



**Australian Government**

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**Department of the Environment and Heritage**

Assessment of the  
**Queensland East Coast Spanish Mackerel Fishery**

October 2004

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This document is an assessment carried out by the Department of the Environment and Heritage of a commercial fishery against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. It forms part of the advice provided to the Minister for the Environment and Heritage on the fishery in relation to decisions under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999*. The views expressed do not necessarily reflect those of the Minister for the Environment and Heritage or the Australian Government.

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# Assessment of the ecological sustainability of management arrangements for the Queensland East Coast Spanish Mackerel Fishery

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## EXECUTIVE SUMMARY

### Background

The Queensland Department of Primary Industries and Fisheries (DPI&F) has submitted a document for assessment under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The draft document *Ecological Assessment of the Queensland East Coast Spanish Mackerel Fishery* (the submission) was received by the Department of the Environment and Heritage (DEH) on 26 May 2004. The submission was released for a thirty-day public comment period that expired on 20 July 2004. One public comment was received. No changes were made to the submission as a result of public comment.

The submission reports on the Queensland East Coast Spanish Mackerel Fishery (ECSMF) against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. The DEH assessment considers the submission, associated documents, public comments and DPI&F response to the comments.

**Table 1: Summary of the Queensland East Coast Spanish Mackerel Fishery**

<b>Area</b>	Waters adjacent to the State of Queensland (Commonwealth and State waters).
<b>Fishery status</b>	The target species is considered fully exploited.
<b>Target Species</b>	Spanish mackerel ( <i>Scomberomorus commerson</i> ).
<b>By-product Species</b>	Low take of non-target species including other species of mackerel ( <i>Scomberomorus spp</i> ), black kingfish ( <i>Rachycentron canadus</i> ), coral trout ( <i>Plectropomus spp</i> ), tropical sharks ( <i>Carcharhinus spp</i> ), dolphinfish ( <i>Coryphaena spp</i> ), various trevally (Family Carangidae) and tuna (Family Scombridae). Due to species based management regimes for Queensland fisheries, catch of non-target spp fall within management regimes for other fisheries.
<b>Gear</b>	Trolling of rigged baitfish and/or artificial lures.
<b>Season</b>	October – November both spawning and fishing peak.
<b>Commercial harvest 2002</b>	700 tonnes of Spanish mackerel.
<b>Value of commercial harvest 2001</b>	Estimated at \$6 M. Whole fish domestic market \$7-10/kg, export \$12/kg.
<b>Recreational harvest</b>	1997 and 1999, 853 and 687 tonnes respectively.
<b>Commercial licences issued 2004</b>	Approximately 300, down by 1,300 (from 2003 to 2004).
<b>Management arrangements</b>	Output controlled from 1 July 2004 through a Total Allowable Commercial Catch (TACC) of 620 tonnes Input controlled through: <ul style="list-style-type: none"> <li>• limited entry;</li> <li>• gear restrictions – maximum of 3 troll lines and six hooks per line per boat;</li> <li>• minimum legal size limit of 75 cm total length (TL); and</li> <li>• area closures.</li> </ul>
<b>Export</b>	Some export to Taiwan.
<b>Bycatch</b>	Bycatch is low, consisting mostly of undersized Spanish mackerel, other mackerel species, black kingfish ( <i>Rachycentron canadus</i> ), dolphinfish ( <i>Coryphaena spp</i> ) and various trevally (Family Scombridae), coral trout ( <i>Plectropomus spp</i> ) and various shark.
<b>Interaction with Threatened Species</b>	Considered very low. Possible interactions with dugongs, cetaceans, seabirds, and marine turtles.

The area of the fishery includes Queensland east coast waters and out to the outer edge of the Australian Exclusive Economic Zone. The fishery is managed by Queensland under an Offshore Constitutional Settlement (OCS) agreement.

The fishery targets Spanish mackerel (*Scomberomorus commerson*) limited by an annual Total Allowable Commercial Catch (TACC) of 620 tonnes. The management of the ECSMF is species based and therefore the fishery does not have a byproduct component per se, as catches of non-target species fall within the management regime of other fisheries. Therefore DEH cannot consider, within the assessment of the ECSMF, that component termed byproduct in the submission. However, the fishing technique is highly selective and therefore the take of non-target species is very limited. Non-target species currently retained are mainly other mackerel species (*Scomberomorus* spp), black kingfish (*Rachycentron canadus*), coral trout (*Plectropomus* spp), tropical sharks (*Carcharhinus* spp), dolphinfish (*Coryphaena* spp), trevally (Family *Carangidae*) and tuna (Family *Scombridae*).

Spanish Mackerel inhabit tropical and subtropical waters of the Indo-West Pacific and are found from South Africa and the Red Sea east to Fiji, Japan and Hong Kong. In Australia it is common in northern tropical and sub-tropical areas south to about 30°S. Research indicates at least three separate stocks in Queensland waters; the east coast stock, the Torres Strait stock and a Gulf of Carpentaria stock. Scientific evidence indicates that several additional distinct stocks exist across the range of Spanish mackerel in Australia. Spanish mackerel is a migratory species with large-scale migrations along the east and west coasts of Australia linked to warm water currents.

Adult fish are epi-pelagic and tend to be found in coral and rocky reef waters or current lines and rarely in depths greater than 100 metres. The species is relatively fast growing recruiting into the main commercial fishery by their second year. Sexual maturity in females usually occurs at about 79 cm fork length (FL), larger than the minimum legal harvest size of approximately 65 cm FL (75 cm total length). Spawning is believed to be concentrated in reef areas east of Ingham (18-20°S latitude) during October and November and it is during this period that a major component of commercial catch takes place.

In 2002, an estimated 700 tonnes of Spanish mackerel were harvested with an approximate value of A\$6 million. The value of whole fish in the domestic market ranges from \$7-10/kg with a small percentage being exported to Taiwan for \$12/kg. Spanish mackerel is marketed both whole and as fillets. Fillets are mainly sold in the northern area of the fishery while whole fish is the preferred product in the south and in export markets.

The fishery began in the 1940s with traditional commercial fishing methods changing relatively little since then. The commercial catch is mostly concentrated in the north while recreational harvest mostly occurs in the south of the State. Standardised data collection started in 1988 with the fishery showing two distinct periods, pre 1997 and post 1997. Pre 1997 the catch oscillated between 350 to 500 tonnes while from 1997 onwards catch and effort have increased with catch between 550 and 700 tonnes. The release of an investment warning for the Coral Reef Fin Fish Fishery (CRFFF) in 1997 may have been the trigger for an increase in effort in the fishery. Stock research has focused on determining an upper catch limit, in the form of a TACC presently set at 620 tonnes (the level of the 2001 commercial catch).

