than 20 m in NSW waters.	1, 2, 4, 6	As required	Shareholders DPI
	g) Develop a mechanism for industry to determine the use of a seasonal closure on an annual basis	1, 2, 4, 6	Short term	Shareholders DPI
2.3. To address impacts from factors external to the commercial Abalone Fishery.	a) Develop a program to manage marine pests and diseases affecting abalone, with initial priority to address <i>Perkinsus</i> , and implement in consultation with ABMAC any measures required in accordance with marine pest or disease management plans.	1, 2, 4, 6, 8	Short term	Shareholders DPI
	b) Continue to support initiatives to refine estimates of the total catch of abalone, including commercial, recreational, Indigenous and illegal catches, for use in stock assessment models and reports to the TAC Committee.	1, 2, 4, 5, 6, 8	Ongoing	Shareholders DPI
	c) ABMAC will provide advice on the development and ongoing management of Marine Protected Areas, including proposed zoning arrangements.	1, 2, 4, 6, 8	As required	Shareholders
	d) ABMAC will provide advice on proposed aquaculture developments in NSW that have the potential to affect wild populations of abalone.	1, 2, 4, 6, 8	As required	Shareholders
	e) Continue to communicate with Government and other stakeholders about external factors that have the potential to affect abalone populations, with the aim of minimising such effects.	1, 2, 4, 6, 8	As required	Shareholders
	f) Develop a strategic plan for the management of the current closure within Region 1 and all areas of the fishery affected by <i>Perkinsus</i> .	1, 2, 4, 6, 8	Short term	Shareholders DPI

Goal 3: Facilitate effective management arrangements and provision of an efficient fisheries management service.				
OBJECTIVES	MANAGEMENT RESPONSES	CONTRIBUTE TO GOALS	TIMEFRAME	RESPONSIBILITY
3.1 To facilitate the delivery of effective and efficient management services.	a) Undertake an independent review of the application of established cost recovery principles to the Abalone Share Management Fishery and implement the approved outcomes.	3, 4	Short term to commence; complete within 2 years	Shareholders DPI
	b) Continue to refine the delivery of specific management services and standards through service delivery agreements or outsourcing regarding research, administration and compliance.	1, 2, 3, 4, 6, 7, 8	Short term and then ongoing	DPI Shareholders
	c) On request by the Abalone Management Advisory Committee, undertake independent performance reviews of the services delivered by DPI under service agreements or other service providers under contract.	3, 4	As required	DPI Shareholders
	d) Develop and implement a nominated diver's card system to facilitate the efficient use of nominated divers.	3, 4	Medium term	DPI
	e) Adopt technological improvements in the catch reporting system that are cost effective and result in the earlier receipt of catch and effort data.	3, 4	Ongoing	DPI Shareholders
	f) Communicate the Department's operational plans and policies for the management of the fishery to all fishery participants.	3, 7, 8	Short term and then ongoing	DPI

Goal 4: To promote the economic viability of the fishery.				
OBJECTIVES	MANAGEMENT RESPONSES	CONTRIBUTE TO GOALS	TIMEFRAME	RESPONSIBILITY
4.1 To promote the long term economic viability of commercial abalone fishing.	a) Refine the performance indicators for monitoring trends in the commercial viability of typical abalone fishing businesses so as to be based on net returns.	4, 5	Medium term	Shareholders DPI
	b) [Note: A management response to manage the number of divers is to be inserted into the final FMS in accordance with the determination made by the Minister for Fisheries in response to the associated EIS for this designated fishing activity].	[To be added]	[To be added]	[To be added]
	c) Develop formal strategies to plan for and adapt to the effects of environmental and economic fluctuations on the fishery.	2, 4, 5	Medium term	Shareholders DPI
	d) Revise the minimum level for trading abalone shares to one share.	4, 5	Short term	DPI
4.2 To increase the appropriate level of ownership capacity in the fishery.	a) Remove the shareholding aggregation limit.	4, 5	Short term	DPI

Goal 5: To appropriately share the resource and harvest abalone in a manner that minimises negative social and economic impacts.				
OBJECTIVES	MANAGEMENT RESPONSES	CONTRIBUTE TO GOALS	TIMEFRAME	RESPONSIBILITY
5.1 Mitigate negative impacts of the Abalone Fishery on Aboriginal cultural heritage.	a) Manage the Abalone Fishery in a manner consistent with the Indigenous Fisheries Strategy and Implementation Plan and participate in any review of that Strategy.	5, 8	Ongoing	Shareholders
	b) To raise the awareness of commercial abalone divers about the traditional value of abalone to Aboriginal people and the way that this traditional value is reflected in contemporary Indigenous communities.	5	Ongoing	Shareholders
5.2 To minimise any negative impacts of the Abalone Fishery on Indigenous and European cultural items in the vicinity of abalone harvesting areas.	a) Ensure that abalone divers are aware of and take into account any information about areas or items of cultural significance that may be affected by their activities.	1, 5, 8	Ongoing	Shareholders
	b) Respond, where relevant, to new information about areas or items of cultural significance in order to minimise the risk from abalone harvesting activities	1, 5, 8	As required	Shareholders

