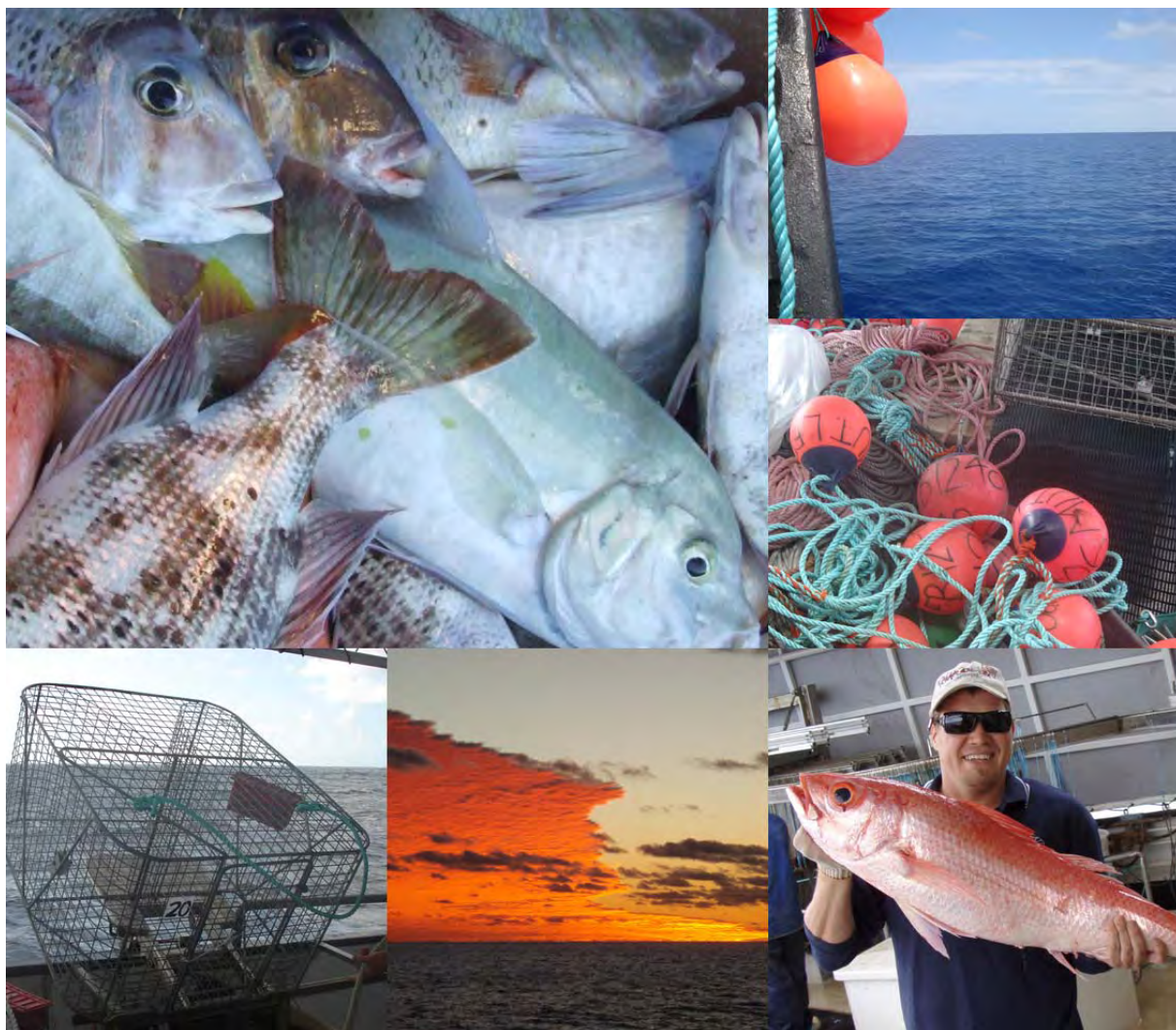




# ANNUAL STATUS REPORT

## January 2009

# CORAL SEA FISHERY



## Executive Summary

This report has been prepared by AFMA for consideration by the Department of the Environment and Water Resources (DEWHA) in relation to the exemption of the Coral Sea Fishery (CSF) from export controls under the *Environment Protection and Biodiversity Conservation Act 1999*. On 16 November 2007, DEWHA advised AFMA that it was satisfied that the operation of the CSF is consistent with the objects of the wildlife trade provisions in Part 13A of the EPBC Act, that it is unlikely to be detrimental to the survival or conservation status of any taxon to which the fishery operation relates, or threaten any relevant ecosystem in the short term.

Given the need to finalise key management documents such as the ecological risk assessment and harvest strategy, DEWHA decided to make this WTO declaration valid for a short term period expiring on 19 March 2008. This WTO declaration was subject to conditions which have been outlined in this report and which have been met by AFMA.

The Coral Sea Fishery is a relatively small but diverse fishery, targeting a wide range of species with methods including line, trap, trawl and hand collection. Entry to the CSF is limited to the existing 18 fishing permits. The CSF covers waters from the east of Sandy Cape (Fraser Island) to east of Cape York. The Fishery commences east of the Great Barrier Reef Marine Park (GBRMP) and extends to the edge of the Australian Fishing Zone (AFZ). It excludes the areas of the Coringa-Herald and Lihou Reef National Nature Reserves. Together the Nature Reserves cover approximately 17,000 square kilometres of coral reef habitat.

The fishery is managed by AFMA in consultation with a range of stakeholders under the *Fisheries Management Act 1991* (the Act). Policies such as harvest strategies, bycatch and discard plans and voluntary industry codes also contribute to the management of the fishery.

Cover photos courtesy of Brad Milic, Observer Section, AFMA

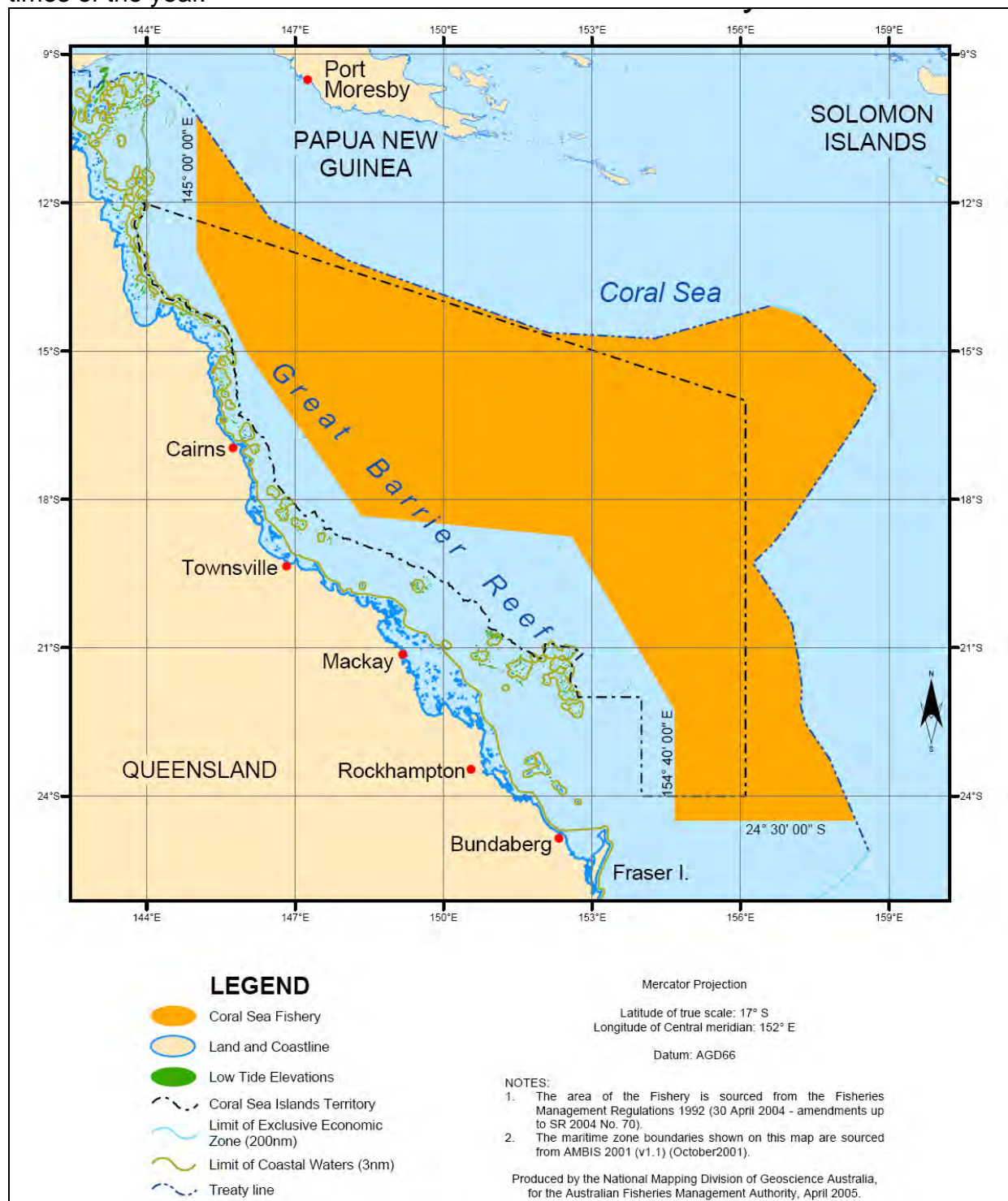
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# 1 Description of the fishery

The CSF lies east of the Great Barrier Reef Marine Park (GBRMP) and extends to the edge of the Australian Fishing Zone (Figure 1). The fishery extends north from Sandy Cape (Fraser Island), to Cape York. It excludes the areas of the Coringa-Herald and Lihou Reef National Nature Reserves. Together the Nature Reserves cover approximately 17,000 square kilometres of coral reef habitat. The CSF often experiences adverse weather conditions which can make fishing difficult at certain times of the year.