Operators in the northern area of the fishery continue to use traditional troll methods consisting of rigged baitfish and/or artificial lures behind powered dories. The gear usually consists of varying lengths of bowden cable with a wire trace attached to the terminal rig. This set up is preferred by commercial fishermen targeting the large spring spawning aggregations. Lighter and more cryptic monofilament line with shorter lighter wire on rod and reel gears are mostly used in the southern

area of the fishery where aggregations are much smaller and exposed to much higher relative fishing pressures.

The fishery uses gears and methods which are relatively benign and have very high targeting efficiency as Spanish mackerel schools have limited association with other species. These factors would indicate that the level of impact on bycatch and protected species is low. Quantitative and qualitative information on bycatch and protected species interactions is limited but is being addressed through the compulsory logbooks, the Commercial and Recreational Fisheries Information Systems (CFISH and RFISH) and the introduction of the Species of Conservation Interest (SOCI) logbook in 2004.

A number of protected species are found in the area of the fishery and limited evidence to date suggests that interaction with any protected species group is very low. Interactions in this fishery include reports by recreational fishers of incidental hooking of marine turtles and sea snakes. DPI&F has proposed to expand RFISH reporting requirements to ensure similar levels of reporting between commercial and recreational sectors. These interactions are assessed under Principle Two of this report.

The take of Spanish mackerel by Indigenous fishers along the east coast is assumed to be negligible since Indigenous communities have traditionally been more dependent on near shore species as opposed to epi-pelagic species such as Spanish mackerel. In contrast, the take by the recreational sector matches and at times surpasses the take by the commercial sector, with an estimated take of 687 tonnes of Spanish mackerel in 1999. Most of the recreational take is concentrated south of Hervey Bay where anglers on average take 400 tonnes annually.

The fishery is managed under *Fisheries Regulations 1995* and *Fisheries Amendment Regulation (no.3) 2003*, which obtains its authority from the *Queensland Fisheries Act 1994*. The fishery has undergone a major revision of its management regime with new arrangements introduced progressively since 2003 and completed on 1 July 2004 with the introduction of a TACC and the allocation of individual quota units and new reporting requirements.

### **Overall assessment**

The material submitted by DPI&F demonstrates that the management arrangements for the Queensland East Coast Spanish Mackerel Fishery meet most of the requirements of the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*.

While the fishery is relatively well managed, DEH has identified a number of risks that must be managed to ensure that their impacts are minimised and are the basis for recommendations. These include:

- Uncertainty in stock assessments;
- Lack of ongoing robust stock assessment process;
- Lack of ongoing validation of commercial and recreational effort data;
- Lack of performance indicators and measures;
- Inadequate reporting on the status of the fishery; and
- Paucity of information on recreational take.

Recommendations to address these issues have been developed to ensure that the risk of impact is minimised in the longer term. Through the implementation of the recommendations and the continuation of a responsible attitude to the management of the fishery, management arrangements are likely to be sufficiently precautionary and capable of controlling, monitoring and enforcing the level of take from the fishery while ensuring the stocks are fished sustainably.

The ECSMF has made considerable progress in developing sound management arrangements. The management regime aims to ensure that fishing is conducted in a manner that does not lead to over-fishing and for fishing operations to be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem. On balance, the fishery is being managed in an ecologically sustainable manner and is working to address existing problems and minimise environmental risks.

The operation of the fishery is consistent with the objects of Part 13A of the EPBC Act. DEH considers that the fishery will not be detrimental to the survival or conservation status of the taxon to which it relates in the short term. Similarly, it is not likely to threaten any relevant ecosystem in the short term. DEH therefore recommends that the fishery be declared an approved Wildlife Trade Operation (WTO) with the actions specified in the recommendations to be undertaken by DPI&F to contain the environmental risks in the long term. DEH considers that the fishery, as managed in accordance with the management regime is not likely to cause serious or irreversible ecological damage over the period of the export decision. Specifically, the WTO declaration would allow the export of product from the fishery for a period of 3 years. The WTO declaration will require annual reporting on the progress of implementing the recommendations of this report and other managerial commitments. The implementation of the recommendations will be monitored and reviewed as part of the next DEH review of the fishery in 3 years time.

As the official fishery area encompasses Commonwealth as well as State waters, consideration under Part 13 of the EPBC Act is required regarding the impact of the fishery on listed threatened species, listed migratory species, cetaceans and listed marine species.

Protected species occurring in the fishery area include marine turtles, dugong, cetaceans, Grey nurse sharks and seabirds. A negligible level of interactions has been reported for the ECSMF in fishery-dependent and independent research. DPI&F refers to research conducted in the Spanish mackerel fisheries in NT and in Queensland managed waters of the Gulf of Carpentaria that support the statement that troll based fishing has negligible interactions with protected species. DEH concurs with this assessment and that the actual and potential impact on Part 13 species under the management arrangements is low and adequate protection is provided. There are no listed threatened ecological communities in the fishery area.

DEH recommends that the ECSMF be declared an accredited management plan under Sections 208A, 222A, 245 and 265 of the EPBC Act. In making this judgement, DEH considers that the fishery to which the regime relates does not, or is not likely to, adversely affect the survival in nature of listed threatened species or population of that species, or the conservation status of a listed migratory species, cetacean species or listed marine species or a population of any of those species. DEH also considers that the regime requires that all reasonable steps are taken to avoid the killing or injuring of protected species, and the level of interaction under current fishing operations is low.

On this basis DEH considers that an action taken by an individual fisher, acting in accordance with the ECSMF management regime, would not be expected to have a significant impact on a matter protected by the EPBC Act.

As approximately two thirds of the area of the fishery operates in the Great Barrier Reef Marine Park (GBRMP), the assessment also considered the possible impacts on the World Heritage values of the park. DPI&F states its commitment to protecting the values of the park and that the fishery is managed to minimise impacts on the park, noting that trolling gear has negligible impacts on benthic ecological communities. The recent introduction of the Representative Areas Program (RAP) within the GBRMP limits access by fisheries by zoning up to 30% of the park as no take green zones. This process has increased the protection of the World Heritage Area values of the park. DEH concurs with DPI&F's analysis and considers that the ECSMF would not have a significant impact on the World Heritage values of the GBRMP World Heritage Area.

The implementation of recommendations and other commitments made by DPI&F in the submission will be monitored and reviewed as part of the next DEH review of the fishery in 3 years time.

