Annual status report 2007

East Coast Beche-de-mer Fishery

Queensland Government
Department of **Primary Industries and Fisheries**

PR07–3350

The Department of Primary Industries and Fisheries (DPI&F) seeks to maximise the economic potential of Queensland's primary industries on a sustainable basis.

Introduction

The Queensland East Coast Bêche-de-mer[1] Fishery (ECBDMF) is one of the oldest fisheries in the state, with commercial harvesting beginning in the early 1800s. Fishers can harvest all species of sea cucumber found in Queensland waters. However, the fishery has a history of focusing effort on the most commercially valuable species, such as black teatfish[2], sandfish, white teatfish, and more recently, burrowing blackfish. Product harvested in the ECBDMF is entirely exported, predominantly to China and other Asian nations for consumption and use in traditional Chinese medicines.

Through industry innovation and initiatives, the ECBDMF has grown to become one of the limited number of sustainably managed sea cucumber fisheries in the world.

This report covers the July 2006 to June 2007 financial year.

Fishery profile 2006–07

Commercial harvest: approximately 284 t

Recreational harvest: no estimate but considered negligible

Indigenous harvest: no estimate but considered negligible

Charter harvest: nil

Commercial Gross Value of Production (GVP): approximately $6.5 million

Number of licences: 18 licences held by 3 operators

Commercial fishing boats accessing the fishery: seven

Fishery season: sea cucumber may be caught all year round

Description of the fishery

Fishing methods

Commercial sea cucumber fishers are permitted to harvest by hand, using free-diving methods or with the aid of hookah apparatus or Self Contained Underwater Breathing Apparatus (SCUBA). Recreational fishers are permitted only to harvest by hand, without the aid of hookah apparatus or SCUBA.

1 Bêche-de-mer (or trepang) is the term referring to the commercial product produced by processing (gutting, boiling and drying) the body of sea cucumbers or holothurians.

2 The commercial Total Allowable Catch (TAC) for black teatfish remains at 0 t. Because of the lack of evidence supporting the proposition that the harvest of this species is sustainable, harvesting is unlikely to recommence. The commercial TAC was set in October 1999 following concerns over the sustainability of the black teatfish stocks. A performance measure is being developed for the ECBDMF that provides the criteria for a recovery strategy for commercial sea cucumber species considered to be below sustainable levels.

Fishing area

Commercial fishing under the B1 fishery symbol is authorised from Tin Can Bay (26°S) to Cape York (10°41'S) (Figure 1). Historically, effort has been focused on reef areas in northern Queensland between Townsville (19°30'S) and Cape York (10°41'S). Harvesting occurs to depths of about 30 m (a safe working depth for occupational diving), leaving much of the deeper Great Barrier Reef (GBR) lagoon free of commercial harvesting. The ECBDMF is adjacent to the Commonwealth-managed Torres Strait Bêche-de-mer and Coral Sea Fisheries.

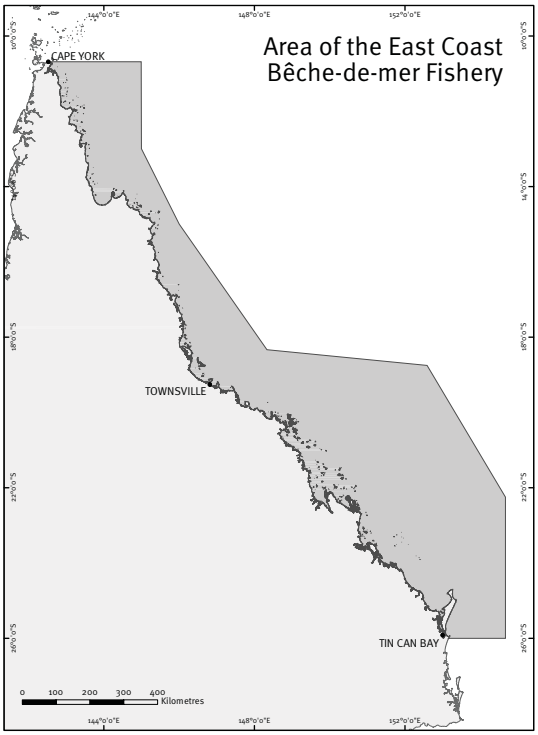

Figure 1: Map of fishery area.

Main management methods used

A series of input and output controls are used to manage the ECBDMF, including:

- Commercial Total Allowable Catch (TAC) of 380 tonnes (t) gutted wet weight. In 2006–07, the commercial TAC comprised 0 t of black teat fish, 89 t of white teat fish (divided into 57 t north of 19°S (Zone 1) and 32 t south of 19°S (Zone 2)) and 291 t of other species.
- Limited entry: 18 transferable licences.
- Species-specific minimum size limits[3] (sandfish 20 cm; white teatfish 40 cm; black teatfish 30 cm; prickly redfish 50 cm; blackfish 20 cm; deepwater redfish 20 cm; surf redfish 25 cm; lolly fish 20 cm; green fish 20 cm; curryfish 35 cm; elephant trunkfish 40 cm; brown sandfish 25 cm; leopard fish 35 cm; amberfish 50 cm; all other species 15 cm).
- Gear limitations: hand harvest only with a maximum of four divers in the water fishing at any one time. Boat and dory limits also apply.
- Area closures: Great Barrier Reef Marine Park (GBRMP) implemented by Great Barrier Reef Marine Park Authority (GBRMPA) and Queensland State Marine Parks (GBR Coast Marine Park and Great Sandy Marine Park).[4]
- Rotational zoning scheme (RZS): Fishery is divided into 154 zones of approximately 100 to 150 square nautical miles (nm) that can be fished for a maximum of 15 days in any one year. Each area is allocated for fishing only one year in every three.[5]
- Recreational bag limit: no more than five in total (all species combined, other than black teatfish).[6]

3 Minimum size limits are at least 15% greater than the current best estimates of size at first maturity for each species.