**Figure 1 Area of the Coral Sea Fishery**

As detailed in the Table 1 below, the CSF is a diverse fishery employing a range of fishing methods to target a wide variety of species. Participation in the CSF is limited to 18 fishing permits, this means that new entrants to the fishery must purchase an existing permit and transfer this into their name before entering the fishery. AFMA maintains a register of all Commonwealth fishing permits on its website.

**Table 1 Summary of the Coral Sea Fishery by sector**

	Number of Permits	Target species	Fishing method/gear
Trawl and Trap	2	Tropical finfish and crustaceans	Otter trawl, demersal finfish traps
Line and Trap	9	Classes Chondrichthys (cartilaginous fishes) and Osteichthyes (bony fishes)	Demersal longlines, trotlines, droplines, handlines and demersal finfish traps. Automatic baiting is available for use with the longline method, subject to application and additional conditions being met.
Lobster and Trochus	3	<i>Trochus niloticus</i> and Tropical Spiny Rock Lobster ( <i>Panulirus ornatus</i> )	Hand collection with or without underwater breathing apparatus.
Aquarium	2	Classes Chondrichthys (cartilaginous fishes) and Osteichthyes (bony fishes) Live rock	Cast, scoop and seine nets, and handlines with barbless hooks may be used with or without the aid of underwater breathing apparatus Collection using non mechanical implements
Sea Cucumber	2	Amberfish ( <i>Thelenota anax</i> ) Blackfish (probably <i>Actinopynga miliaris</i> ) Black teatfish ( <i>Holothuria whitmaei</i> ) Greenfish ( <i>Stichopus chloronotus</i> ) Lollyfish ( <i>Holothuria atra</i> ) Prickly redfish ( <i>Thelenota ananas</i> ) Sand fish ( <i>Holothuria scabra</i> ) Surf redfish ( <i>Actinopynga mauritiana</i> ) White teatfish ( <i>Holothuria fuscogilva</i> ) Deepwater redfish ( <i>Actinopynga echinites</i> ) Elephant's trunk fish ( <i>Holothuria fuscopunctata</i> ) Curry fish ( <i>Stichopus hermanni</i> )	Hand collection with or without underwater breathing apparatus.

## Catch

The CSF recorded a commercial harvest of 192.2 tonnes for the 2006/2007 financial year with an estimated value of almost \$1.4 million. Markets are largely domestic, however some sea cucumber and aquarium fish are exported.

## Stock status

The Bureau of Rural Sciences Fishery Status Report 2007 classified the CSF as having an uncertain status. The relatively small number of operators, limited fishing effort and relatively low GVP of the fishery make research and stock assessments in this fishery difficult. Management arrangements, including harvest strategies for all sectors of the fishery are based on precautionary catch and effort limits and triggers for investigating changes in the fishery. It is hoped that as data collection and research in the fishery continue to improve the fishery's current uncertain status will be clarified.

## Target and bycatch species

### Target species

The CSF targets a wide range of species (Table 1). Analysis of AFMA Logbook data (excluding Aquarium sector data) revealed at least 183 different species were taken by the CSF between 1998 and 2007. Fifty-four of these species were caught exclusively by CSF operators and 129 were also caught by other AFMA fisheries during this period.

The species caught will vary depending on the methods used as well as the areas and time fished. Due to the variability in species caught and fishing effort across the different fishery sectors the distinction between target and bycatch species can be difficult to make.

The Lobster and Trochus, Aquarium, and Sea Cucumber sectors employ methods which are highly selective and able to avoid bycatch species.

The Line and Trap, and Trawl and Trap sectors target a wide range of species and there is no clear distinction between target and bycatch species in these sectors, this is also indicated by the variable catch compositions over time. An attempt has been made to outline the main target species for each sector below.

All permits in the CSF prohibit the taking or carrying of the following tuna and tuna like species:

- fish of the family Scombridae except fish of the genera *Scomberomorus*, *Scomber*,
- *Acanthocybium*, *Grammatorcynus* and *Rastrelliger* (commonly known as mackerels); and
- fish of the families *Istiophoridae* and *Xiphiidae* (commonly known as billfish).
- fish of the family *Bramidae* (commonly known as pomfrets or ray's bream).

### Line and Trap sector

This sector targets tropical snappers (*Lethrinidae* or *Lutjanidae*), emperors (*Lutjanidae*), coral trout (*Plectropomus leopardus*) and jobfish (*Lutjanidae*, subfamily *Etelinae*). Individual operators may also target other species depending on the location being fished and method being used.

### Trawl and Trap sector

There has been little effort in this sector. Effort has typically been investigative in nature with operators trialling different nets, locations and water depths. Consequently, there is high variability in catch levels and species composition between fishing trips.

### Fish trapping

Fish traps are used by the Line and Trap and Trawl and Trap sectors, targeting trout cod, trevally, red emperor, rosy jobfish/king snapper, goldband snappers, redthroat emperor, Japanese sea bream, sea bream snapper, coral trout, samsonfish, amberjack, golden-eyed jobfish, long nose emperor, grass emperor, spangled emperor and red-eared emperor.

### Sea Cucumber sector

This sector targets a number of species including amberfish (*Thelenota anax*), blackfish (probably *Actinopynga miliaris*), black teatfish (*Holothuria whitmaei*), greenfish (*Stichopus chloronotus*), lollyfish (*Holothuria atra*), prickly redfish (*Thelenota ananas*), sandfish (*Holothuria scabra*), surf redfish (*Actinopyga mauritiana*), white teatfish (*Holothuria fuscogilva*), deepwater redfish (*Actinopyga echinites*), elephant's trunk fish (*Holothuria fuscopunctata*) and curry fish (*Stichopus hermanni*).

### Aquarium sector

Operators target ornamental reef fish species from the class Chondrichthyes (cartilaginous fishes) and Osteichthyes (bony fishes) except for tuna and tuna like species. There are over 100 different species that are harvested by the Aquarium sector, but the majority of the species comprise damselfish, butterflyfish, angelfish, wrasse, anemone fish, surgeonfish, blennies and gobies. Species targeted vary over time as a response to changing market demands.

Live rock (limestone covered with living coralline algae and other encrusting species) is also collected by hand or use of hand-held, non-mechanical implements. Coral is not permitted to be taken under these permits.

### Lobster and Trochus sector

There has been little effort or catch in this sector, particularly with regard to trochus.

The Lobster sector targets species *Panulirus ornatus* and *P. versicolor* and to a lesser degree *P. pennisiulatus*.

The main trochus species in the CSF is probably not *Trochus niloticus*, but may be a related species, *Tectus pyramis*, which is smaller and has a lower value than *T. niloticus* (Wells and Bryce, 1988).

## **Bycatch species**

Bycatch in the CSF is recorded using logbooks and through observer coverage. There is no bycatch in the Sea Cucumber, Aquarium, and Lobster and Trochus sectors.

Trawl and Trap sector operators have been required to use nets with a specified minimum mesh diameter to limit bycatch and also utilise a Bycatch Reduction Device (BRD) when trawling for crustaceans.

Line and Trap sector operators must use specified bird scaring devices whenever using automatic longline gear.

The CSF is an opportunistic fishery targeting a wide range of species. Less commercially valuable species are discarded. Data on discarded species is limited for most sectors in the CSF, however good quality data is available relating to the demersal finfish trapping method.

AFMA is currently developing measures to address bycatch and discarding in all fisheries including the CSF. Work on measures specific to the CSF is expected to commence in 2009. All catch including discarded catch is recorded using logbooks and through Observer coverage.

## **Fishing areas**

The CSF lies east of the GBRMP and extends to the edge of the Australian Fishing Zone, it extends north from Sandy Cape, Fraser Island, to Cape York but excludes the area of the Coringa-Herald and Lihou Reef National Nature Reserves, an area spanning approximately 17,000 square kilometres (Figure 1). Spatial management tools including a rotational reef harvest strategy and 'move-on' provisions are also used in the CSF.

## **2 Management arrangements**

The *Fisheries Management Act 1991* (the Act) and the *Fisheries Management Regulations 1992* provide the principal legal framework for the management of the CSF.

A limited number of fishing permits are granted each year under the Act; these permits are subject to conditions set out in section 32(5) of the Act as well as conditions specified on the permits. Each permit includes conditions specific to the sector to which it relates and may contain conditions specific to the particular permit. Conditions may include limits on the number of persons able to fish under the permit at any time, gear restrictions, species size limits, trigger limits and total allowable catch limits (TACs) as well as spatial controls.

Through an approach known as ecosystem based fisheries management (EBFM), AFMA aims to minimise the impacts of Commonwealth managed fisheries on all aspects of the marine ecosystem. AFMA's adoption of EBFM is a significant departure from traditional fisheries management with the focus shifted from the direct management of target species to also considering the impacts on bycatch species, protected (TEP) species, habitats, and communities. This approach is supported through a range of policies such as harvest strategies, bycatch and discard plans and voluntary industry codes of practice. Management of the fishery is designed to be precautionary, monitoring activity and collecting data for more detailed analysis as

fishing activity increases. This approach effectively minimises costs to the fishery while fishing activity and risks of impact are low; the level of assessment increases as fishing increases.

### **Fishing permits**

All CSF fishing permits are granted for the duration of the financial year (1 July – 30 June) after which time the holder of the permit may be invited to reapply for another permit. Persons have three months to reapply for a permit following the expiration of their fishing permit and must not fish without a copy of a current fishing permit authorising their activity on board their boat.

## **3 Changes to management arrangements**

The following changes have been made to management arrangements and permit conditions for the CSF since the last WTO accreditation in 2007.