## **Recommendations**

**Recommendation 1.** *DPI&F to inform DEH of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on bycatch, protected species or the ecosystem.*

**Recommendation 2.** *From 2005, DPI&F to report publicly on the status of the fishery on an annual basis, including explicit reporting against each performance measure once developed.*

**Recommendation 3.** *DPI&F to develop a compliance strategy for the ECSMF. The strategy will explicitly address the following issues and provide for the periodic review of the effectiveness of the strategy:*

- *Effectiveness of shore based compliance activity*
- *Non-compliance with size and bag limits*
- *The possible existence of a black market*
- *Compliance with reporting of protected species interaction*
- *Compliance benefits in the adoption of new technology*
- *Fishers and processor knowledge of new compliance requirements.*

**Recommendation 4.** *As part of the biennial review of the ECSMF, DPI&F develop fishery specific objectives linked to performance indicators and performance measures for target, bycatch, protected species and impacts on the ecosystem.*

**Recommendation 5.** *DPI&F to monitor the status of the fishery in relation to the performance measures once developed. Within 3 months of becoming aware of a performance measure not being met, DPI&F to finalise a clear timetable for the implementation of appropriate management responses.*

**Recommendation 6.** *DPI&F to develop a system to ensure that catch data collected in compulsory logbooks and voluntary diaries is validated on an ongoing basis and to investigate methods for documenting and validating effort in the fishery.*

**Recommendation 7.** *DPI&F to monitor the size composition of the retained commercial catch of Spanish mackerel and conduct a review of the fishery appropriate to the magnitude of the change if the proportion of catch of pre-mature fish increases above 5% of the TACC. If necessary DPI&F to introduce additional management measures to ensure sustainability.*

**Recommendation 8.** *That DPI&F, at its biennial review of the ECSMF, consider means of reducing the capture of undersized and large Spanish mackerel including more effective size selective gear.*

**Recommendation 9.** *As part of the next biennial review of the ECSMF, DPI&F to develop a robust and regular fishery assessment process, that provides a basis for management decisions which are precautionary and recognise the uncertainty and level of risk. The assessment process will examine the ecological sustainability of the target species using robust stock assessments.*

**Recommendation 10.** *As part of the biennial review of the ECSMF, DPI&F to consider the protection of Spanish mackerel spawning aggregations. If necessary, DPI&F to implement measures to protect them within 18 months of such finding.*

**Recommendation 11.** *Within 18 months, DPI&F to provide reliable estimates of recreational take, and factor these into stock assessments and management controls to ensure overall catch levels are sustainable.*

**Recommendation 12.** *As part of its biennial review, DPI&F to examine measures designed to control Spanish mackerel harvest by recreational fishers to ensure that they are appropriate and adequately constrain recreational effort to within sustainable levels. Should the review indicate that existing measures are not appropriate DPI&F will develop new measures within 12 months.*

**Recommendation 13.** *DPI&F, as part of the development of performance indicators and performance measures for the fishery, to include a mechanism to identify and respond to changes in the composition and quantity of bycatch in the ECSMF.*

**Recommendation 14.** *Within one year, to support the implementation of the Species of Conservation Interest Logbooks, DPI&F to ensure that an education program for fishers, both recreational and commercial, is developed and implemented, to promote the importance of protected species protection and accurate incident reporting.*

## PART I - MANAGEMENT ARRANGEMENTS

The Queensland East Coast Spanish Mackerel Fishery is managed by DPI&F.

The management regime is described in the following documents, all of which are publicly available:

- *The Fisheries Act 1994*;
- *Fisheries Regulations 1995*;
- *Fisheries Amendment Regulation (no.3) 2003*;
- Zoning arrangements under the *Great Barrier Reef Marine Park Act 1975* and *Regulations 1983*;
- Zoning arrangements under the *Queensland Marine Parks Act 1982*;
- *Queensland Marine Parks Regulations 1990*; and
- Relevant Gazetted notices and licence conditions.

A number of other documents, including research reports, scientific literature and discussion papers are integral to the management of the fishery. Due to the importance of the management regime and documents referred to above to DEH's assessment of the fishery, an amendment could change the outcomes of our assessment and decisions stemming from it.

Export decisions relate to the arrangements in force at the time of the decision. In order to ensure that these decisions remain valid, DEH needs to be advised of any changes that are made to the management regime in order to make an assessment that the new arrangements are equivalent or better, in terms of ecological sustainability, than those in place at the time of the original decision.

**Recommendation 1.** *DPI&F to inform DEH of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on bycatch, protected species or the ecosystem.*

Management of the fishery incorporates a sound range of consultative mechanisms and a clear commitment to effective consultation with a variety of stakeholders. The Reef Line Fisheries Management Advisory Committee (ReefMAC) is the main body providing advice to DPI&F on the Spanish mackerel fishery. ReefMAC membership is appointed by the Minister and consists of an independent chair, commercial and recreational fishers, charter boat operators, conservationists, indigenous fishers, marketers, managers, compliance officers and researchers. The Queensland Fishing Industry Research Advisory Committee (QFIRAC) is responsible to its stakeholders for establishing fishing industry's research and development (R&D) priorities and advising the Fisheries Research and Development Corporation (FRDC) and the Fishing Industry Development Council (FIDC) of these priorities. The FIDC is the peak body of all key stakeholders in fisheries and aquaculture in Queensland and reports to the Minister for Primary Industries and Fisheries. QFIRAC is a subcommittee of FIDC.

DEH considers the level of consultation to be adequate and is confident that the management agency will continue to ensure interested parties are consulted appropriately.

DEH believes that management should be transparent and include public reporting on the status of the fishery on an annual basis. DEH notes that while the Condition and Trend Reports provide valuable information about the status of fish resources under Queensland management, public reporting of performance on a fishery by fishery basis would enhance transparency and public accountability. It is also unclear if the existing reporting framework is intended to be ongoing.

DEH suggests that for each fishery, including the ECSMF, DPI&F publicly report against fishery performance criteria on an annual basis (note the requirement for the development of performance criteria for the fishery in Recommendation 4).

**Recommendation 2.** *From 2005, DPI&F to report publicly on the status of the fishery on an annual basis, including explicit reporting against each performance measure once developed.*

The ECSMF is managed under the Queensland *Fisheries Act 1994* which provides for the use, conservation and enhancement of the community's fisheries resources and fish habitats seeking to apply and balance the principles of Environmentally Sustainable Development (ESD). The ECSMF management regime has recently undergone a major review resulting in the introduction of an upper catch limit in the form of a TACC with carry over/under provisions; a reduction in effort by limiting the number of commercial licenses to approximately 300 (a decrease of 1300); a requirement to review the TACC biennially and new reporting requirements. An assessment of the effectiveness of the ECSMF management regime measures is included in Part Two of this report.

Management of the fishery is based on a mixture of input and output controls. Such controls include:

- A TACC and Individual Transferable Quotas (ITQs);
- Provisions for dealing with quota under and over-runs;
- Limited entry with approximately 300 primary vessel licences;
- Gear restrictions;
- Area specific closures; and
- Minimum (750 mm TL) size limits for both sexes.

Compliance and enforcement tools to be utilised in the fishery are to be based on the ITQ regime, which involves a detailed document trail based on prior notice of impending landings, transshipment notices, landed fish notices and catch disposal records. New reporting requirements underwent a Regulatory Impact Statement (RIS) and Public Benefit Test (PBT) previous to the introduction of the new TACC scheme on 1 July 2004.