Goal 6: Facilitate appropriate research and monitoring of the Abalone Fishery.				
OBJECTIVES	MANAGEMENT RESPONSES	CONTRIBUTE TO GOALS	TIMEFRAME	RESPONSIBILITY
6.1 To collect information on the Abalone Fishery and the environment on which it operates in a timely manner.	a) Continue to implement an integrated monitoring and research program involving both fishery independent research and joint industry/government initiatives, and update as necessary.	1, 2, 3, 4, 6, 8	Ongoing	DPI Shareholders
	b) Develop and implement a method of estimating the rate of disturbance of undersize abalone.	2, 4, 6	Medium term	DPI Shareholders
6.2 To keep informed of research and management initiatives in other jurisdictions.	a) Maintain good communication links with abalone researchers, managers, compliance officers and industry bodies nationally and internationally.	1, 6	Ongoing	DPI

Goal 7: Achieve a high level of compliance within the Abalone Fishery.				
OBJECTIVES	MANAGEMENT RESPONSES	CONTRIBUTE TO GOALS	TIMEFRAME	RESPONSIBILITY
7.1 Promote a high level of compliance in the fishery.	a) Continue to implement and review, in consultation with ABMAC and key stakeholders, the compliance strategic plan and update where appropriate.	1, 2, 4, 5, 7	Immediate and then Ongoing	Shareholders DPI
	b) Develop a cost-effective system for divers to report the planned location of their fishing activity.	2, 4, 5, 7	Short term	DPI Shareholders
7.2 To ensure that commercial abalone shareholders, divers, crew and receivers comply with the rules for the fishery.	a) Continue compliance and enforcement measures applicable to operators in the commercial fishery.	1, 2, 4, 5, 7	Ongoing	DPI
	b) Extend the fit and proper persons requirements applicable to abalone crew to abalone divers, shareholders and receivers.	1, 2, 4, 5, 7, 8	Short term	Shareholders DPI
	c) Require processors of abalone harvested from the fishery to record the number of abalone handled (in addition to weight) on the prescribed record keeping form(s).	1, 2, 4, 5, 7, 8	Short term	DPI
	d) Develop and implement a mechanism to apply temporary bans on receivers, wholesalers and retailers (including individuals and business entities) if they are caught in possession of abalone without the appropriate documentation.	1, 2, 4, 5, 7	Medium term	DPI
	e) Participate in the development and implementation a of training and accreditation scheme for commercial fishers.	1, 2, 4, 5, 7, 8	Medium term	Shareholders
7.3 To continue to minimise the illegal catch of abalone.	a) Design and implement an industry communication program to assist in preventing illegal catch.	2, 5, 7	Medium term and then ongoing	Shareholders
	b) Examine the costs and benefits of increasing effective enforcement to reduce illegal catch and assist in maintaining the fishery biomass relative to other stock rebuilding measures.	2, 4, 7	Medium term	Shareholders DPI
	c) Continue implementation of the National Docketing System for abalone product in consultation with ABMAC and abalone processors.	2, 3, 4, 7	Short term and then Ongoing	DPI

Goal 8: Ensure adequate stakeholder involvement and community consultation.				
OBJECTIVES	MANAGEMENT RESPONSES	CONTRIBUTE TO GOALS	TIMEFRAME	RESPONSIBILITY
8.1 To ensure the Abalone Management Advisory Committee communicates effectively with shareholders, other industry sectors and other stakeholders.	a) Continue the development of the MAC and industry networking process to improve the effectiveness of consultation, including the appointment of an independent chairperson and examination of improved communication methods.	3, 4, 5, 8	Ongoing	Shareholders
	b) Improve the communication with nominated divers to ensure information from divers is transmitted to management and vice versa	1, 2, 3, 6, 8	Short term	Shareholders
	c) Consult with abalone processors and marketing agencies while developing management policies.	4, 8	As required	DPI
	d) Promote consultation with the Aboriginal community in a culturally appropriate manner.	5, 8	Ongoing	Shareholders
	e) Encourage Aboriginal involvement in the commercial fishery.	5, 8	Ongoing	DPI Shareholders
8.2 To promote community awareness about the importance of habitat and other environmental factors that affect abalone.	a) Communicate information about the habitat (including alienation of reefs), stocks and risks to the fishery from invasive species and disease outbreaks to the community	1, 2, 4	As required	Shareholders
	b) Develop a communication plan regarding human-induced environmental impacts that are likely to adversely effect or alienate abalone populations, habitat or reef	1, 2, 4, 8	Short to medium term	Shareholders

APPENDIX CR1

APPENDIX CR2