4 Approximately 37% of commercially diveable sea cucumber habitat in the Great Barrier Reef Marine Park (GBRMP) is closed to fishing. See: A Roelofs, *Ecological assessment of Queensland's East Coast Bêche-de-mer Fishery. A report to the Australian Government Department of Environment and Heritage on the ecologically sustainable management of a highly selective dive fishery*, Department of Primary Industries and Fisheries, Brisbane, Australia, 2004.

5 As per the Memorandum of Understanding (MOU) between sea cucumber industry operators.

6 The recreational take of black teatfish is prohibited.

Approximate allocation between sectors

The ECBDMF is predominantly a commercial fishery.

The recreational take of sea cucumber is currently limited to an in-possession limit of five specimens (excluding black teatfish) from Queensland waters north of 20°S latitude and east of 143°E longitude. Recreational take of sea cucumber to the south and west of this defined area is prohibited. There is no information available for recreational fishing levels of sea cucumber in Queensland. However, it is assumed to be negligible. No catches of sea cucumber have been reported through charter logbooks. There is also no estimate of the harvest of sea cucumber by Indigenous fishers for cultural purposes within the area of the fishery.

The take of sea cucumber by the recreational, charter and Indigenous sectors is considered to be negligible and will not be reported on further within this status report.

Fishery accreditation under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act)

The ECBDMF was granted a three-year Wildlife Trade Operation (WTO) approval under Part 13A of the EPBC Act on 22 December 2004. This accreditation acknowledges that the Fishery is being managed in an ecologically sustainable manner and allows the export of sea cucumber caught on the east coast of Queensland. The approval expires on 21 December 2007.

Catch statistics

Commercial

The 2006–07 financial year is the third year of operation in this fishery following the introduction of the RZS. The total fishery harvest (kg) for the 2006–07 financial year was approximately 2.7% higher than in 2005–06 (Figure 2). Burrowing blackfish[7] made up the majority of this total (approximately 69%), followed by white teatfish (approximately 15%) and blackfish (approximately 7%) (Figure 3). The introduction of the new logbook in July 2006 (BD03 Version 03) provides DPI&F with greater resolution of the blackfish species harvested, by separating out burrowing blackfish (*Actinopyga spinea*) and blackfish (*Actinopyga miliaris*) from what had previously been a single category (Table 1). These new finer-detailed catch statistics support industry's reporting that the most of the 'blackfish' collected in recent years have been burrowing blackfish (Figures 3 and 4).

The Department of Primary Industries and Fisheries (DPI&F) and the sea cucumber industry are monitoring the harvest of burrowing blackfish through the introduction of improved reporting for the species in logbooks and prior reports. A review of the burrowing blackfish resource was triggered by the increased catch reported in the logbooks since the 2002–03 quota year (see also Research and Monitoring section).

In 2004, an industry-led initiative in the development of a southern zone quota was implemented to encourage fishing effort for white teatfish away from the traditionally harvested northern areas. In the 2004 quota year the target commercial TAC for the southern zone quota (Zone 2) was 69 782 kg, with only about 30% of the quota being harvested, although the full quota for the northern zone was caught. As a result, in the 2005 quota year the southern zone quota was reduced to 32 002 kg, resulting in around 43% of the quota being harvested for that period.

7 The burrowing blackfish has been the focus of the sea cucumber industry in recent years.

Catches of white teatfish have continued to decrease in the 2006 quota year (approximately 34%) in both the northern and southern areas. Advice from industry has confirmed that operators are currently targeting other species of sea cucumber (Figure 5). Most of the decrease occurred in the southern white teatfish zone (approximately 50%). However, the northern zone also recorded a significant decrease in total catch (approximately 39%). Despite lower overall catches, the annual catch per unit effort (CPUE) for white teatfish has remained relatively stable over the past two years providing no evidence of any sustainability concerns for that species.

With burrowing blackfish being the current target species for the fishery, catches of sandfish have also significantly decreased in the 2006–07 quota year (approximately 80%). As a result, the CPUE has also decreased to 63 kg/hour from 125 kg/hour (Figure 6).

All other sea cucumber species were incidentally collected in the reporting year and are considered to be by-product in this fishery.