Conditions on all fishing permits in the CSF were reviewed prior to 2007/08 permits expiring and 2008/09 permits being issued. The following conditions were amended:

- Fishing permits authorising the collection of sea cucumber, lobster and trochus and aquarium species no longer have a prescribed limit on the number of operators able to fish under each concession. This limitation is considered unenforceable by AFMA and of little risk to fishery sustainability. Other management arrangements such as limits on the number of tender boats, TACs, catch and effort triggers and spatial management measures such as the rotational zone plan and move-on provisions remain in force.
- The requirement to submit trip reports in addition to logbook and catch disposal records was removed. It was considered that the information obtained in these reports was already largely collected through other measures such as the use of logbooks, catch disposal records, prior to departure and prior to landing reports as well as observer reports.
- Observer coverage for all line fishing permits has been made more consistent, with the introduction of a minimum 25% observer coverage now specified on all line fishing permits. This represents an increase in observer coverage for some operators.
- The procedures for measuring nets and trochus have been better detailed in the relevant fishing permits, helping industry to follow a consistent approach, and consistent with other fisheries. Actual net mesh and trochus size limits were not changed.
- All fishing permits authorising the use of demersal finfish traps now require all non finfish species taken with this method to be released in a manner that best ensures their survival. This condition was introduced to encourage the pursuit of best practice rather than in response to catch levels or release practices.
- The limit of 15,000 hooks able to be used, stowed, or secured onboard the boat at any time, previously only applied to automatic longline methods, has been extended to all line methods in the CSF. AFMA note that in practicality, methods other than auto-longline are constrained to use much fewer than 15,000 hooks.

A subsequent amendment was also made to disallow processing of sharks at sea beyond certain prescribed limits (in line with other Commonwealth fisheries). This amendment was applied to one permit which previously had unique conditions relating to the processing of sharks at sea. This amendment ensures all permits in the CSF are consistent with AFMA's approach to processing of sharks at sea, prohibiting shark finning and encouraging the sustainable harvest and utilisation of sharks.

Four Harvest Strategies developed under the Harvest Strategy Policy for the CSF were finalised on 12 December 2007 and have been implemented since 1 July 2008. Details of the harvest strategies are provided below. Due to the difficulties differentiating target and bycatch species, these harvest strategies cover all species taken in the fishery, and are based on an extensive suite of catch and effort triggers.

These variations to the management arrangements for the CSF strengthen management arrangements for the fishery and do not diminish the sustainability of the fishery.

## **4 Consultation processes**

AFMA consults a range of stakeholders about any development, implementation and review of fisheries management arrangements in the CSF. An annual stakeholder meeting is also held at least once a year (typically in March/April) to discuss issues relevant to the management of the fishery. AFMA also seeks approval for any amendments to management arrangements from the DEWHA before changes are implemented.

AFMA considers the overlap of species and management issues with adjoining Queensland state fisheries and where appropriate consults Queensland state fisheries managers, Great Barrier Reef Marine Park Authority (GBRMPA) managers and Queensland Scientific Advisory Groups (HarvestSAG and ReefSAG) in developing and implementing management arrangements for the CSF. HarvestSAG and ReefSAG provide scientific advice to both AFMA and Queensland state fisheries managers and their involvement facilitates the development of consistent management approaches to related state and Commonwealth fisheries. AFMA undertake to consult as widely as practicable to develop sound fisheries management arrangements.

## **5 Outcomes of review processes**

AFMA undertake regular reviews of management arrangements in all managed fisheries, including the CSF. This includes review of conditions on fishing permits and review of management arrangements. Catch and trigger limits for the CSF are also reviewed and amended where necessary to ensure the fishery remains ecologically sustainable and economically efficient.

Outcomes of a recent review of management arrangements for the CSF have been outlined in section 3 of this report.

## **6 Harvest strategies – an overview**

The Commonwealth Fisheries Harvest Strategy Policy 2007 and associated Guidelines provides a consistent framework for taking the available information about a particular fish stock and applying an evidence-based, precautionary approach to setting harvest levels on a fishery by fishery basis. Harvest strategies set out the

management actions necessary to achieve defined biological and economic objectives in a fishery. Harvest strategies contain:

- a process for monitoring and conducting assessments of the biological and economic conditions of the fishery; and
- rules that control the intensity of fishing activity according to the biological and economic conditions of the fishery (as defined by the assessment). These rules are referred to as decision rules.

With a harvest strategy in place, fishery managers and industry are able to operate with greater confidence, management decisions are more transparent, and there should be fewer unanticipated outcomes necessitating hasty management responses.

Harvest strategies for the CSF were finalised in December 2007, and implemented with the start of the fishing year in July 2008. AFMA in consultation with industry and other stakeholders have developed four separate harvest strategies for the CSF; one for the Line, Trap and Trawl sectors, one for the Aquarium sector, one for the Sea Cucumber sector and one for the Lobster and Trochus sectors. These harvest strategies prescribe a range of reference points, or triggers, that allow controlled development of the fishery by requiring increased assessment and management actions with increasing fishing effort or catch. Each strategy has a series of triggers to detect changes in the fishery, based on catch composition, spatial distribution of catch and assessments of fishing catch and effort. The extent, and therefore cost, of the management response to a trigger being reached is linked to the potential risk to the fishery and level of uncertainty it presents.

Therefore, the first trigger point and decision rule aims to detect and determine why the change has occurred, its extent and possible implications, and appropriate management responses.

Reaching a higher level trigger point requires fishing for the species that triggered the response to cease in the fishing year until an assessment can show that it can continue by way of a revised trigger point. Following any assessment, trigger limits may be revised up or down.

#### **Line trap and trawl**

The harvest strategy for the Line, Trap and Trawl sectors of the CSF states that if any of the following conditions are met in a fishing year (1 July-30 June) a Level 1 response will be initiated:

- catch of any species meets or exceeds the historic high level for that species (based on all permits over a financial year);
- cumulative catch of all species taken by all line trap and trawl permits in a financial year reaches 450 tonnes;
- the take of white tip reef shark reaches 2.5 tonnes;
- the take of grey reef shark reaches 13 tonnes;

- the relative catch proportion of any species changes by 30% or more from the historical average and catch of that species is greater than one tonne for the fishing year; and
- the relative catch proportion of any species declines between years by 10% or more over three consecutive years (overall catch per unit effort (CPUE) not exceeding 50% decline in total over three years).

Level 1 responses include:

- detailed logbook data analysis;
- industry consultation to determine why the change has occurred and the perceived significance of the change;
- increased data collection;
- a revised risk analysis; and
- depending on the outcomes of the precautionary risk analysis, management responses may include spatial management and reduction of Level 2 triggers.

A range of spatial and CPUE triggers are also employed; the following conditions will trigger a Level 1 response:

- if the area fished changes by 40% or more;
- if 40% or more of the total catch is taken from a single area;
- if 40% or more of historically fished areas are not fished; and
- if CPUE for any species declines by 50% or more over the last three consecutive years without another trigger being reached.

If a trigger is reached in conjunction with a new species being taken, this will be taken into account.

If the Level 1 assessment cannot determine why the change has occurred or if it can be shown to be a risk to sustainability, then precautionary management responses such as spatial closures, move on provisions and revised triggers will result.

If any of the following conditions are met in a fishing year (1 July-30 June) a Level 2 response will be initiated.

- if any of the Level 1 spatial or CPUE trigger conditions are accompanied by a 50% or greater overall decline in CPUE over the past three years, a Level 2 response will be invoked (50% or greater inter-annual decline for three consecutive years).
- cumulative catch of all species taken by all line trap and trawl permits in a financial year reaches 1,000 tonnes;
- the relative catch proportion of any species changes by 30% or more from the historical average, catch of that species is greater than one tonne and there is a 50% or greater decline in CPUE over the last three years;

- the relative catch proportion of any species declines between years by 10% or more over three consecutive years and there is a 50% or greater overall decline in CPUE over the last three years (50% or greater inter-annual decline for three consecutive years);
- the take of white tip reef shark reaches five tonnes;
- the take of grey reef shark reaches 26 tonnes; and
- the CPUE for any species declines by 50% or more over the past three years without another trigger being reached.

If a Level 2 trigger is reached AFMA will undertake a detailed assessment of the species which triggered the change. This may involve:

- assessment of stored otoliths and/or vertebrae;
- catch curve analysis using collected age and size data, to estimate fishing mortality (F) and natural mortality (M);
- assessment of F/M (ratio) and/or spawner biomass per recruit (SBPR) empirically derived from catch curve analyses;
- a time series of total mortality (F+M) may also be assessed;
- Delury depletion curves (CPUE vs time) in combination with habitat mapping may also be used to estimate biomass for an area; and
- trends in CPUE, spatial and temporal catch and effort, length frequency and age of catch may also be assessed.

Total allowable catch limits may be established for particular species based on these analyses. Once assessments have been completed an appropriate action will occur, for example, changing trigger points and spatial management.

Until assessments are complete, triggers will remain at their current level and fishers must avoid catching the species which contributed to the trigger being hit; if this is not possible, trip limits will apply. The limits apply to the particular year in which the trigger was reached and may be revised up or down following completion of the assessment.

### **Lobster and Trochus**

Under the harvest strategy for the Lobster and Trochus sectors, if 30 tonnes of lobster tails or 30 tonnes of trochus are landed in a fishing year, monitoring will increase and may include additional details such as size of individuals. An assessment of the stock will also be undertaken with consideration also given to adjacent fisheries (Queensland, Great Barrier Reef and Torres Strait Island). Assessments must be completed within 12 months and annual catch must not exceed 30 tonnes until the assessment is completed. If the assessment is not completed within 12 months, the TAC will be reduced to 30 tonnes for lobster and 20 tonnes for trochus for the subsequent year. Once the assessment is complete, the limits may be revised up or down.

In addition to the requirements of the harvest strategy the following conditions also apply in these sectors:

- a minimum tail length of 125 millimetres applies to lobsters and a slot limit (size range) of 80 – 125 millimetres applies to trochus species;
- once operators collect the lesser of three tonnes of lobster tails or five tonnes of trochus the mothership must move at least 15 nautical miles to a new anchorage. This provision aims to prevent localised depletion;
- each permit specifies a maximum number of tender boats authorised to take fish using the boat specified in the permit; and
- a trigger limit of 30 tonnes (combined all species of lobster and trochus) is in place. If fishing effort reaches this level an evaluation of the sustainability and impacts is undertaken.