As the new management regime is based on the introduction of a quota system, it is important that compliance is monitored and enforcement measures' effectiveness, such as shore based compliance activities, is assessed. DEH is concerned that reported catch levels of Spanish mackerel may be an underestimate of the total take due to the possible existence of a black market, particularly through illegal sale to shops and restaurants. If this is the case, an illegal trade not only increases the pressure on stocks but also leads to increased uncertainty in stock modeling requiring the factoring in of estimated uncertainty factors<sup>1</sup>. The ability of fisheries officers to detect illegal trade of Spanish mackerel has recently been improved through enhanced capacity to search premises.

Compliance risks in this fishery include effort data validation, catch reporting prior to landing, possible black markets, reporting of protected species interactions, non-compliance with gear restrictions and bag and size limits.

To address these issues, DEH believes that the future compliance and enforcement activities in the fishery should be based on an overarching strategy based on a risk analysis. The compliance strategy should be subject to periodic reviews and include measurable performance criteria and incorporate the development of an education campaign to improve commercial and recreational fishers and processors compliance with new requirements.

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<sup>1</sup> Hoyle, S.D. 2003. 2003 update: Management Strategy Evaluation for the Queensland East Coast Spanish Mackerel Fishery. Agency for Food and Fibre Sciences Fisheries and Aquaculture 2003. QDPI&F.

**Recommendation 3.** *DPI&F to develop a compliance strategy for the ECSMF. The strategy will explicitly address the following issues and provide for the periodic review of the effectiveness of the strategy:*

- *Effectiveness of shore based compliance activity;*
- *Non-compliance with size and bag limits;*
- *The possible existence of a black market;*
- *Compliance with reporting of protected species interactions;*
- *Compliance benefits in the adoption of new technology; and*
- *Fishers and processor knowledge of new compliance requirements.*

Under regulation, the new management regime of the ECSMF requires that commercial and recreational catch be reviewed at least biennially. This is to ensure that the TACC continues to be set at a level within the long term sustainability constraint of the stocks. Other issues to be incorporated in the review process are yet to be determined. DEH considers that an appropriate level of review should include recreational, indigenous and commercial catch and effort trends and non-target catch, bycatch and protected species interaction trends. The periodicity of a biennial review is adequate while critical aspects are reviewed annually and DPI&F continues to act when adverse signals appear in the fishery.

The QLD *Fisheries Act 1994* has broad objectives for the management of Queensland fisheries but there is little in the way of fishery specific operational objectives, particularly in relation to bycatch, protected species and ecosystem impacts. Specific performance indicators and performance measures are also lacking for individual fisheries. ReefMAC has committed to twice yearly reviews of the fishery however, there are no fishery sustainability criteria that would trigger a review nor associated management responses with timelines for implementation.

DEH believes that ECSMF specific objectives, indicators and measures for target and bycatch species and protected species interactions need to be developed to ensure that the performance of the fishery can be measured and management action taken as required. DEH does not necessarily require that these be expressed in a statutory management plan, rather that they are developed, regularly reviewed and made publicly available. In particular, performance measures should be capable of detecting and responding to changes in the status of target, bycatch and protected species.

**Recommendation 4.** *As part of the biennial review of the ECSMF, DPI&F to develop fishery specific objectives linked to performance indicators and performance measures for target, bycatch, protected species and impacts on the ecosystem.*

Performance indicators and measures, once developed, should be capable of detecting and responding to changes in the fishery. This requires ongoing monitoring of the fishery against such performance measures and a clear process for responding to breaches of performance measures.

**Recommendation 5.** *DPI&F to monitor the status of the fishery in relation to the performance measures once developed. Within 3 months of becoming aware of a performance measure not being met, DPI&F to finalise a clear timetable for the implementation of appropriate management responses.*

Fishery-dependent data relating to the target species is collected on a regular basis in the fishery. Some fishery independent information is also collected. Discussion of the information collection system can be found in Part Two of this report.

An analysis of the fishery's capacity for assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem in which the target species lives and the fishery operates is contained under Principle Two of this report.

DPI&F has identified the existence of at least three separate stocks of Spanish mackerel in Queensland waters. These are the East Coast, the Gulf of Carpentaria and the Torres Strait stocks. Recognising this diversity of stocks DPI&F manages the East coast and Gulf of Carpentaria stocks separately. Currently the Northern Territory, Queensland and Western Australia together with industry are conducting further stock structure and distribution analysis of the northern and western Australian Spanish mackerel, including analysis of data collected in Indonesia. The realisation that stocks overlap several national and international jurisdictions is addressed by the ongoing cooperative approach by relevant management agencies through direct collaboration in the development of management arrangements or in fora such as the Northern Australian Fisheries Managers Forum.

DEH considers that the current management arrangements comply with all relevant threat abatement plans, recovery plans, the National Policy on Fisheries Bycatch, and bycatch action strategies developed under that policy. DEH expects that DPI&F will also ensure compliance with any future plans or policies as they are developed.

No regional or international management regimes, to which Australia is a party, are of direct relevance to the fishery. The prime international regime affecting the fishery is the United Nations Convention on the Law of the Sea (UNCLOS). The management regime essentially complies with this. Other international regimes are applicable to fisheries management but do not explicitly involve this fishery, for example the 1992 Convention on Biological Diversity and in particular the 1995 Jakarta Mandate requiring that, in relation to the sustainable use of marine and coastal biological diversity, the precautionary principle should apply in efforts to address threats to biodiversity. While these agreements are not specifically addressed in the Submission, the fishery's compliance with their requirements can be assessed by examination of Part Two of this report. The application of the International Convention for the Prevention of Pollution from Ships (MARPOL) to vessels operating in the fishery is explicitly discussed under Principle 2, Objective 3.

DEH considers it is incumbent on all authorities to develop a thorough understanding of the framework of national, regional and international agreements and their applicability to export-based fisheries for which they are responsible.

Approximately two-thirds of the area of the ECSM fishery operates within the area of the Great Barrier Reef World Heritage Area. Under the EPBC Act, a person may not take an action that has, will have or is likely to have a significant impact on the world heritage values of a declared World Heritage property. People that are taking actions that are a lawful continuation of a use of land, sea or seabed, that was occurring immediately before the commencement of the EPBC Act, may continue to take those actions. An enlargement, expansion or intensification of a use is not a continuation of a use. The ECSMF is managed to ensure minimum impacts on the World Heritage values of the area. For this reason, and the outcomes of the assessment as listed throughout Part Two of this assessment report, DEH considers that fishing activities as currently practiced in this fishery are unlikely to have a significant impact on the world heritage values of the Great Barrier Reef in the next three years. Any significant change to existing practices, which is likely to significantly impact on the Great Barrier Reef's World Heritage values, may require approval by the Australian Government Minister for the Environment and Heritage.

**Conclusion**

DEH considers that the Queensland ECSMF management regime is documented, publicly available and transparent, and is developed through a consultative process. The management arrangements are adaptable. Recommendations have been made in relation to objectives and performance criteria by which the effectiveness of the management arrangements can be measured, enforced and reviewed.

The management arrangements are capable of controlling the harvest through a combination of input and output controls appropriate to the size of the fishery. Periodic review of the fishery is provided for, as are the means of enforcing critical aspects of the management arrangements.