Table 1: Catch composition of blackfish in the previous three financial years.[8]

Financial year	Blackfish (including burrowing blackfish)	Blackfish	Burrowing blackfish
2004–05	160 790	N/A	N/A
2005–06	153 351	N/A	N/A
2006–07	N/A	20 891	196 129

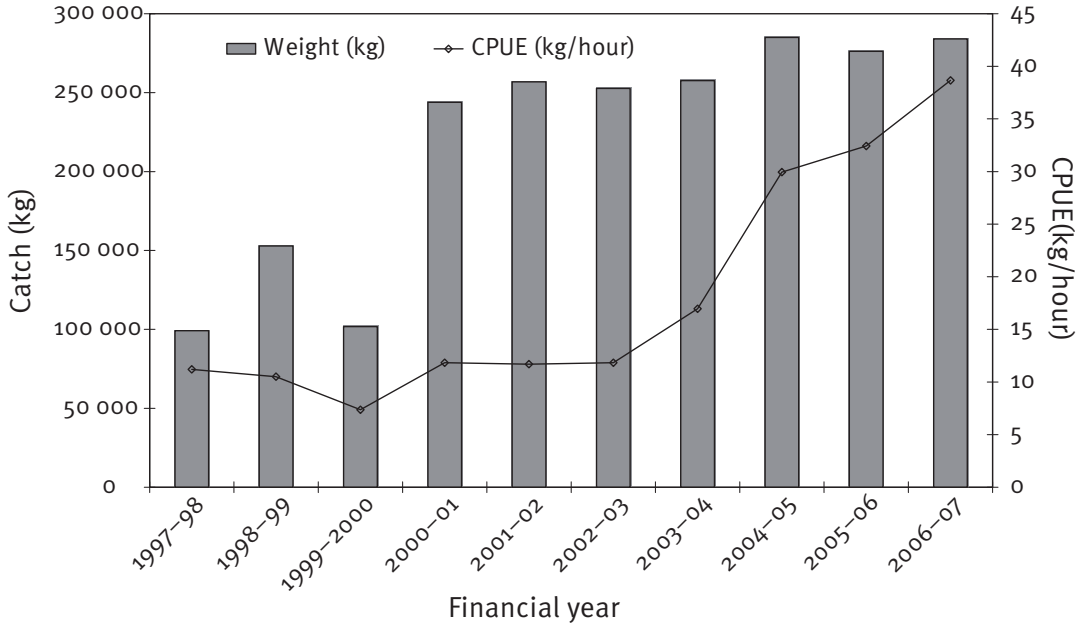

Figure 2: Total catch in kilograms (kg) for the ECBDMF from 1996–97 to 2006–07 financial years (Source: DPI&F CFISH database 20 August 2007).[9]

8 Since the introduction of a new logbook in July 2006, the catch composition of the burrowing blackfish component of the previous blackfish category can now be ascertained

9 Note: data from 1996–2000 were obtain from logbook estimated weights (kg). Data from 2001–07 obtained from actual weighed product (kg) reported in buyers reports. Where individual fisher hours were not reported, an average of previous fishing hours by licence was calculated.

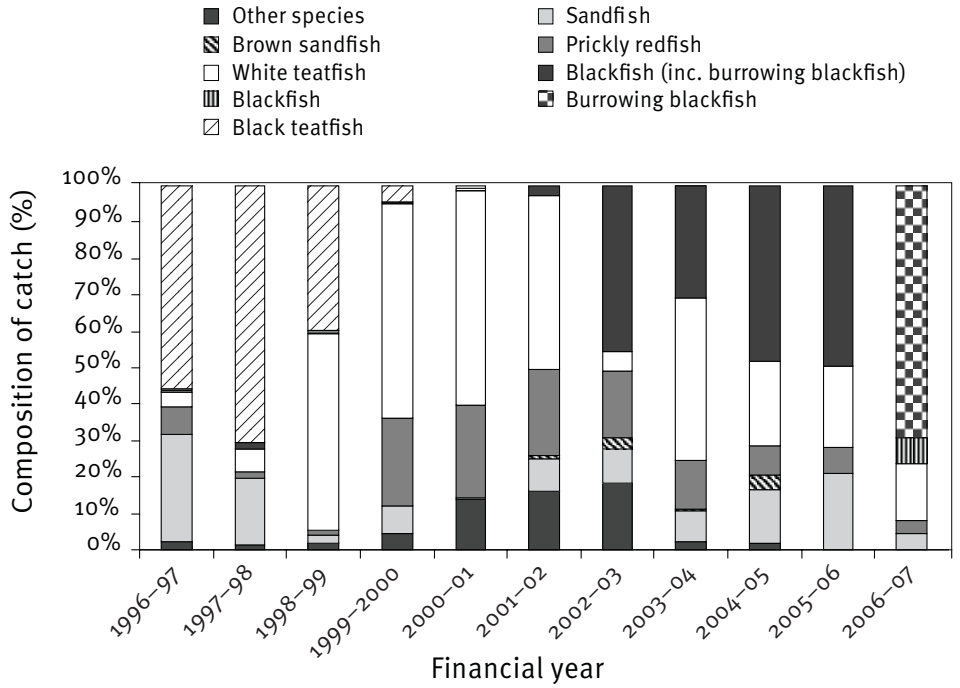

Figure 3: Species composition of total catch in kilograms (kg) for the ECBDMF from 1996–97 to 2006–07 financial years (Source: DPI&F CFISH database 20 August 2007).[10]