### **Aquarium**

Under the harvest strategy for the Aquarium sector, if any of the following conditions are met in a fishing year (1 July - 30 June) a Level 1 response will be initiated:

- a combined total of 200 fishing days are undertaken by Aquarium sector permit holders;
- a combined total of 40,000 individuals are landed by Aquarium sector permit holders;
- a combined total of 20 tonnes of live rock is landed by Aquarium sector permit holders or, if this limit has not been reached in the past three years, undertake an assessment within the following three years; and
- if a significant change has occurred in the relative catch proportion of any species group, the number of specimens landed is greater than 500 and no other trigger has been reached relating to this species group.

The catch proportions of various functional groups are also assessed in the Aquarium sector. These functional groups were developed due to the wide range of species and changing catch levels in response to market demands. Functional groups include, but are not limited to:

- angelfish;
- damsel fish;
- gobies;
- surgeon fish; and
- wrasses.

A Level 1 response may involve:

- detailed logbook data analysis;
- industry consultation to determine why the change has occurred and the perceived significance of the change; and
- a revised risk analysis.

If a combined total of 40 tonnes of live rock is landed by Aquarium sector permit holders then all take of live rock is to cease in the fishing year until a detailed assessment has been undertaken.

Following any assessment AFMA may revise catch limits, implement spatial closures, trip limits, move on provisions and/or increase monitoring for any species or areas within the fishery.

In addition to the requirements of the harvest strategy, each permit specifies a maximum number of tender boats authorised to take fish using the boat specified in the permit.

### **Sea Cucumber**

Annual catch limits which will trigger an assessment of the fishery are specified in the harvest strategy for the Sea Cucumber sector; these trigger limits are specified in Table 2 below. If any of these limits are reached, fishing for the relevant species must cease in the fishing year if and until the results from the assessment indicate that it is sustainable to do so.

An assessment may include consideration of the spatial distribution of catch and effort and will aim to establish species specific TACs. If data is insufficient to set TACs then a cost effective abundance survey will be undertaken.

In addition to the requirements of the harvest strategy the following conditions also apply to this sector:

- each permit in this sector of the CSF has an annual quota limit for each of five sea cucumber species and an annual quota limit of 75 tonnes for all species of sea cucumber (Table 2). There is a total allowable catch (TAC) limit of 150 tonnes of sea cucumber for the entire CSF which includes the afore-mentioned quotas. For all other species of sea cucumber, the remaining uncaught proportion of the total TAC determines the catch limit. There are also minimum size limit guidelines for sea cucumber which are implemented through a voluntary agreement with industry (see Table 2); and
- each permit specifies a maximum number of tender boats authorised to take fish using the boat specified in the permit. Once operators collect five tonnes of any species or combination of species the mother-ship must move at least 15 nautical miles to a new anchorage. This provision aims to prevent localised depletion. A rotational harvest strategy is also in place for this sector. A number of reefs are identified over which a limited amount of fishing activity may be undertaken over a period.

**Table 2 Catch limits (based on landed weight) for the Sea Cucumber sector in the CSF**

Common name	Species	Minimum size limit	Annual quota per permit	Total Allowable Catch
Black teatfish	<i>Holothuria whitmaei</i>	25 cm	500 kg	1 tonne
White teatfish	<i>Holothuria fuscogilva</i>	32 cm	2 tonnes	4 tonnes
Sand fish	<i>Holothuria scabra</i>	16 cm	500 kg	1 tonne
Prickly redfish	<i>Thelenota ananas</i>	30 cm	10 tonnes	20 tonnes
Surf red fish	<i>Actinopyga mauritiana</i>	15 cm	5 tonnes	10 tonnes
Any combination of greenfish and lollyfish	Greenfish – <i>Stichopus chloronotus</i> Lollyfish – <i>Holothuria atra</i>	15cm	5 tonnes	10 tonnes
Any other single species		15 cm	5 tonnes	10 tonnes
All species of the Order Aspidochirotida		15 cm	75 tonnes (including the take of the above species)	150 tonnes (including the take of the above species)

### Monitoring Progress Against the Harvest Strategies

AFMA monitors the activities of the fisheries against the harvest strategies for the CSF. Preliminary assessments indicate that there may be need to revise some triggers to ensure they are meeting their intended objectives. Review of the CSF harvest strategies will be undertaken during 2009/10 and will be undertaken in consultation with industry and scientific experts. The sensitivity of triggers, species identification and taxonomic resolution, data management and spatial management are all areas which AFMA will consider during the review.

## 7 Fishery sectors – gear and method descriptions

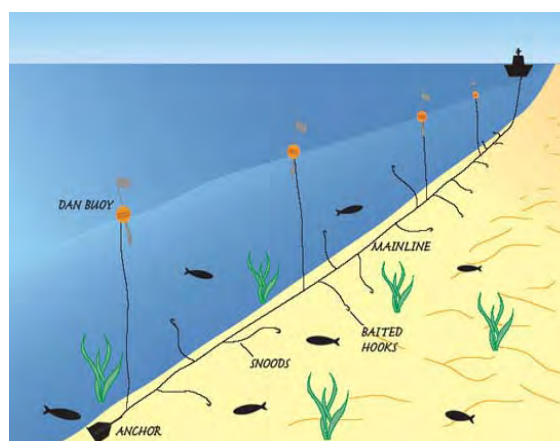
Descriptions from Kiolola et al, 1993.

### Line and Trap sector

Line and Trap sector permits allow the use of demersal longline, setline, dropline and trotline methods. Permit conditions aim to minimise interactions with protected species and include the use of tori lines, hook and depth limits and Observer coverage.

#### Demersal Longline

A demersal longline consists of a sinking mainline constructed of six to eight millimetre diameter synthetic rope with snoods (branch



lines) about 1 metre long attached at intervals of six to ten metres. Each snood carries a hook at one end and is attached to the main-line at the other end either permanently or by means of a 'snood clip'.

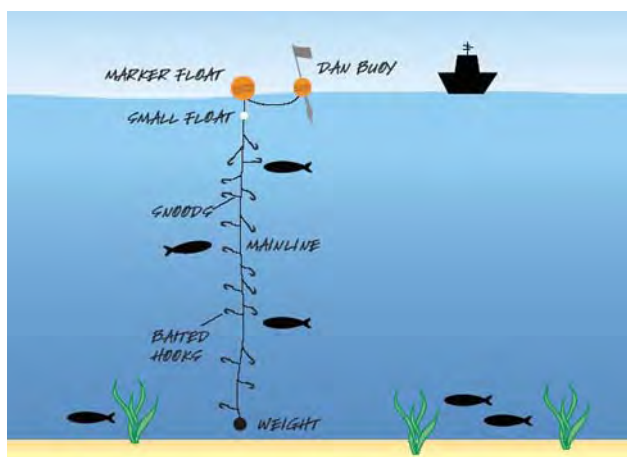
The gear is divided into a number of 'sets' which each has a certain number of hooks. Each hook is baited before the gear is deployed into the water. The hooks together with the main-line and an anchor weight at each end are placed on the seabed. A buoy and dan pole with flag attached by way of buoy-line to the main-line at each end for retrieval of the gear. The main-line is hauled from one end over a roller mounted on the gunnels by a line hauler.

Demersal longlines can be set in deep water on the continental slope and in strong tidal currents where it is more difficult to set other gear. The steep rocky slopes of seamounts and plateaus are usually targeted in depths ranging from 30 to 500 metres, most typically 370 metres (Furlarni et al. 2007).

Auto-longline uses the same method as demersal longline except automated baiting allows for deployment of more hooks in a shorter time period. Use of automatic or random baiting equipment with demersal longline gear is specifically prohibited unless otherwise stated in the permit conditions. AFMA will permit the use of such equipment by some operators in the fishery, subject to application and additional conditions such as conditions relating to bycatch reduction for seabirds. A minimum depth limit of 200 metres (unless an observer is on board) also applies to operators of automatic/random baiting equipment. At the time of writing, only one longline permit allows automatic/random baiting.

A trotline is very similar to the demersal longline described above. The main-line of a trotline has a small float attached to suspend it off the seabed, avoiding snagging on the bottom. The snoods (also called trots) are attached to the main-line in a similar way to demersal longlines at intervals of six to ten metres. These snoods are weighted and hang vertically under the main-line and act like a series of short droplines.

Trotlines are deployed and retrieved in a similar way to demersal longlines. All hooks are baited before deployment with similar baits to demersal longlines.



### **Dropline**

A dropline consists of a main-line, usually made of synthetic rope, set vertically in the water with a weight on the bottom and floats attached at the surface. Between ten and 100 short snoods are either clipped or permanently attached to the main-line at regular intervals at one end and have a hook on the other.

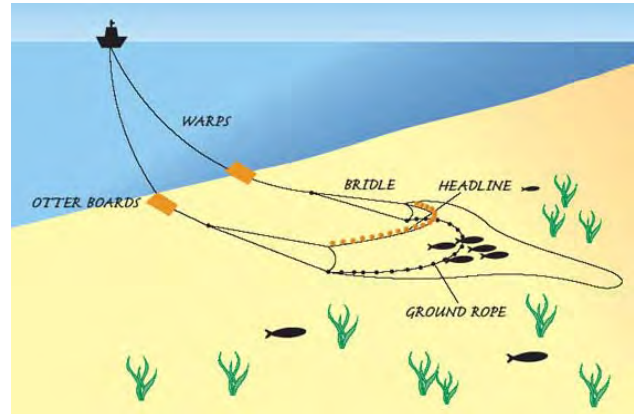
The hooks are baited before the gear is deployed. Gear is deployed by dropping the weighted end of the main-line overboard and letting the main-line run off, either attaching the snoods as the line deploys or allowing permanently fixed snoods to run off 'shooting rails'. The gear is retrieved by a line hauler (powered winch) with the caught fish removed from the snoods as they come aboard.