The management regime takes into account arrangements in other jurisdictions, and adheres to arrangements established under Australian laws and international agreements.

DEH considers that there is scope to further refine the management arrangements and has provided a number of recommendations for improvements in the longer term.

## **PART II – GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES**

### **Stock Status and Recovery**

Principle 1: *‘A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover’*

### **Maintain ecologically viable stocks**

Objective 1: *‘The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability’*

### **Information requirements**

Fishery dependent data are obtained through compulsory daily logbooks based on 6 nm squares. All logbook information is processed using standards developed since the inception of the logbook program, including date stamping and electronic receipting on the day the information is received and data entry within 2 months of receipt of the log-sheet. All weight and abundance information is double-punched and cross-checked before the information is saved in the database. The logbooks contain information on daily and shot-by-shot target catch, hours fished and areas of operation. A formal logbook compliance program was implemented in this fishery in 2003.

Logbooks do not include a compulsory field on bycatch or discards and information on species and quantities mostly comes from direct observations from fishers. DEH believes that measures should be developed to ensure that information on bycatch is accurately reported and made available for analysis.

With the introduction of the Total Allowable Catch (TAC) system, DPI&F will now be in a position to collect data from a range of sources (logbooks, processor records and quota management docketts) which will supplement scarce fishery-independent data. DEH considers this a useful approach given the economic and resource constraints under which the fishery operates.

Fishery-independent data collection is limited. DPI&F recognises that improvements can be made in the level of fishery-independent data collection. A review of fishery dependent information of the CRFFF, a similar type of fishery to the ECSMF, in 2002 identified no major reporting accuracy issues however, it is important to confirm this is the case as well in the ECSMF. DEH believes that DPI&F should move towards expanding its fishery independent data collection as the basis of validating fishery dependent information on the fishery.

DEH considers that an ongoing data validation program should be part of the future management arrangements, given DPI&F’s dependence on catch and effort data as the main indicator of performance in the fishery. Validation of commercial fishers’ catch and effort data recorded in logbooks, as well as data from the recreational sector recorded in voluntary diaries should be undertaken as a priority, noting that comprehensive commercial effort data are already collected.

**Recommendation 6.** *DPI&F to develop a system to ensure that catch data collected in compulsory logbooks and voluntary diaries is validated on an ongoing basis and to investigate methods for documenting and validating effort in the fishery.*

There have been several recent studies evaluating the sustainability of the ECSMF. Two preliminary and follow up stock assessments and a management strategy evaluation have indicated that the Spanish mackerel stock is fully exploited, that spawning biomass is likely to be at 65% of

the virgin biomass and that fishing effort should not increase. These estimates incorporate a high degree of uncertainty with sensitivity analysis indicating stock decline ranging between 39% and 78% of initial biomass. Based on these results and the perceived potential for effort transfer from other fisheries, ReefMAC and DPI&F instigated the development of new management arrangements seeking to prevent effort increase and to improve the sustainability of the fishery. These measures are discussed below.

Additional ongoing research is provided by the incorporation of Spanish mackerel into the Long Term Monitoring Project (LTMP) and the genetic mark-recapture pilot study in northern Australia Spanish mackerel fisheries (GENETAG) which seeks to identify trends in real time harvest rates. The overall objectives of these research programs include long term assessment and data collection and to provide estimates of harvest rates using genetic and conventional tagging.

DEH notes and commends DPI&F and ReefMAC's responses, in the form of new management arrangements, to research raising concerns on the status of stocks and general sustainability of the fishery. This response highlights the need for ongoing and expanded efforts in the collection and analysis of fisheries independent data as the basis for the review of the performance of the fishery. Continuation of existing data collections and research programs, combined with some extension and refinement of such activities, will be important for the future management of the fishery.

### **Assessment**

Recent stock assessment reports have indicated that Spanish mackerel stocks are fully exploited. The DPI&F Condition and Trend report for 2002 included an assessment of Spanish mackerel stocks which highlighted 3 main concerns: the perceived heavy exploitation of the east coast stock, with a possible decline in spawning stock; selective fishing of larger females in spawning aggregations; and the effect of technology creep on fishing efficiency. DPI&F and ReefMAC responded by conducting a review of the fishery and developing a range of new management arrangements which have been implemented through regulation since 2003 and completed on 1 July 2004.

The objectives of the new management regime are to control the identified heavy exploitation, the effects of technology creep and the prevention of effort transfer from other fisheries through the use of a TACC regime. In relation to the concern that females are selectively fished in spawning aggregations, additional analysis of catch data has indicated that females are not targeted to a greater degree but that when harvested they tend to be older and larger than the male component of the catch.

Sexual maturity in females usually occurs at 90 cm Total Length (TL), a size larger than the current Minimum Legal Size (MLS) of 75 cm TL, which applies to all sectors of the ECSMF. DPI&F recognises that this MLS does not afford the standard protection to the Spanish mackerel stocks of ensuring fish are not targeted before reaching sexual maturity, as is the case in general fisheries management practice and as exemplified by the DPI&F statement "Size limits are based on biological research into each species' reproductive cycles. Minimum size limits allow fish to spawn at least once and thereby contribute to the growth of that species population before capture" (Source: DPI&F web-site). DPI&F argues that it is reasonable to retain the current MLS because:

- Current catch only has a small component of fish smaller than the size of first maturity (~4.9% and 15% of commercial and recreational sectors, respectively);
- Released Spanish mackerel have low survival rates due to stress of capture and serious physical damage caused by hooks;

- There are human occupational safety concerns in releasing large active fish (e.g. at or below the size range of first maturity);
- Yield-per-recruit (YPR) calculations indicate that the optimum size for harvesting Spanish mackerel is actually below the current MLS at 70 cm TL<sup>2</sup>;
- Fishermen are very efficient in targeting schools according to their size; and
- While there is commercial incentive for fishermen to target fish larger (85-90 cm TL) than the MLS, it would be inefficient and environmentally ineffective to not allow fishers to land fish between 75-90 cm.

DEH considers that minimum size limits are probably inappropriate for species like Spanish mackerel with low post-release survival, but measures are needed to limit the take of fish below optimal size from an ecological sustainability perspective.

**Recommendation 7.** *DPI&F to monitor the size composition of the retained commercial catch of Spanish mackerel and conduct a review of the fishery appropriate to the magnitude of the change if the proportion of catch of pre-mature fish increases above 5% of the TACC. If necessary DPI&F to introduce additional management measures to ensure sustainability.*

The option of establishing a maximum size limit to allow larger females, which produce large amounts of eggs, to continue to reproduce is similarly constrained by problems relating to low post-release survival. However, there appears to be a commercial incentive not to catch larger females. Due to perceived concerns over ciguatoxin accumulation in larger fish, fishermen do not target them.