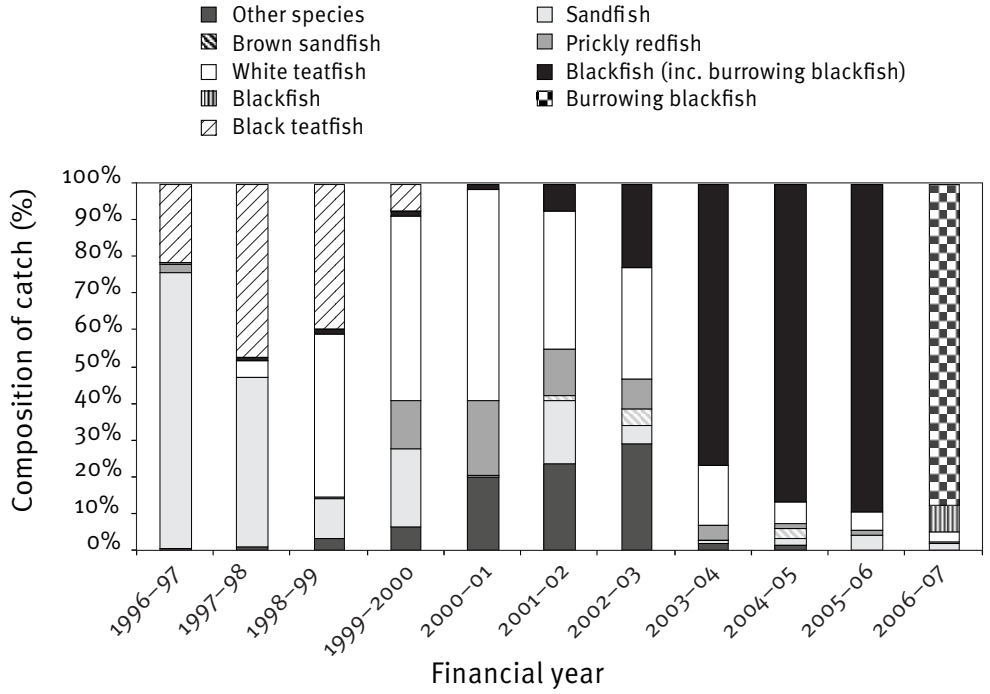

Figure 4: Species composition of total logbook reported numbers caught in the ECBDMF from 1996–97 to 2006–07 financial years (Source: DPI&F CFISH database 20 August 2007).

10 ibid.

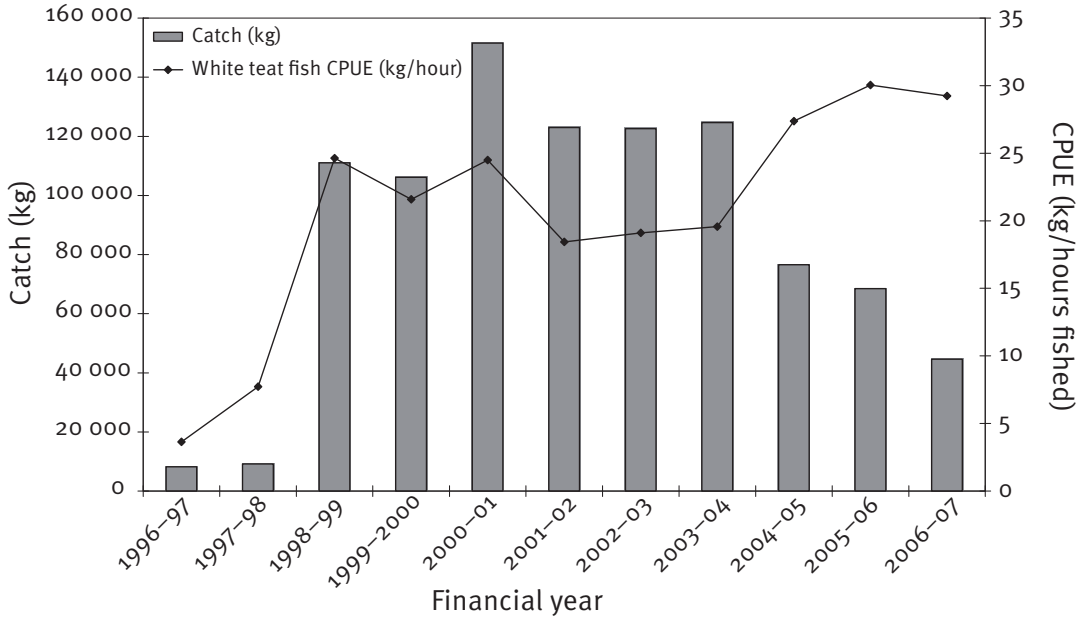

Figure 5: Total catch (kg) and CPUE[11] (kg/hour) of white teatfish in the ECBDMF from 1996–97 to 2006–07 financial years (Source: DPI&F CFISH database 20 August 2007).