## Setline

Setline is the simplest form of fishing. A setline (or handline) is a line to which one or more lures or baits are attached. Setlines are set and retrieved manually, although electric or hydraulic motors are available to reduce labour.

## Trawl and Trap sector

Demersal and midwater otter board trawl gear is used in this sector to target bony fish and crustaceans. Demersal trawling is the term used to describe the fishing method where a net is towed along, or just above, the ocean floor in depths of water ranging from a few metres to 1,500 metres. A trawl net is attached to the vessel by two long wires, called warps which are attached to an otter board either side of the net. The net opening (mouth) is spread horizontally by the outward force acting on the otter boards as they are towed through the water. The bottom of the net opening is called the footrope and is heavier than the headline and normally in contact with the bottom. The footrope is often rigged with rubber rollers to minimise the damage to the seafloor and allow it to move across the substrate without becoming snagged. The top of the mouth (headline) is lifted vertically by a series of floats.



Otter trawling relies on the principle of herding fish inward from the otter boards and the sweep (wire from otter board to the headline and footrope) towards the mouth of the trawl net. Fish have a natural tendency to swim away from the otter boards, sweeps and net wings and fall backwards, towards the codend. The codend is the end of the net where the fish are caught. The size of the mesh in the codend is one of the most important factors in the size and shape of fish that are caught and those that escape.

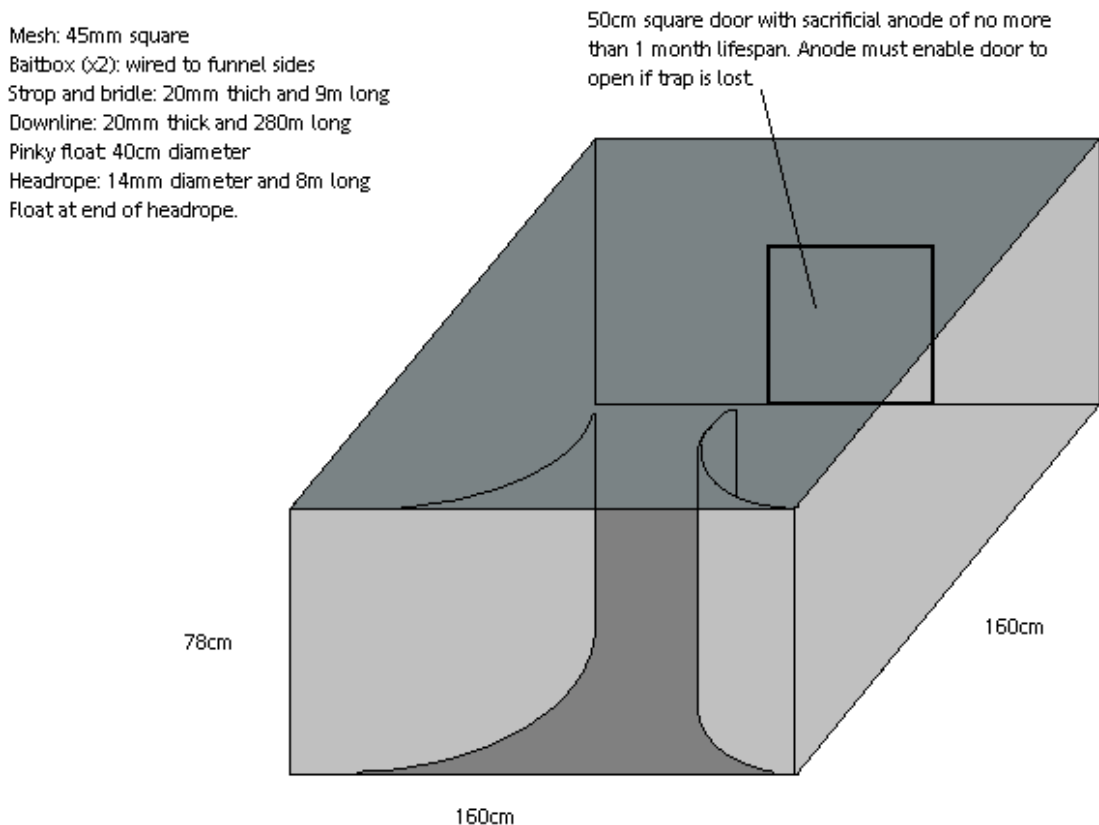
A trawl shot involves the net being deployed from the stern of the vessel by way of winches. The net is then towed along the bottom, usually at around three knots for a period of time before being hauled up toward the vessel. The fish are contained in the codend, which is fastened with a rope to release the catch on the vessel deck.

Trawl sector permit conditions aim to minimise interactions with protected species and specify a minimum net-mesh size and the use of Bycatch Reduction Devices (BRDs) when trawling for crustaceans.

Demersal finfish traps (trap provisions included on all Line and Trap, and Trawl and Trap permits) Fish traps are devices which fish enter voluntarily but from which they are prevented in some way from escaping. Fish are enticed into the trap either by bait or because the trap appears to provide some sort of refuge. Demersal finfish traps are set on the sea floor with a haul-in line, surface float and dan buoy to mark their position. Traps are left to fish from 20 minutes to 24 hours.

Galvanised steel traps are used in the CSF and there are limits on the number and size of traps used. All traps must be fitted with sacrificial anodes (of no more than one month life span fitted to trap doors) to avoid ghost fishing if the traps are lost. Traps in

the CSF are typically set at between 60 and 120 metres depth, with most catch occurring between 80-100 metres depth.



### **Lobster and Trochus sector**

Lobster and Trochus sector permits allow hand collection with or without the use of underwater breathing apparatus. Diving usually occurs within 30 metres of the surface.

The level of catch and effort is generally very low but can be highly variable across years. Effort is generally focused on three reefs closest to the GBRMP.

### **Aquarium sector**

The Aquarium sector generally operates within the 30 metre depth range, though there are no limitations associated with the permits. While a diverse range of fish species (over 500 species) are targeted for the aquarium trade, much of the trade tends to be focused on a limited number of species such as blue green chromis and humbugs (Roelofs and Silcock 2008). Collection of live rock by hand or use of non mechanical implements is also permitted, subject to an annual catch limit.

Aquarium sector permits allow operators to use either their hands, barbless hook and line, cast nets and seine nets and/or scoop nets for herding and catching fish. Underwater breathing apparatus (such as SCUBA or Hookah equipment) may also be used. Gear restrictions are in place for this sector and the use of chemicals and or explosives for taking fish is prohibited.

Each permit specifies a maximum number of tender boats and a trigger limit of 200 days fished per year is in place. If fishing effort reaches this level an evaluation of the sustainability and impacts is undertaken.

Both effort and catch can be highly variable in the CSF Aquarium sector. The current operators of CSF Aquarium sector permits also have permits that allow them to operate in the GBRMP, these are issued and managed by the Queensland Department of Primary Industries and Fisheries (QDPI&F). The majority of the fishing effort by these operators therefore tends to occur in these waters closer to shore. Logbook records of Aquarium catch and effort are shared across the GBRMP and the CSF. Although operators are prohibited from fishing in more than one fishery on any trip where they are fishing under the authority of their CSF fishing permit, differentiation of records is presently difficult. AFMA are currently developing new databases to better manage this data.

### **Sea Cucumber sector**

Collection of sea cucumber may only be done by hand with, or without the use of underwater breathing apparatus.

## **8 Other types of permits**

### **Fish Receiver Permits**

Some sectors of the CSF are required to unload their catch to a licensed Commonwealth Fish Receiver Permit holder. Where relevant, this requirement is stipulated in CSF fishing permit conditions.

Fish Receiver Permits are granted for 12 months duration and cannot be issued to the same person who holds a fishing permit. They cannot be transferred.

Fish Receivers are required to complete the Catch Disposal Record (CDR) within 50m of the point the consignment is unloaded however this can be extended to 500m upon written application to AFMA for an exemption.

### **Scientific Permits**

Scientific Permits are granted for the purposes of conducting scientific research in a specified area of the Australian Fishing Zone (AFZ) or in a specified fishery. An application made for the grant of a scientific permit must contain information that AFMA requires for proper consideration of the application.

Scientific Permits are granted for a maximum duration of six months and are not transferable.

## **9 Allocation between fishing sectors**

### **Commonwealth Fisheries**

AFMA manages all fishing in the CSF, which is commercial in nature. The Eastern Tuna and Billfish Fishery, Eastern Skipjack Tuna Fishery and the Southern Bluefin Tuna Fishery all overlap the CSF area of waters. These fisheries operate pelagically targeting Tuna and Tuna-like species. All CSF concessions are prohibited from targeting or being in possession of Tuna or Tuna-like species. The Southern and Eastern Scalefish and Shark Fishery and Southern Squid Jig Fishery are adjacent to the southern bounds of the CSF and the Torres Strait fisheries bound areas of waters to the north of the CSF; these fisheries are managed separately to the CSF.

### **Recreational and Charter Fisheries**

Recreational and charter fishing in the CSF is managed by the QDPI&F. A number of charter operators run recreational fishing trips into the waters of the CSF. The fishery is remote and consequently only a small number of recreational trips are run each year. Catch from these trips is thought to be small.

### **Indigenous Fisheries**

Indigenous Fishing in the CSF is managed by the QDPI&F. Due to the CSF's distance from the coastline, the level of indigenous fishing in the CSF is thought to be minimal or non-existent. A project funded by the Fisheries Research and Development Corporation (FRDC) entitled the National Recreational and Indigenous Fishing Survey (Project No. 99/158) provided no additional information on indigenous fishing in the waters of the CSF.