DPI&F should explore options to improve targeting by size including, for example, the use of larger hooks to reduce the catch of smaller Spanish mackerel that have not reached sexual maturity. The benefits to stocks of avoiding capture of pre-mature and larger fish should be disseminated to commercial and recreational fishers and the wider community as part of an overall strategy to improve the sustainability of the fishery.

**Recommendation 8.** *That DPI&F, at its biennial review of the ECSMF, consider means of reducing the capture of undersized and large Spanish mackerel including more effective size selective gear.*

DPI&F is operating the Queensland Fisheries Information System (QFISH) which collects commercial, recreational, charter and Indigenous catch data. This data, together with information from programs such as the LTMP and new research such as GENETAG, will serve as the basis for future stock assessments.

Two formal stock assessments have recently been conducted (2000 and 2002) for the fishery. Therefore a limited data-set is available with which to detect trends in catch and effort and environmental influences. The submission argues that the TACC has been set conservatively, based on the average commercial catch from 1992/03 to 2000/01 less the catch from 1998-2000 from licenses not meeting entry criteria and allowing a 10% overrun to deal with reconsideration of applications and appeals to the Fisheries Tribunal. DEH notes that ReefMAC and DPI&F will review the status of the fishery on a twice yearly basis seeking to define the appropriateness of the TACC as the data set improves.

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<sup>2</sup> Welch, et al., 2002 cited by Tobin, A. and Mapleston, A. 2004. Exploitation dynamics and biological characteristics of the Queensland east coast Spanish mackerel (*Scomberomorus commerson*) fishery. CRC Reef Research Centre Technical Report 51, CRC Reef Research Centre, Townsville.

The fishery is considered fully exploited but at a sustainable level<sup>3</sup>, with some concerns expressed by DPI&F on the inherent levels of uncertainty in the modelling used. Despite these uncertainties, there is no commitment to an ongoing process to improve modelling for Spanish mackerel stocks. Although ReefMAC has committed to review the fishery every 6 months, a scientifically robust process is needed to ensure that the best possible information (eg stock status) is used in reviews of the fishery. Stock assessment and TACC setting need to take into account all extractions from the fishery (eg Indigenous, recreational and potential illegal take). The establishment of a dedicated group to oversee the stock assessment process should be considered as an option in achieving this objective.

**Recommendation 9.** *As part of the next biennial review of the ECSMF, DPI&F to develop a robust and regular fishery assessment process, that provides a basis for management decisions which are precautionary and recognise the uncertainty and level of risk. The assessment process will examine the ecological sustainability of the target species using robust stock assessments.*

Spanish mackerel are susceptible to overfishing throughout their distribution due to their preference for shallow coastal and continental shelf waters, known migration routes and areas of aggregation and their voracious feeding behaviour.

Spawning aggregations in the east coast are believed to be concentrated in reef areas east of Ingham in October and November although they are known to occur as far south as Bundaberg. The area of spawning aggregations seems to have contracted since the 1970s.

Spawning aggregations are targeted by the commercial fishery. This increases the species vulnerability to overfishing. Stock assessments and other research collectively indicate that spawning biomass is likely to be low and that since the 1970s, the distribution of spawning aggregations has contracted. The inner reefs off Ingham and Townsville are major areas into which commercial fishing effort is applied and represent the major east coast spawning sites. There may be smaller spawning aggregations but these are not readily apparent.

Because of the vulnerability of spawning aggregations, DEH considers that DPI&F should consider the need and options for protecting Spanish mackerel aggregations, including spatial or temporal closures around lunar cycles that would allow fish to spawn before being subjected to harvest.

**Recommendation 10.** *As part of the biennial review of the ECSMF, DPI&F to consider the protection of Spanish mackerel spawning aggregations. If necessary, DPI&F to implement measures to protect them within 18 months of such finding.*

Currently an FRDC funded project, with collaboration between the Northern Territory, Queensland, Western Australia and industry, is underway investigating the stock structure of northern and western Australian Spanish mackerel. Based on analysis of genetic material, otolith and parasite samples from Australian and nearby south-east Asian populations, the project will establish and describe stock structure over a wide geographic range. This information will be of value in the stock assessment process and to DPI&F and other relevant fishery management agencies both in Australia and overseas. DEH welcomes DPI&F involvement in cross-jurisdictional actions to address shared stock concerns.

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<sup>3</sup> Welch, D.; S.D. Hoyle, G.R. Mcpherson and N.A. Gribble. Preliminary Assessment of the East Coast Spanish Mackerel Fishery in Queensland. Agency for Food and Fibre Sciences Fisheries and Aquaculture 2002. DPI&F.

Potential removals from the Spanish mackerel population include direct harvest by this fishery, recreational and indigenous harvest, discarding and removals by the Rocky Reef Fin Fish Fishery (RRFFF) and the CRFFF. These removals are taken into account when developing management arrangements.

Discard data are important for stock assessment purposes and to measure the overall impact the fishery may be having on not only the target species, but on other components of the marine environment. No discard data is available for the ECSMF. Presumably fishers discard some unmarketable, undersized or damaged fish but to date have not been required to record this information. DEH considers the ongoing collection of data and monitoring for discards an important component in providing confidence in the TACC and to enable changes in Spanish mackerel size and fisher behaviour to be detected over time. A mechanism is also needed to record and monitor discards for consideration at the next biennial review of the fishery.

A more pressing issue is the catch of Spanish mackerel by the recreational sector (including charter boat operators) which is comparable, and at times greater, than that of the commercial sector. Since the scale of take is so large, it is important that data collection and analysis of recreational catch is at a commensurate level and that the nature and degree of its impact on fish stocks is reliable, well understood and considered in stock assessments and TACC setting. DEH believes that it is necessary to establish a more regular and robust process to improve estimates of all human related Spanish mackerel mortalities including recreational take.

**Recommendation 11.** *Within 18 months, DPI&F to provide reliable estimates of recreational take, and factor these into stock assessments and management controls to ensure overall catch levels are sustainable.*

### **Management response**

The current ECSMF management regime aims to maintain ecologically viable stock levels through a range of input and output controls. These measures are outlined in Table 1 and Part I of this report.

DEH considers that the combination of the input and output controls should ensure adequate protection of the target stocks, but notes that this is contingent upon the TACC being set at a sustainable level.

DEH notes DPI&F has capped recreational take through its recent reduction in bag limit. DEH considers that recreational bag and size limits should be regularly reviewed to take account of potential increasing numbers of recreational fishers as well as the potential increases in discards, through high grading, to ensure that total take remains sustainable.

**Recommendation 12.** *As part of its biennial review, DPI&F to examine measures designed to control Spanish mackerel harvest by recreational fishers to ensure that they are appropriate and adequately constrain recreational effort to within sustainable levels. Should the review indicate that existing measures are not appropriate DPI&F will develop new measures within 12 months.*

The ECSMF management regime is based on a TACC. No additional reference points have been developed. DPI&F contends that the twice-yearly review of the fishery by ReefMAC will ensure that the TACC is set at a sustainable level.