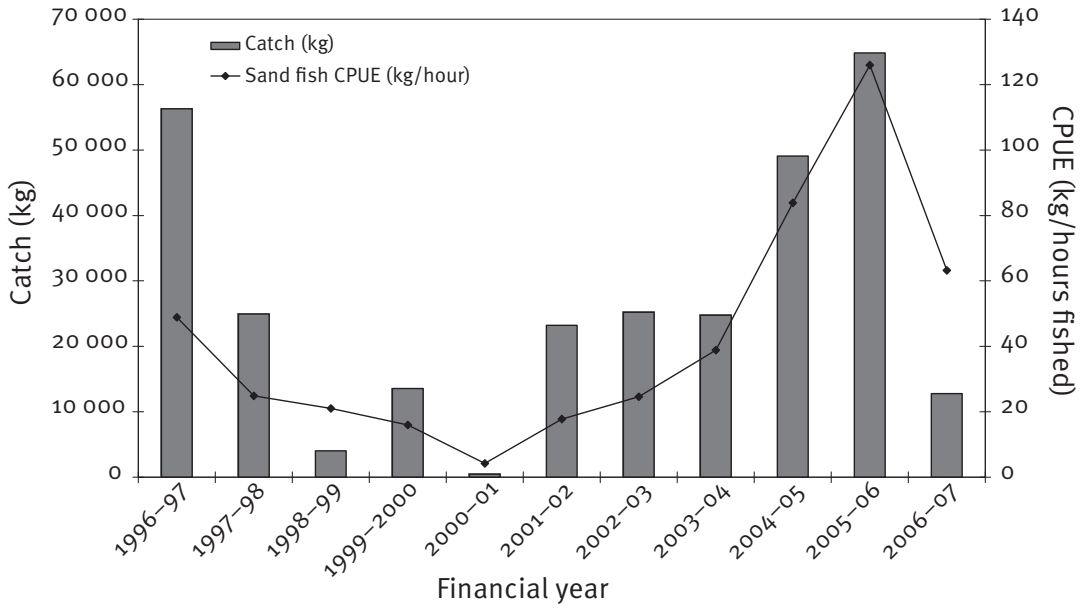

Figure 6: Total catch (kg) and CPUE[12] (kg/hour) of sandfish in the ECBDMF from 1996–97 to 2006–07 financial years (Source: DPI&F CFISH databse 20 August 2007).

Spatial issues/trends

DPI&F are investigating the use of finer-scale spatial information to ensure that the status and performance of the fishery can be adequately reviewed (e.g. assessing the effectiveness of the RZS fishing strategy at minimising local-scale depletions).

11 Note: where individual fisher hours were not reported, an average of previous fishing hours by licence was calculated.

12 ibid.

As a result, DPI&F are currently working in collaboration with the Commonwealth Scientific and Industrial Research Organisation (CSIRO) and the Australian Fisheries Management Authority (AFMA) to determine a spatially-based assessment model for the east coast and Coral Sea sea cucumber fisheries. In developing the model, DPI&F will endeavour to establish an estimate of the total resource available at the species level. The results of the initial pilot study will be used to establish a resource estimate of white teatfish in the GBRMP by the end of 2007.

Socio-economic characteristics and trends

The value of the fishery has increased as sea cucumber fisheries in other countries continue to yield less product compared with the ECBMDF because of overfishing. However, the prices for sea cucumber products (per processed kg) were slightly lower in the 2006–07 financial year with burrowing blackfish at approximately $11/kg (cooked), sandfish varying between $10–$14/kg (cooked), and white teatfish at $20/kg (salted/cooked). This was attributed to a strong Australian dollar relative to the US dollar prices paid by overseas importers. In addition, power and fuel costs have increased substantially, resulting in higher overheads. Reports of the continued labour shortage due to more attractive salary packages in the mining industry have led to quota left uncaught, and some seafood processing being sent offshore. Sea cucumber fishers have also reported a shortage of divers available to the fishery, which has contributed to the lower catch of white teatfish (generally found in deeper waters) in the 2006–07 period.[13]

On 1 July 2007, the Australian Quarantine and Inspection Service (AQIS) introduced an 'Approved Arrangements System' for sea cucumber fishers. The AQIS system is designed for the accountability and traceability of all harvested sea cucumbers, including tracking of product form and operator identification. This means that spoiled or diseased product may be traced back to the original suppliers. The system is a formal arrangement, meaning that all stages of the catch to export are auditable by the government. As a result, there has been a significant increase in the amount of paperwork that operators must complete and retain[14].

Fishery performance

Appraisal of fishery in regard to sustainability

Commercial logbook data suggests that the harvest of sea cucumber is sustainable at current levels. Significant changes to the way the sea cucumber resources are harvested in the fishery following the introduction of the RZS have greatly reduced the likelihood of localised and serial depletions occurring. The range of input and output controls currently implemented (commercial TAC, size limits, closures) are precautionary approaches to management that have the capacity to protect the fishery from increases in effort. The fishery is regarded as being managed in a precautionary and sustainable manner.

13 R Lowden (Queensland Sea Cucumber Association), pers. comm., conversation, 28 August 2007.
14 R Torelli (Tasmanian Seafoods), pers. comm., conversation, 28 August 2007.