### **State Managed Commercial Fisheries**

A number of commercial fisheries exist in Queensland state managed waters adjacent to the western bounds of the CSF.

## **10 Status of export approval/accreditation under the *Environment Protection and Biodiversity Act 1999***

The CSF was last assessed in 2007 under section 33, Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). Harvesting operations in the CSF were declared an approved Wildlife Trade Operation on 16 November 2007 until 19 March 2009, subject to a range of conditions and recommendations to improve management of the fishery. Details of the fishery's progress against these recommendations are detailed in section 30 of this report.

## **11 Observers**

The observer's role is to collect independent, accurate and reliable data on Commonwealth fishing operations, catches and interactions with the environment by the vessel and its fishing gear.

This is achieved through:

- collection of vessel activity and catch data, (which is not obtainable through official logbooks);
- collection of data for implementing harvest strategies, research programs, supporting marine management and other issues relevant to environmental awareness and management; and
- monitoring compliance of the vessel with its fishing agreements.

All CSF fishing operators must be able to facilitate carriage of an AFMA observer if requested to do so. All CSF fishing operators must also comply with the following minimum observer coverage requirements as stated on their fishing permit. It is the responsibility of the concession holder to monitor their observer coverage and notify AFMA at least 72 hours prior to departure to arrange for an observer as necessary.

**Line and Trap sector and Trawl and Trap sector:** Operators in these sectors are required to carry an observer on their first trip of the period starting 1 July – 30 June, and every fourth trip thereafter, covering at least 25% of all shots and trap lifts each year. Following application by the permit holder, AFMA may reduce the minimum observer coverage to one in eight trips.

**Sea Cucumber sector, Aquarium sector and Lobster and Trochus sector:** There is no prescribed minimum observer coverage for these sections with coverage being as requested by AFMA.

## 12 Catch data

Catch data is collected for the CSF via logbooks and verified by catch disposal records and observer coverage. The small number of operators in the CSF prevents the public release of this data under current AFMA confidentiality policy.

## 13 Vessel Monitoring Systems

All AFMA licensed vessels in the CSF must operate an AFMA approved Vessel Monitoring System (VMS) to allow AFMA to monitor their activity.

## 14 Protected species, threat abatement plans, recovery plans, domestic and international agreements

The Threat Abatement Plan 2006 for the incidental catch of seabirds during oceanic longline fishing operations (TAP) applies to the CSF. This TAP is closely linked to recovery plans for threatened seabirds caught on longlines and Australia's National Plan of Action – Seabirds prepared to meet Australia's commitment to the Fisheries and Agriculture Organisation International Plan of Action for reducing the Incidental Catch of Seabirds in Longline Fisheries.

Auto longline fishing operations are currently required to carry observers for one in every four trips (or one in every three trips if using certain types of random/automatic baiting gear). An auto longline permit holder with a vessel that has had 100,000 hook sets observed by an AFMA observer (in this and/or other domestic fisheries) and who has met the current longline fishing TAP requirements may apply in writing to AFMA to have observer coverage reduced to one in eight trips, with a minimum coverage of at least 10% of hooks set annually.

Tori poles and streamers are compulsory for auto longline operations and deter birds from interacting with baits.

### Protected Species Identification Guide

To help operators accurately report their protected species interactions, AFMA has produced a protected species identification guide. This guide covers the range of protected species that AFMA managed fisheries do, or have the potential to, interact with during their normal fishing operations. The guide provides pictures of these species along with an indicative distribution and key biological information. All CSF boats have been provided with a copy of this identification guide.

## **Interactions with a Protected Species**

"Interaction" means any physical contact an individual (person, boat or gear) has with a protected species that causes death, injury or stress to the individual directly resulting from fishing activities. This includes any collisions, catching hooking, netting, entangling, or trapping of a protected species.

CSF line, trawl, trap, and hand collection operators (other than Aquarium) are required to report interactions with protected species in their Commonwealth logbook. Aquarium operators must report interactions with protected species in the "comments" section of their relevant Queensland Logbook. Completed original logsheets must be submitted to AFMA. No protected species interactions have been reported in the CSF to date.

## **15 Impacts of the fishery on the ecosystem**

### **Ecological Risk Assessments**

Through an approach known as ecosystem based fisheries management (EBFM), AFMA aims to minimise the impacts of Commonwealth managed fisheries on all aspects of the marine ecosystem. AFMA's adoption of EBFM is a significant departure from traditional fisheries management with the focus shifted from the direct management of target species to also considering the impacts on bycatch species, TEP species, habitats, and communities.

Key to AFMA's implementation of EBFM has been to develop and implement an ecological risk management (ERM) framework. The framework details a robust and transparent process to assess, analyse and respond to the ecological risks posed by Commonwealth managed fisheries.

The ERM framework progresses through a number of steps and involves a hierarchy of risk assessment methodologies progressing from a comprehensive but largely qualitative analysis at Level 1 to a quantitative analysis at level three. This approach means low risk activities can be screened out and attention can be focused more intensive and quantitative analyses on those activities assessed as having a greater environmental impact on AFMA managed fisheries.

The initial assessment stage involves the development of a qualitative ecological risk assessment (ERA) for each individual fishery. Ecological Risk Assessments assess the impact, direct and indirect, that a fishery's activities may have on the marine ecosystem. These assessments provide the foundation for further risk assessment and analysis.

Eight level 1 ERAs were completed for the CSF in 2006. It was decided at that time not to continue the assessment of the fishery to the Level 2 stage due to a paucity of catch and effort data. In reaching this decision AFMA also took account of the relatively high of cost of management versus the low GVP of the fishery.

The 2007 WTO approval was conditional on AFMA progressing ERAs for the CSF to Level 2. Following discussions between AFMA and DEWHA, it was agreed that the ERA Level 2 assessment would be undertaken in two parts and would be qualitative in nature; recognising the ongoing data limitations. The first part of this Level 2 ERA has been undertaken and the results are presented in Section 29 of this report. The assessment focussed on chondrichthyans (sharks, skates, chimaeras and rays) and TEP species. Subsequent assessment of target and bycatch species was agreed, following discussions with DEWHA, to be excluded from the assessment at this time.

## 16 Spatial issues

Two Marine Protected Areas Coringa-Herald National Nature Reserve and Lihou Reef National Nature Reserve exist within the bounds of the CSF and cover an area of approximately 17,000 square kilometres. No commercial fishing is permitted in these reserves and management provisions are in place to detect any illegal fishing in these waters.

Provisions are in place for the Lobster and Trochus and the Sea Cucumber sectors which require fishing operators to move their mother-ship once a specified amount of quota or effort is reached. These measures help prevent localised depletion within the fishery.

Since July 2005 fishing permit holders targeting sea cucumbers have been signatories to the Memorandum of Understanding (MOU) in relation to the Queensland Sea Cucumber Association for the Waters Under Australian Fisheries Management Authority Jurisdiction (2005–2008). This stipulates a three-year rotational harvesting strategy for sea cucumber on 21 reefs within the Coral Sea. The conditions of this memorandum are incorporated into the permit conditions and management arrangements for the sector.

Auto-longliners must fish in waters deeper than 200 metres unless an observer is on board. If an observer is on board 50% of lines may be set shallower than 200 metres.

A MOU has been negotiated between the Coral Sea Fishers Association (CSFA) and the Cod Hole and Ribbon Reef Operators Association (CHARROA). Under the MOU, the CSFA has agreed not to hook fish within two kilometres of particular reefs in the CSF (Osprey Reef, Bouganville Reef, Flora Reef, Dart Reef and Heralds Surprise reef) in order to preserve iconic species of importance to tourist operators. In addition, a circular area with 0.75 nautical mile radius around CHARROA moorings at Osprey Reef, namely North Horn and Admiralty Anchor is protected from all fishing of sharks, rays, potato cod, Maori wrasse, Queensland groper, anemones and anemone fish.

## 17 Performance of the fishery against objectives, performance indicators and performance measures

The CSF is managed in accordance with the objectives specified in section 3 of the *Fisheries Management Act 1991* (the Act). The performance of the fishery is reported in the annual report available at webpage:

<http://www.afma.gov.au/information/publications/corporate/annual/default.htm>

## 18 Compliance risks present in the fishery and actions taken to reduce these risks

Compliance risks in the fishery include illegal fishing by unlicensed operators and fishing by licensed operators contrary to specified permit conditions. Illegal fishing by licensed operators could potentially include fishing in excess of allocated quota, non-compliance with size and gear restrictions and contravention of rotational harvest plans and spatial closures.

Measures taken to monitor compliance with CSF permit conditions and management arrangements include:

- patrols by Coastwatch (air and sea) and investigations to ensure vessels operating in the area have the appropriate permits and are complying with the conditions of these permits.
- all sectors of the CSF are required to have an operational VMS installed on their fishing vessels, this data is used by AFMA to monitor activity in the fishery and verify other reported data.
- all relevant information about fish taken in the CSF as well as information on bycatch, discards and interactions with protected species must be accurately and fully recorded and submitted in appropriate logbooks. Catch Disposal Records are also required for all sectors other than the Aquarium sector.
- catch verification is also supported by prior to landing reports in the Sea Cucumber sector; prior to departure reports in the Sea Cucumber sector and also the Aquarium sector if live rock has been collected; single jurisdiction trips in all sectors; and observer coverage requirements for auto longlining, demersal finfish trapping and trawling.
- AFMA Fisheries Officers conduct both vessel and fish receiver premise inspections in accordance with section 84 of the *Fisheries Management Act 1991* (FMA).

No inspections were undertaken at sea, in port or of fish receivers for the CSF during 2007/08. Compliance monitoring activity is targeted based on intelligence received and may also be opportunistic.

## **19 Compliance with threat abatement plans, recovery plans, domestic and international agreements**

The *Threat Abatement Plan 2006 for the incidental catch of seabirds during oceanic longline fishing operations* (TAP) applies to the CSF. This TAP is closely linked to recovery plans for threatened seabirds caught on longlines and Australia's *National Plan of Action – Seabirds* prepared to meet Australia's commitment to the Fisheries and Agriculture Organisation *International Plan of Action for reducing the Incidental Catch of Seabirds in Longline Fisheries*.