DEH is concerned over the recent assessment that the east coast Spanish mackerel stock is fully exploited with a possible decline in spawning stock. The development of clear and timely

management responses to address sustainability issues should be a priority and is the subject of Recommendation 4.

DEH notes that management of most Queensland fisheries is species based and therefore those fisheries do not have a byproduct component per se, as non-target species fall within the management regime of a different fishery. Therefore DEH cannot consider, within the assessment of ECSMF, that component termed byproduct in the submission.

The submission indicates that the high level of efficiency of the fishing gear and methodology used results in low levels of take of non-target species by ECSMF operators. These include Coral trout, a number of species of mackerel, Black kingfish as well as “other” species. All retained species must be recorded in logbooks. DEH concurs with the assessment that the catch level of non-target species in this fishery is low.

### **Conclusion**

DEH considers that the management regime in the Queensland ECSMF is appropriately precautionary and provides for the fishery to be conducted in a manner that does not lead to overfishing. DEH considers that the information collection system and stock assessment and management arrangements can be expanded and improved but generally are sufficient to ensure that the fishery is conducted at catch levels that maintain ecologically viable stock levels with acceptable levels of probability.

DEH considers that there is scope to further refine some of the existing information collection, assessment and management responses and has provided a number of recommendations for improvements in the longer term.

### **Promote recovery to ecologically viable stock levels**

Objective 2: *‘Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes’*

This objective is not applicable to the fishery at present. Although the Spanish mackerel stock is considered as fully exploited with a possible decline in the spawning stock, management responses and recommendations have been developed to avoid the risk of overfishing. However, without established performance indicators and measures, the point at which Spanish mackerel is considered overfished is not defined. As a result of the decline in stock abundance during the period of rapid growth of the commercial and recreational sector of the fishery, new catch limits in the form of a TACC for the commercial sector and a reduced bag limit for the recreational sector have been introduced. This precautionary management strategy is aimed at rebuilding stock abundance. The development of reference points to further enhance the overall sustainability of management arrangements are addressed in **Recommendation 4**.

### **Conclusion**

DEH considers that the Spanish mackerel stocks are not below a defined reference point but should that occur in the future, the fishery is conducted such that there is a high degree of probability the stock would recover to ecologically viable stock levels within nominated timeframes.

## **Ecosystem impacts**

Principle 2: *'Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem'*

### **Bycatch protection**

Objective 1: *'The fishery is conducted in a manner that does not threaten bycatch species'*

### **Information requirements**

There is no formal recording of bycatch from commercial catch and effort data for the ECSMF or ongoing fishery independent sources. The major source of information on bycatch from the commercial sector comes from direct observations of fishing operations by DPI&F and other researchers and anecdotal information from fishers. Bycatch of the ECSMF has been described through a number of research projects which indicate that it consists of only a few species. DPI&F monitors ECSMF catch through ongoing programs such as the CFISH, RFISH, LTMP and the Cooperative Research Centre (CRC) Reef's Effects of Line Fishing program.

DEH concurs with DPI&F that due to the high selectivity of the gear, and the epipelagic schooling behaviour of Spanish mackerel the fishery is not likely to generate high bycatch levels.

### **Assessment**

Bycatch tends to be composed of Spanish mackerel released when it is smaller than the minimum legal size (75 cm TL) although this component is considered minimal. There is a commercial incentive for operators to target larger fish and they will move on if a school of Spanish mackerel is below legal size. On average 76.2% of commercial catch measures between 87.5 and 117.5 cm FL well above the minimum legal size.

A risk assessment on the post-capture survival of bycatch species found varying susceptibility to mortality. Spanish mackerel, cod (Family Serranidae), tropical snappers (*Lutjanus spp*) and trevallies (*Caranx spp*, *Carangoides spp*) rate a high risk. Coral trout (*Plectropomus spp*), some tunas (*Thunnus spp*) and black kinfish (*Rachycentron canadus*) rate a mid range risk. Dolphinfish (*Coryphaena spp*) and silver trevally (*Pseudocaranx dentex*) rate a relative low risk.

### **Management response**

Potential fishing effort has been reduced in the ECSMF with the introduction of new TACC and ITQ based management arrangements. While these reductions were in response to a perceived risk to potentially over-fish target species, they have also served to reduce the amount of potential bycatch taken in the fishery.

The Australian National Sportfishing Association (ANSA) has adopted a Code of Practice on Releasing Fish. The ANSA code outlines practices for catching, handling and releasing fish in a way that will improve their chance of survival. DPI&F has conducted information and education programs and has developed fact sheets detailing best release practices for Spanish mackerel, tropical reef species, tropical snapper, tuna and trevally covering most of the bycatch species of the ECSMF.

No specific group of bycatch indicator species has been formally defined in the ECSMF. DPI&F states that due to the negligible amount and number of bycatch species taken no indicator group is readily apparent.

DEH considers the development and implementation of an ongoing bycatch monitoring program important for the future management of the fishery.

Although bycatch is considered to be low in the fishery, performance indicators and measures should be developed, in line with Recommendations 3 and 4, so that any changes can be detected and suitable mitigation measures implemented if required. Mechanisms are also needed to collect the information needed to monitor performance.

**Recommendation 13.** *DPI&F, as part of the development of performance indicators and performance measures for the fishery, to include a mechanism to identify and respond to changes in the composition and quantity of bycatch in the ECSMF.*

## **Conclusion**

DEH considers that there is a high likelihood the fishery is conducted in a manner that does not threaten bycatch species. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that DPI&F would undertake appropriate actions to ensure that bycatch species are not threatened by this fishery.

Recommendations have been developed to ensure that the risk of unacceptable impact on bycatch species is detected and minimised in the longer term.

## **Protected species and threatened ecological community protection**

Objective 2: *'The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities'*

### **Information requirements**

The ECSMF, due to its selective gear and area of operation, is considered to have a minimum risk of interaction with protected species. In 2004 the SOCI logbook will be introduced in the ECSMF in conjunction with a new line fishery logbook (LFO4) associated with the new management arrangements. Use of the SOCI reporting logbook will provide DPI&F with the ability to monitor interactions.

DEH notes and commends the introduction of the SOCI logbooks. DEH suggests that to accompany the introduction of the SOCI logbooks, an education program for fishers be implemented to enable accurate reporting, promote appropriate handling techniques and highlight the importance of minimizing interactions with protected species.

**Recommendation 14.** *Within one year, to support the implementation of the SOCI Logbooks, DPI&F to ensure that an education program for fishers, both recreational and commercial, is developed and implemented, to promote the importance of protected species protection and accurate incident reporting.*

## **Assessment**

Data arising from the SOCI logbook are to be analysed in future as part of the annual fishery assessment. DEH recognises that the minimal data collection and analysis of protected species interactions to date is likely due to the relatively benign fishing method.

Of the protected species likely to interact with the fishery, the most likely negative interactions (although considered only remotely possible) appear to be boat strikes on Dugongs and Cetaceans, and hooking (only one recorded incident of a turtle hooked since 1970s). Although a number of protected species inhabit the area of the fishery, most are in shallow or demersal habitats not used by the ECSMF.