Progress in implementing the Department of the Environment and Water Resources (DEW) recommendations

Recommendation	Progress	Improvements to management regime
Department of Primary Industries and Fisheries to inform the Department of the Environment and Heritage of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on the ecosystem.	*Ongoing* DEW were advised of the proposed reallocations of quota between the quota categories (i.e. southern zone white teatfish and other species) in late 2005. During the reporting period, DPI&F and DEW consulted over additional changes to quota arrangements. Negotiations extended into the 2006 reporting year and changes are yet to be implemented.	N/A
From 2005, the Queensland Department of Primary Industries and Fisheries to report publicly on the status of the fishery on an annual basis, including explicit reporting against each performance measure once developed.	*Ongoing* This annual status report is the third to be completed for the ECBDMF.	Public reporting on the status of Queensland's fisheries is an important aspect of managing fisheries on behalf of the Queensland community. These reports provide an important catalogue of historical information on the status of Queensland fisheries, links to ecological assessments demonstrating to the Australian Government that fisheries meet sustainability guidelines, and the most up-to-date information on Queensland's fisheries.
The Queensland Department of Primary Industries and Fisheries to conduct a risk assessment to ensure compliance resources are targeted to the areas of greatest risk within 2 years.	*Completed* A Compliance Risk Assessment (CRA) was completed in 2005. Detailed strategies addressing the identified risks have been developed and implemented through the Queensland Boating and Fisheries Patrol (QBFP) operational plans.	A CRA is used by the QBFP in undertaking operational planning activities associated with management the fishery. Through identification and prioritisation of compliance risks associated with the fishery, planning and operational processes at the district level may be improved and risks mitigated.
The Queensland Department of Primary Industries and Fisheries to develop and implement a robust system to validate commercial logbook reporting of catch and effort in the fishery within two years.	*Ongoing* The logbook validation process for this fishery has been developed, with the first data validation tasks completed in the 2005–06 quota year. DPI&F's commitment to continually assess the validity of fishery-dependent data means that the validation exercise for this fishery will be undertaken every two to three years. The next validation exercise is planned for the 2007–08 quota year.	Validation of logbook information provides confidence in the accuracy of reporting by commercial fishers. With greater reliance on logbook data for quantitative stock assessments and ecological assessments, there is a need for authentication of the information reported by fishers through the logbook program.

Recommendation	Progress	Improvements to management regime
The Queensland Department of Primary Industries and Fisheries to cooperate with other jurisdictions in efforts to undertake research on key gaps in bêche-de-mer biology and ecology.	*Ongoing* DPI&F has highlighted interest in collaborative sea cucumber research at the Australian Fisheries Managers Forum (AFMF) and continues to identify it as a priority for research through Queensland Fishing Industry Research Advisory Committee (QFIRAC). DPI&F are collaborating with AFMA and CSIRO in the development of a spatially-based model for estimating the sea cucumber resource for the Coral Sea fishery.	A greater understanding of sea cucumber biology and ecology will assist DPI&F in determining future management strategies for the fishery.
The Queensland Department of Primary Industries and Fisheries to continue to refine analysis of fishery dependent data to ensure that the status and performance of the fishery can be adequately reviewed.	*Ongoing* DPI&F implemented a new commercial fishery logbook (BD03 Version 03) in 2006 to improve the collection of species-specific fishery-dependent data.	Improvements to the fishery-dependent data collected through the logbook program provides DPI&F with greater commercial catch and effort resolution to report on the status and performance of the ECBDMF.
The Queensland Department of Primary Industries and Fisheries to develop and implement a robust method of monitoring and stock status for key target species.	*Ongoing* DPI&F are progressively improving the methods for monitoring stock status in the ECBDMF. This process is reliant on high quality fishery-dependent data sourced through the commercial logbooks. The new commercial fishery logbook (BD03 Version 03) introduced in 2006 is designed to improve the collection of species-specific fishery-dependent data and will be used in monitoring stock status for target species. Results of the logbook validation exercise in 2006 identified key areas for improvement in the data collection systems which have been addressed through the new quota reporting system and logbook. DPI&F are also considering ways to address the other key recommendations which will further improve confidence in logbook data.	Data collected through the logbooks provides the principal means of monitoring harvest in the fishery. DPI&F have even greater confidence in the accuracy and comprehensiveness of data recorded in logbooks following the improvements to the commercial logbooks and data validation exercise.

Recommendation	Progress	Improvements to management regime
The Queensland Department of Primary Industries and Fisheries to obtain estimate of sustainable harvest levels for key target species in the fishery within three years.	*Ongoing* Industry has conducted biomass assessments for burrowing blackfish in two key areas. Burrowing blackfish are a major target species in the fishery at present and it is appropriate that reference limits for this species are developed as a priority. Results of the surveys were considered when developing sustainable harvest levels for this species. The assessments are expected to be finalised and considered by Harvest Management Advisory Committee (MAC) in 2007. DPI&F are developing a spatially-based resource assessment for white teatfish in the ECBDMF. Preliminary Geographical Information System (GIS) models have been constructed and DPI&F are working with the industry and CSIRO to finalise estimates of the white teatfish resource.	Resource estimates will provide a sound basis for the future development of sustainable harvest levels for target species in the ECBDMF.
The Queensland Department of Primary Industries and Fisheries to develop fishery specific objectives linked to performance indicators and performance measure for all bêche-de-mer species and for all fishery impacts on the ecosystem within two years. Within three months of becoming aware that a performance measure has not been met, the Department of Primary Industries & Fisheries to finalise a clear timetable for the implementation of appropriate management responses.	*In progress* In June 2006, a draft Performance Measurement System (PMS) for the ECBDMF was developed in consultation with stakeholders. The PMS was endorsed by Harvest MAC. Implementation of the PMS is currently underway, and will be finalised by the end of 2007.	N/A
The Queensland Department of Primary Industries and Fisheries to implement within one year, measures to minimise localised depletion and serial depletion in the fishery.	*Completed* The RZS was implemented in 2004 through an industry MOU. The RZS substantially reduces the potential of localised and serial depletions occurring for the fishery by placing strict effort controls on fishery operations.	Spatial effort controls such as zonal TACs provide insurance against localised depletion, which is particularly important due to the density-dependent reproductive characteristics of sea cucumber.
The Queensland Department of Primary Industries and Fisheries to develop and implement a precautionary recovery strategy for overfished species, that specifies reference points linked to management actions, within two years.	*In progress* A performance measure addressing this matter that defines elements of a recovery strategy has been developed as part of the PMS for the ECBDMF. The draft PMS was endorsed by Harvest MAC and is awaiting final approval by the DPI&F Chief Executive.	N/A