Auto longline fishing operations are currently required to carry observers for one in every four trips. An auto longline permit holder with a vessel that has had 100,000 hook sets observed by an AFMA observer (in this and/or other domestic fisheries) and who has met the current longline fishing Threat Abatement Plan (TAP) requirements may apply in writing to AFMA to have observer coverage reduced to one in eight trips, with a minimum coverage of at least 10% of hooks set annually.

Tori poles and streamers are compulsory for auto longline operations and deter birds from interacting with baits. AFMA recorded no infringements of these provisions in the 2006/2007 financial year.

The recovery of marine turtles is promoted through *The Recovery Plan for Marine Turtles in Australia, 2003*. Turtle exclusion devices have been required to be fitted to nets during trawl operations targeting crustaceans in the CSF. Observers are required

on one in four trawl trips. No interactions with marine turtles have been reported. AFMA and DEWHA allowed a trial of trawling for crustaceans at depths exceeding 400 metres during 2007. Compulsory observer coverage was required and no interactions with marine turtles were observed.

## **20 Catch data**

Catch data for the CSF is collected via logbooks. This data is verified by a combination of catch disposal records and Observer coverage for most sectors. Catch data for the CSF has been submitted to DEWHA, however, the small number of operators in the CSF prevents the public release of this data under current AFMA confidentiality policy.

## **21 Total catch of target species (including retained and discarded catch)**

The CSF targets a wide range of species on a largely opportunistic basis, as such, the distinction between target and non-target species is difficult to make. Species encountered by the CSF and other fisheries are recorded in logbooks. It should be noted that many species reported in the data are taken as bycatch by fisheries other than the CSF and may be discarded by these fisheries and also the CSF.

The total discard rate is generally low for the CSF. It is unlikely that all species retained in the catch are target species due to the often exploratory nature of the fishery.

## **22 Total catch of target species taken in other fisheries (if applicable)**

It is unlikely that all species retained in the catch are target species due to the often investigative nature of the fishery.

## **23 Catch of byproduct species (reported by species)**

Please see section 21.

## **24 Total catch of bycatch species (reported by species if possible)**

Please see section 21.

## **25 Harvest by each sector (i.e. commercial, recreational, indigenous and illegal)**

All AFMA licensed vessels in the CSF must operate VMS to allow AFMA to monitor their activity. There is no evidence of illegal harvesting by CSF or other fishing vessels.

A number of charter operators run recreational fishing trips into the CSF. The fishery is remote and consequently only a small number of recreational trips are run each year. Catch from these trips is thought to be small. Recreational fishing in the area of the CSF is managed by QDPI&F.

Due to the CSF's distance from the coastline, the level of indigenous fishing in the CSF is thought to be minimal or non-existent. A project funded by the Fisheries Research and Development Corporation (FRDC) entitled the National Recreational and Indigenous Fishing Survey (Project No. 99/158) provided no additional information on indigenous fishing in the waters of the CSF.

### **Commonwealth fisheries**

Please see section 22.

A number of other Commonwealth fisheries overlap or are located near to the CSF.

The Eastern Tuna and Billfish Fishery, Eastern Skipjack Tuna Fishery and the Southern Bluefin Tuna Fishery all overlap the CSF area of waters but operate pelagically targeting tuna and tuna-like species. All CSF concessions are prohibited from targeting or being in possession of tuna or tuna-like species.

The Southern and Eastern Scalefish and Shark Fishery (SESSF) and Southern Squid Jig Fishery are adjacent to the southern bounds of the CSF. The SESSF is a large fishery comprised of many sectors and sub-fisheries. Key species taken in the CSF are not taken by sectors of the SESSF located near the CSF and those species taken by SESSF sectors located further south appear in very small quantities (see Table 4 above). The Southern Squid Jig Fishery is also not represented in Table 4 as squid were not targeted or caught in significant numbers in the CSF. A range of fisheries exist in the waters of Torres Strait, north - north/west of the CSF. These fisheries include prawn, tropical rock lobster, Spanish mackerel, barramundi, pearl shell, dugong and turtle, finfish, crab, trochus and sea cucumber. The linkages between the Torres Strait and Coral Sea fisheries have not yet been explored.

### **State fisheries**

A number of commercial fisheries exist in Queensland state managed waters adjacent to the western bounds of the CSF. The linkages between the stocks in the CSF and inshore waters are unknown at this time. Stocks are managed separately and operators in the CSF are prohibited from fishing in any other fishery on the same trip as fishing in the CSF; in this way, state and commonwealth catches can be clearly differentiated.

### **Recreational fisheries**

Recreational anglers fish in the same waters as the CSF. Because the CSF lies some distance from the coast and outside the Barrier Reef, most recreational fishing is undertaken by charter fishing operators.

Recreational catch is relatively small and appears to be well managed by Queensland state fisheries managers.

## **26 Effort data including information on any trends**

Catch data for the CSF has been submitted to DEWHA, however, the small number of operators in the CSF prevents the public release of this data under current AFMA confidentiality policy.

## **Spatial issues/trends**

Two Marine Protected Areas (Coringa-Herald National Nature Reserve and Lihou Reef National Nature Reserve) exist within the bounds of the CSF and cover a total area of approximately 17,000 square kilometres. No commercial fishing is permitted in these reserves and management arrangements are in place to detect any illegal fishing in these waters.

Provisions are in place for the Lobster and Trochus and the Sea Cucumber sectors which require fishing operators to move their mother-ship once a specified amount of quota or effort is reached. These measures help prevent localised depletion within the fishery.

Since July 2005 fishing permit holders targeting sea cucumbers have been signatories to the *Memorandum of Understanding in relation to the Queensland Sea Cucumber Association for the Waters under Australian Fisheries Management Authority Jurisdiction (2005–2008)*. This stipulates a 3-year rotational harvesting strategy for bêche-de-mer on 21 reefs within the Coral Sea. The conditions of this memorandum were incorporated into the permit conditions and management arrangements for the sector from 1 July 2006.

Auto-longliners must fish in waters deeper than 200 metres unless an observer is on board. If an observer is on board 50% of lines may be set shallower than 200 metres.

A MOU has been negotiated between the Coral Sea Fishers Association (CSFA) and the Cod Hole and Ribbon Reef Operators Association (CHARROA). Under the MOU, the CSFA has agreed not to hook fish within two kilometres of particular reefs in the CSF (Osprey Reef, Bouganville Reef, Flora Reef, Dart Reef and Heralds Surprise reef) in order to preserve iconic species of importance to tourist operators. In addition, a circular area with 0.75 nautical mile radius around CHARROA moorings at Osprey Reef, namely North Horn and Admiralty Anchor is protected from all fishing of sharks, rays, potato cod, Maori wrasse, Queensland grouper, anemones and anemone fish.

## **27 Status of target stock**

### **Resource concerns**

The 2007 BRS fishery status report for the CSF describes all stocks in the CSF as uncertain and notes that there is little information available to assess the sustainability of catches or status of stocks. There are no identified resource concerns in the CSF at this time. AFMA is working to improve the available data to clarify the status of the fishery.

### **Results of stock assessments**

An assessment of logbook and catch data was performed for the Sea Cucumber sector in 2002 and this led to the Total Allowable Catch limits (TACs) being reduced. There have been no other stock assessments undertaken in the CSF since this time. Management arrangements have established precautionary low level TACs for sea cucumber species of global concern.

Development of an indicator of stock status for the Sea Cucumber sector (as recommended by DEWHA) is currently being considered with the Scientific Advisory Group HarvestSAG. Analyses of catch rates together with estimates of sea cucumber

habitat from recent reef mapping initiatives may be useful for estimating sea cucumber stock size and relative stock status in the CSF. This approach is currently being developed for the adjoining sea cucumber fishery in the GBRMP.

### **Results of stock recovery strategies**

AFMA introduced measures to recover stocks of certain sea cucumber species in 2002. These measures included Total Allowable Catch limit (TAC) reductions and the introduction of a rotational harvest strategy to prevent localised depletion. The results of these measures have not yet been assessed.

The Commonwealth Harvest Strategy Policy under which the harvest strategy for the CSF has been developed, specifies measures to be undertaken to prevent overfishing and recover overfished stocks to sustainable levels.

## **28 Interactions with protected species**

### **Frequency and nature of interactions**

No interactions with protected species have been reported in the CSF, this may be attributable to the limited fishing effort, small number of operators and the fact that several sectors of the fishery use hand collection.

### **Management action taken to reduce interactions, and results**

Conditions attached to permits specify measures that must be undertaken by operators to avoid interactions with protected species. These include gear restrictions such as minimum net-mesh size on trawl permits, the use of Tori lines and other provisions aimed at avoiding interactions with sea birds on line permits, and requirements to report any interactions to AFMA, supported by AFMA Observers.

No interactions with protected species in the CSF have been recorded from logbook data or Observer reports.

## **29 Impacts of the fishery on the ecosystem**

### **Results of Ecological Risk Assessments**

During 2006, Level 1 ERAs were completed for all CSF sectors.

Impacts identified by the Level 1 ERAs included:

- Translocation of species
- Anchoring/mooring and other anthropogenic activities as a habitat hazard
- Other fisheries in the region as a community hazard
- Fishing activity with and without capture disturbing physical processes and impacting on habitats and target and byproduct species
- Gear loss
- Provisioning (providing food resources) for TEP and other species

- Discarding as a hazard to target and byproduct species
- Concerns regarding exploitation levels of certain species

Further qualitative risk analyses (equivalent to Level 2) were commenced in 2008; these analyses have been divided into two parts. The first part assesses the risks that the CSF poses to chondrichthyans and to TEP species found in the Coral Sea region. This first part has been completed and been submitted to DEWHA, however, the small number of operators in the CSF prevents the public release of this report under current AFMA confidentiality policy. A summary of the qualitative risk analysis for chondrichthian and TEP species is provided below.