There are no listed ecological communities in the fishery area.

### **Management response**

DEH concurs with DPI&F's position that marine protected areas contribute significantly in minimising interactions. A number of marine parks have been declared in Queensland to protect species such as turtles, dugong and whales. Approximately 80% of the ECSMF area of operation is within the GBRMP and therefore the measures implemented within the marine park to protect protected species are of direct relevance to the fishery. The introduction of the RAP in the GBRMP should further reduce the risk of interactions.

The Great Barrier Reef Marine Park Authority (GBRMPA) has conducted a number of education campaigns to inform the public on the values and issues relating to protected species. These campaigns have included televised announcements, reef user workshops, liaison with advisory committees, information kits and media releases.

Entanglement by protected species in discarded rubbish and rope is addressed through fishers being encouraged to retain all rubbish on board. The National Code of Practice for Recreational and Sportsfishing 2001, includes voluntary measures that would reduce pollution or impacts on the wider environment. It also includes measures to minimize boat strikes, ingestion of fishing line and habitat disturbance.

### **Conclusion**

The available information indicates interactions with protected species in this fishery are minimal. DEH considers that the fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that DPI&F will take appropriate actions to ensure that the fishery avoids mortality or injury to these species and avoids or minimises impacts on threatened ecological communities.

A recommendation has been developed to ensure that the risk of unacceptable impact on protected species is minimised in the longer term.

## **Minimising ecological impacts of fishing operations**

Objective 3: *'The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally'*

### **Information requirements**

There is general consensus among researchers, fishers and fishery managers that the ECSMF has a low impact on the ecosystem. Research has indicated that Spanish mackerel is a generalist carnivore on nekton species. It has not been identified as a major prey species for other large carnivorous fish or mammals.

While information collection and research covering the fishery's impact on the ecosystem and environment generally are limited, this is the case across a range of Australian and International fisheries. Until appropriate research techniques and programs are developed and implemented this situation will continue to be the case. DEH strongly supports research in this area.

### **Assessment**

The potential of the ECSMF to impact unacceptably and unsustainably on the environment generally is considered to be low. As a consequence, the need for a risk assessment conducted for this fishery has not been a priority.

The fishing gear generally is not regarded as posing a significant risk to the physical environment. Impacts on benthic communities is limited to occasional contact by the fishing line and gear or with boat anchors.

Recent studies on the impact on reef communities from the removal of predators are limited however they indicate that environmental factors affecting larval supply and associated recruitment events are more likely to control population levels. Similar conclusions were found on the impact on prey species since their density are limited by recruitment, competition or food availability.

Impacts on the water quality from this fishery are likely to be restricted to the discard of fish scraps through processing of catch and vessel borne effluent. These impacts are assumed to be negligible as only 45% of the catch is processed on board. DPI&F advises that discards of fish scraps tend to be dispersed and quickly assimilated.

### **Management response**

DPI&F has implemented a range of management measures that minimise the risk of significant impact of fishing on ecosystems and their components. Most management measures were established to protect target species and their habitats, although some actions are specifically designed to protect the broader environment. Further work to improve management of ecosystem impacts is also proposed.

As discussed under Principle 1 of this report, significant reductions in effort, both in number of commercial sector boats, a set TACC and reduced bag limits for the recreational sector have been recently imposed in the fishery. These reductions, while imposed to protect Spanish mackerel stocks, may also result in a reduction in the amount of bycatch and discards and reduction in the impact of fishing on benthic communities.

Impacts on water quality through the discharge of plastic wastes and pollution from vessels are controlled under MARPOL legislation. Operators are required to comply with the legislation and must retain any plastic waste and dispose of it only when the vessel returns to port. Additional voluntary measures forming part of the recreational sector's code of practice seek to ensure that impacts in the form of discarded waste or interactions with protected species and on the wider marine environment are further reduced.

The ECSMF industry, ReefMAC and DPI&F have a history of addressing sustainability and impact issues in the fishery. Their record of incorporating research results into management is excellent. DEH is confident that the fishery will continue to be managed in a manner that aims to minimise ecosystem and broader environmental impacts.

DEH notes that the recreational sector has developed a code of practice which includes measures to avoid interactions with protected species. DEH supports the use of codes of practice and believes that a similar approach could be undertaken by the commercial sector seeking to reduce its overall impacts on the environment.

The National Oceans Office is currently leading a regional marine planning process to the North and East of the area of the fishery. The planning process aims to ensure the ecologically sustainable use of the resources in the planning area and will help to integrate management across jurisdictions and sectors. It will also identify potential candidate areas for the National Representative System of Marine Protected Areas (NRSMPA). The regional marine planning process is a potential vehicle for pursuing sustainable fisheries objectives, particularly where cross sectoral or cross jurisdictional approaches are required. DPI&F should continue to engage in the process as far as practical. More information is available at [www.oceans.gov.au](http://www.oceans.gov.au).

## **Conclusion**

DEH considers that the fishery is conducted in a sufficiently precautionary manner to minimise the impact of fishing operations on the ecosystem generally. Recommendations have been developed to ensure that the risk of significant impact by the fishery on the marine environment generally is minimised in the longer term.

## LIST OF ACRONYMS

ANSA	Australian National Sportsfishing Association
CFISH	Commercial Fisheries Information System
CRC	Cooperative Research Centre
CRFFF	Coral Reef Fin Fish Fishery
DEH	Department of the Environment and Heritage
DPI&F	Queensland Department of Primary Industries & Fisheries
ECSMF	East Coast Spanish Mackerel Fishery
EPBC Act	Environment Protection and Biodiversity Conservation Act
ESD	Environmentally Sustainable Development
FIDC	Fishing Industry Development Council
FL	Fork Length
FRDC	Fisheries Research and Development Corporation
GENETAG	Genetic mark-recapture pilot study
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
ITQ	Individual Transferable Quota
LFO4	Fishery Logbook
LTMP	Long-Term Monitoring Program
MARPOL	International Convention for the Prevention of Pollution from Ships, 1973
MLS	Minimum Legal Size
NRSMPA	National Representative System of Marine Protected Areas
OCS	Offshore Constitutional Settlement
PBT	Public Benefit Test
QFIRAC	Queensland Fishing Industry Research Advisory Committee
QFISH	Queensland Fisheries Information System
RAP	Representative Areas Program
R&D	Research and Development
RFISH	Recreational Fishing Information System
ReefMAC	Reef Line Fisheries Management Advisory Committee
RIS	Regulatory Impact Statement
RRFFF	Rocky Reef Fin Fish Fishery
SOCI	Species of conservation interest (logbook)
TAC	Total Allowable Catch
TACC	Total Allowable Commercial Catch
TL	Total Length
UNCLOS	United Nations Convention on the Law of the Sea
WTO	Wildlife Trade Operation
YPR	Yield-per-recruit