Management performance

DPI&F held a workshop in June 2006 to develop performance measures for the fishery in consultation with stakeholders for the ECBDMF. The draft PMS was endorsed by Harvest MAC and is awaiting final implementation by DPI&F. The performance of the ECBDMF will be measured against the PMS once implemented.

Resource concerns

The commercial harvest of black teatfish was stopped in 1999 following concerns over sustainability of the stock. Benzie and Uthicke (2003)[15] suggested that there had been little to no recovery by 2001 after conducting surveys to assess the recovery of over-fished black teatfish stocks on the Great Barrier Reef. The commercial TAC will remain at 0 t while there is no conclusive evidence that the resource has recovered to a sustainable level.

A performance measure has been developed that aims to recover stocks of sea cucumber species that are currently considered to be below sustainable levels, to a level where a sustainable harvest may be determined. The measure requires that a fishery independent assessment be conducted to determine the level of available biomass for each species that is considered to be below sustainable levels. The level will be used to determine whether the fishery for a species can re-open. Any survey designed to provide species-specific available biomass levels will require significant industry support or funding through external agencies.

Ecosystem

Non-retained species/bycatch

Harvest of sea cucumber in the ECBDMF is by hand collection, a highly selective method of fishing that only collects individuals specifically chosen for harvest. Bycatch is restricted to releasing undersize specimens of the target species immediately at the collection site.

The post-release mortality of discarded sea cucumbers has not been assessed, but is expected to be low. Minimum size limits and the preference of operators to collect the most marketable-sized animals suggest that minimal discarding would occur.

Interactions with protected species

With the introduction of the BD03 Version 03 logbook in 2006, commercial operators also received a SOCI 01 logbook in order to bring the fishery in line with all other Queensland fisheries with respect to Species of Conservation Interest (SOCI) reporting. Highly selective fishing methods limit the potential for the interaction of ECBDMF operators with endangered, threatened or protected species. No interactions with protected species have been reported by fishers in the ECBDMF.

Fishery impacts on the ecosystem

Hand collection methods employed in the ECBDMF have virtually no detrimental effect on the environment.

15 JAH Benzie and S Uthicke, *Stock size of bêche-de-mer, recruitment patterns and gene flow in black teatfish, and recovery of over-fished black teatfish stocks on the Great Barrier Reef*, FRDC Project 97/344, The Australian Institute of Marine Science, Townsville, 2003.

Limited available research suggests that sea cucumbers are an important component in the natural nutrient recycling pathways of benthic environments.[16] Preliminary findings of a joint project being undertaken by CSIRO/Institute for Biodiversity Research (Germany) have found that the removal of *Holothuria scabra* (sandfish) in Moreton Bay may have an effect on the ecology of shallow water, subtropical seagrass ecosystems. These results are preliminary and require ongoing repeated experiments before drawing any conclusions regarding the impact of harvesting sea cucumber species on seagrass and coral reef associated ecosystems.[17]

Other ecosystem impacts

The ECBDMF operates within the boundaries of the Great Barrier Reef Marine Park which is managed by the GBRMPA. Water quality, marine fauna and flora, and the physical environment is closely monitored by the GBRMPA through its involvement in a suite of local, state and Commonwealth community and scientific monitoring programs. A comprehensive list of current programs can be viewed at: www.reeffutures.org/topics/monitoring/programlist.cfm

Research and monitoring

Recent research and implications

A joint research project between CSIRO and the German Institute for Biodiversity Research is currently being undertaken by Svea Mara Wolkenhauer as part of a PhD thesis titled 'Impacts of Removal—A Case Study on the Ecological Role of the Commercially Important Sea Cucumber *Holothuria scabra* in Moreton Bay'. Preliminary results indicated that sandfish have a distinct diurnal burying and feeding cycle, with periods of burying increased with decreasing temperature. Knowing when and how long sandfish bury and are not visible is crucial for population surveys conducted for conservation and fishery research on this species.[18] Sandfish were also shown to play a role in recycling inorganic nutrients within sub-tropical seagrass beds.[19]

This research will provide useful information on the biology and ecosystem functions of holothurians, as well as an increased knowledge of the environmental impacts associated with the removal of holothurians from associated food webs. Results from this research combined with previous CSIRO relative abundance studies will better inform managers of the potential ecosystem impacts of this fishery.