One hundred and nine TEP species were identified as possibly occurring in the area of the CSF from an EPBC Act Protected Matters search, including 13 birds; 44 sea horses and pipefish; 23 reptiles; 28 cetaceans and one chondrichthyan. A further 109 chondrichthyan species that may also be expected to occur in the CSF were identified from an analysis undertaken by GBRMPA; these species were also assessed.

Risk was assessed across the eight fishing sectors and included consideration of:

- productivity risk scores;
- species distribution ratings; and
- post-capture mortality risk scores (for species also found in other fisheries assessed under the Level 2 Productivity Susceptibility Analysis (PSA) methodology).

In fisheries with similar gear types and practices, gear selectivity and spatial overlap risk scores (also taken from the corresponding Level 2 PSA) were used as a guide for assessing risk levels to species groups. Where there was no information for a species or animal group, the highest level of risk was assumed.

The qualitative risk assessment process identified a range of risks across the CSF fishing sectors. The hand collection sectors including Aquarium, Lobster and Trochus, and Sea Cucumber, were assessed as low risk to all TEP and chondrichthyan species. These sectors employ methods that are targeted with zero bycatch and have limited interactions with non-target species. Consequently, these sectors require few mitigative responses.

The remaining sectors present a range of risks to TEP and chondrichthyan species which require mitigative responses. The Demersal Trawl sector represents a medium to high level of risk to all TEP and chondrichthyan species and a high risk to marine turtles and bathyl shark species. The Demersal and Auto-Longline sector was assessed and found to represent a high risk to marine turtles and, given the targeting of sharks by the sector, a high risk to all chondrichthyan species. The Other Line sector presents similar risk levels for TEP and chondrichthyan species and was assessed as high risk to marine turtles and all chondrichthyans. Finally the Finfish Trap sector allows for the safe release of non-target species; consequently, this sector was assessed as representing a low to medium risk to TEP and chondrichthyan species.

The second part of the analysis will assess the risk that the CSF poses to target, bycatch and by-product species. This is anticipated to be completed during 2009.

## Management action taken to reduce impacts, and results

AFMA is already implementing numerous measures which mitigate ecological risks in the CSF; these measures are outlined throughout this document.

Turtle Exclusion Devices (TEDs) are required to be used whenever trawling for crustaceans in the CSF, however, the risk of interacting with a turtle at the depths trawled are considered negligible (Limpus, 2008); the greatest risk occurs during setting and hauling, the latter of which facilitates the release of the turtle alive even if caught in the net.

There have been no interactions with turtles reported in either logbook records or by AFMA observers in the CSF. Consequently, no additional mitigative measures are considered necessary at this time.

Targeting of chondrichthyan species, primarily sharks by the CSF is not prohibited and current catches of these species are considered sustainable. Harvest strategies in place for the CSF prescribe conservative catch limits for key species and trigger limits for all species. Improved species identification may improve data available for assessing the fishery under these strategies. No further mitigative measures are considered necessary at this time.

## 30 Progress in implementation of recommendations and conditions resulting from the previous assessment of the fishery

### Progress in implementing each recommendation and condition

All sectors of the CSF have been accredited as Wildlife Trade Operations (WTO) and exempted from export restrictions under the *Environmental Protection and Biodiversity Conservation Act 1999* until 19 March 2009.

AFMA reports its progress in implementing recommendations and conditions resulting from strategic assessments of the CSF to DEWHA biannually. The last progress report was provided to DEWHA in September 2008.

An outline of progress to date is provided below.

**Table 7. Recommendations to the Australian Fisheries Management Authority (AFMA) on the ecologically sustainable management of the CSF.**

Performance Criteria	Level of Achievement as at 30 June 2008	Deadline
<b>Condition 1:</b> Operation of the fishery will be carried out in accordance with the CSF management regime made under <i>Statement of Management Arrangements, Coral Sea Fishery 2007</i> , in force under the <i>Fisheries Management Act 1991</i> .	Yes	Ongoing

Performance Criteria	Level of Achievement as at 30 June 2008	Deadline
<p><b>Condition 2:</b> The Australian Fisheries Management Authority (AFMA) to inform the Department of the Environment, Water, Heritage and the Arts (DEWHA) of any intended amendments to the management arrangements that may affect the criteria on which <i>Environment Protection and Biodiversity Conservation Act 1999</i> (EPBC Act) decisions are based.</p>	<p>Yes DEWHA was advised of changes to management arrangements for the CSF on 6 August 2008. These changes strengthened management arrangements and did not diminish the sustainability of the fishery. DEWHA has also participated in the annual CSF Stakeholder Committee meeting.</p>	<p>Ongoing</p>
<p><b>Condition 3:</b> AFMA to produce and present reports to DEWHA annually as per Appendix B to the <i>Guidelines for the Ecologically Sustainable Management of Fisheries - 2<sup>nd</sup> Edition</i>.</p>	<p>Yes</p>	<p>This report is the first since the fishery was last strategically assessed in November 2007.</p>
<p><b>Condition 4:</b> AFMA to develop and finalise the Harvest Strategy for the CSF by 31 July 2008.</p>	<p>Yes All CSF harvest strategies were finalised on 12 December 2007.</p>	<p>Completed</p>
<p><b>Condition 5:</b> By 19 March 2009 AFMA to finalise the Ecological Risk Assessment (ERA) for the CSF. AFMA to then identify and implement appropriate management responses, to address and mitigate risks and impacts identified in the ERA.</p>	<p>Yes Following discussions between AFMA and DEWHA officers, AFMA has completed a qualitative risk assessment focusing on chondrichthyans and TEP species. Identification and implementation of appropriate management responses is being undertaken and is expected to be completed during 2009. Assessment, of target and bycatch species (second part of the assessment) will be scheduled in 2009. These activities are consistent with broader Ecological Risk Management activities being implemented for all Commonwealth fisheries.</p>	<p>19 March 2009</p>
<p><b>Recommendation 1:</b> AFMA to continue to cooperate with QDPI&amp;F to pursue complementary management and research of shared stocks for all target and by-product species.</p>	<p>Yes AFMA has worked with QDPI&amp;F on issues relating to multi-jurisdiction trips, <i>chondrichthyans</i>, and the landing and sale of red bass in Queensland during 2007-2008. AFMA Officers participated in Management Advisory Committee and Scientific Advisory Group meetings during</p>	<p>Ongoing</p>

Performance Criteria	Level of Achievement as at 30 June 2008	Deadline
	this time.	
<b>Recommendation 2:</b> AFMA to develop performance measures and performance indicators that take account of fishery impacts on bycatch species, protected species and the ecosystem for all sectors of the CSF by 31 December 2008.	Yes Harvest strategies for the CSF have been developed which take into account all species, including bycatch species. These species are monitored and assessed as required under the harvest strategy to mitigate against any impact.  Management arrangements and voluntary industry practices, such as rotational harvest strategies and designated mooring points are in place to limit impacts from fishing on the environment.	Completed
<b>Recommendation 3:</b> AFMA to continue monitoring compliance with CSF permit conditions, management arrangements and bycatch and protected species policies and plans. Within 3 months of becoming aware that a breach of the management arrangements has occurred, AFMA to develop a clear timetable for the implementation of appropriate management responses.	Yes. No breaches detected.  All line, trap and trawl fishing permits require observer coverage on the first trip and then on 25% of subsequent fishing trips each fishing year.	Ongoing

### How the measures implemented have improved the fishery

The development of harvest strategies for the CSF has provided a comprehensive framework for monitoring activity and changes in the CSF. The harvest strategies have been developed for each sector and so are best able to cater to the diverse fishing methods, species and areas which make up the CSF. AFMA are still working to improve the data systems necessary to best implement the harvest strategies and it is hoped that this ongoing process will both improve the available information on the fishery.

The ERA process has allowed AFMA to identify key risks in the fishery and better target mitigation measures. This process is ongoing.

Amendments to CSF fishing permit conditions have made management of the fishery more streamlined, conditions easier to abide by and enforce. The increased level of Observer coverage will improve the available data on the fishery and limiting processing of sharks at sea will better facilitate species identification, enforcement of conditions and further discourage the practice of 'finning'.

## 31 Research and Monitoring

## **Results of any research completed relevant to the fishery, including how results will be incorporated into management of the fishery**

AFMA has assessed and issued a scientific permit for the assessment of nautilus in the CSF during 2008. This permit facilitates ongoing research into this species, with information then being reported back to AFMA. Although nautilus are not currently targeted by the CSF, this research is considered useful in furthering understanding of this species in the fishery.

AFMA has also convened a Chondrichthyan Working Group to assess the impacts of fishing, across all Commonwealth fisheries on chondrichthyan species. This group comprised eminent researchers in this field and delivered recommendations on ways in which AFMA can continue to improve its management of chondrichthyan species.

## **Description of monitoring programs used to gather information on the fishery (such as observer programs, long term monitoring programs etc) and results of these**

Catch disposal records are used to verify and monitor catches in all sectors except the Aquarium sector. Prior to landing reports are used in the Aquarium sector and require operators to specify what catch they have prior to landing.

Integrated Computer Vessel Monitoring Systems are compulsory for all vessels operating in the CSF. Vessel Monitoring Systems are used to monitor vessel operations.

Compulsory observer coverage applies to all CSF permits except the Aquarium, Sea Cucumber and Lobster and Trochus sectors. In these hand collection sectors, where bycatch does not occur, observer coverage is undertaken on an opportunistic basis.

## **Results of collaborative research undertaken for the fishery**

AFMA utilise the assistance of industry members wherever possible to collect information on the fishery.

Collaborative arrangements recently established with the Queensland Scientific Advisory Groups are encouraging the development of consistent approaches and collaborative research.

## 32 References

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