Monitoring programs and results

The ECBDMF is monitored using catch and effort data collected through the DPI&F compulsory logbook program (see Catch statistics section).

16 A Roelofs, *Ecological assessment of Queensland's East Coast Beche-de-mer Fishery. A report to the Australian Government Department of Environment and Heritage on the ecologically sustainable management of a highly selective dive fishery*, Department of Primary Industries and Fisheries, Brisbane, 2004.

17 S-M Wolkenhauer, S Uthicke, T Skewes, and R Pitcher, *Sea cucumber removal and its consequence for seagrass growth: a case study on commercially important sandfish* Holothuria scabra *in shallow seagrass beds of Moreton Bay, Queensland*, Australian Marine Science Bulletin, 168: 36, 2005.

18 S-M Wolkenhauer and T Skewes, *Burying and feeding activity of adult* Holothuria scabra *(Echinodermata: Holothuroidea) in a controlled environment*, Memoirs of the Queensland Museum, accepted May 2007.

19 S-M Wolkenhauer, S Uthicke, C Burridge, T Skewes and R Pitcher, *Does the removal of sea cucumbers* Holothuria scabra *(Echinodermata: Holothuroidea) alter seagrass and benthic microalgae communities?* Draft, submitted to Marine Ecology Progress Series July 2007.

Two resource assessments of burrowing blackfish have been conducted by the industry and both surveys suggest that this species can occur in very high densities over specific habitats.[20] These resource assessments will be used to develop appropriate TACs for this species. In setting catch limits through the development process, the following will be considered:

i) levels of acceptable risk

ii) recruitment rates and the minimum adult densities for successful spawning/fertilisation

iii) resurvey at defined intervals to determine changes in biomass/density and to detect recruitment events.

The ECBDMF catch and effort logbook data for the last three financial years was validated in November 2006 using the buyer's reports and Vessel Monitoring System (VMS) location data. The results demonstrated a high level of accuracy by fishers for both catch and effort reporting.

DPI&F and GBRMPA are monitoring fishers compliance with the RZS through the location data collected from the VMS fitted to each mother boat in the fleet. Preliminary data suggests that RZS guidelines are adhered to in the majority of fishing trips.

Collaborative research

The ECBDMF operates in waters adjacent to the Coral Sea and the Torres Strait Fisheries, both under AFMA management.[21] There are currently no collaborative research projects being undertaken in these fisheries. An annual biomass assessment is conducted by CSIRO in the Torres Strait and results may be useful in enhancing our knowledge of stock dynamics for the same species in the ECBDMF. Regular dialogue occurs between all management and research agencies to discuss issues common to all sea cucumber fisheries.

Fishery management

Compliance report

Compliance and enforcement in the ECBDMF are the responsibility of the QBFP. In the 2006–07 quota year, 14 inspections were conducted in the ECBDMF (10 commercial vessels, 4 marketer premises), with no offences detected.

A CRA was conducted for this fishery in June 2005 in order to determine compliance priorities and allow the most effective use of QBFP resources. The risk assessment identified the following as the highest priorities for enforcement and compliance in the fishery: exceeding the annual quota; failure to comply with the VMS and manual reporting conditions; and failure to provide buyers return within the required period. There were also a number of activities rated as having a moderate risk, which are also being addressed.

20 G Leeworthy (Queensland Sea Cucumber Association), pers. comm., August 2005.
21 The Torres Strait Fisheries are jointly managed by DPI&F and AFMA.

Changes to management arrangements in the reporting year

For quota monitoring purposes, on 1 July 2006 DPI&F introduced a requirement for sea cucumber fishers to prior report their catch to the Automated Interactive Voice Response (AIVR) system before landing their product. Rather than monitoring quota based on weights provided in buyers returns, quota is now drawn from the converted wet gutted weight (kg) derived from the prior reported bin size and number of bins and/or bag size and number of bags (depending on the product form).

DPI&F is also in the process of implementing an agreed change with industry that involves stating quota as processed weight values rather than wet gutted weight. This is being progressed and changes will be implemented in the 2007–08 quota year.

Outcomes of review processes for management plans/arrangements

There is no specific management plan for the sea cucumber fishery. DPI&F review management arrangements for the fishery regularly in consultation with the fishery's working group and Harvest MAC.

Consultation/communication/education

Promotion of regulations applying to both commercial, recreational and Indigenous fishers is an ongoing role of DPI&F. This is achieved through:

- recreational fishing brochures containing size and possession limit information
- distribution of the 'Fish' newsletter
- distribution of the 'FishFlash' e-newsletter.

Consultation also occurs through Harvest MAC, with meetings generally held twice a year. Harvest MAC provides an opportunity for stakeholders to review and advise DPI&F on management measures for the ECBDMF.

A Bêche-de-mer Working Group and a Harvest Scientific Advisory Group (SAG) also review issues relating to the fishery. The Working Group and Harvest SAG provide advice to Harvest MAC members on management actions required to ensure the fishery continues to operate within sustainable levels.

Complementary management

The ECBDM fishery is managed by DPI&F in consultation with GBRMPA (permits are issued by GBRMPA for this fishery).

Information compiled by
Bonnie Holmes

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Front cover image
Sandfish (*Holothuria scabra)*