

Annual status report 2009

East Coast Bêche-de-mer Fishery



On 26 March 2009, the Department of Primary Industries and Fisheries was amalgamated with other government departments to form the Department of Employment, Economic Development and Innovation.

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Fishery profile 2008		
Species targeted All species of sea cucumber specifically sandfish, white teatfish, and burrowing blackfish.	Total number of commercial licences in 2008–09 18 licences held by three operators	
Total harvest from all sectors Approximately 355 t	Commercial licences accessing the fishery in 2008–09 Six	
Commercial harvest 355 t	Fishery season Sea cucumber may be caught all year round.	
Recreational harvest (2005) No estimate but considered negligible.	Fishery symbols B1	
Indigenous harvest No estimate but considered negligible.	Monitoring undertaken Catch monitoring through compulsory logbook. Prior reporting of commercial catch against respective quota allocations.	
Charter harvest Nil	FOP days monitored in 2008–09 Nil	
Commercial Gross Value of Production (GVP) Approximately \$4,691,469	Accreditation under the EPBC Act Wildlife Trade Operation expires on 20 December 2010.	
Allocation between sectors Primarily a commercial fishery. However because of the limited data available, an approximate allocation between indigenous, commercial and recreational sectors cannot be determined.	Quota managed Commercial Total Allowable Catch (TAC) 361 tonnes landed form (salted/frozen boiled). TAC 0 t for Black Teatfish, 64 t for White Teatfish (divided into 51 t north of 19°S (Zone 1) and 13 t south of 19°S (Zone 2) and 297 t of other species.	
Total exports Primarily to China.	Logbook validation Yes—completed November 2006	
Key fish resources		Stock status
White Teatfish, <i>Holothuria (Microthele) nobilis</i> , Burrowing Blackfish, <i>Actinopyga spinea</i> and Sandfish, <i>Holothuria scabra</i> .		Not yet assessed
Comments: The status of the key fish resources will be assessed as a part of the 2009–10 stock status program and reported in the 2010 annual status report.		

Introduction

The Queensland East Coast Bêche-de-mer¹ 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 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. Fisheries Queensland (formerly Queensland Primary Industries and Fisheries), part of the Department of Employment, Economic Development and Innovation (DEEDI), is responsible for the management of the ECBDMF.

This report covers the July 2008 to June 2009 financial year.

Fishery description

Fishing area and methods

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 up to 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.

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.



Figure 1: Boundary of the Queensland East Coast Bêche-de-mer Fishery.

Key Species

The key species are White Teatfish *Holothuria (Microthele) nobilis*, Burrowing Blackfish *Actinopyga spinea*, and Sandfish *Holothuria scabra*. Sea cucumbers are benthic, deposit feeders that inhabit shallow waters up to depths of 30m (Conand 1998). Reproduction occurs by external fertilisation and so larvae and juveniles rely on seagrass for settling cues and early life stages (Wolkenhauer *et al.* 2009). Successful reproduction of such broadcast-spawning animals is therefore density dependent; hence the removal of density reduces fertilization and subsequent recruitment (Uthicke *et al.* 2004). Life history parameters are relatively unknown however it is suggested that some species are quite long lived and have naturally low recruitment and growth rates (Uthicke and Conand 2005; Uthicke *et al.* 2004).

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.

Main management methods used

Fisheries Queensland manages the ECBDMF using a combination of input and output controls, including:

- Commercial Total Allowable Catch (TAC) of 361 tonnes (t) gutted wet weight. In 2008–09, the commercial TAC comprised 0 t of Black Teatfish, 64 t of White Teatfish (divided into 51 t north of 19°S (Zone 1) and 13 t south of 19°S (Zone 2)) and 297 t of other species.
- Limited entry: 18 transferable licences.
- Species-specific minimum size limits² (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; Lollyfish 20 cm; Greenfish 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 four³ 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

² Minimum size limits are at least 15% greater than the current best estimates of size at first maturity for each species.

³ Whilst legislation states up to 10 divers may be fishing at any given time, a Memorandum of Understanding (MOU) drawn up by industry has further limited divers to four.

⁴ Approximately 37% of commercially diveable sea cucumber habitat in the Great Barrier Reef Marine Park (GBRMP) is closed to fishing (Roelofs 2004).

⁵ As per the MOU between sea cucumber industry operators.

⁶ The recreational take of Black Teatfish is prohibited.

Catch statistics

Commercial

The 2008–09 financial year is the fifth year of operation of the fishery following the introduction of the RZS. The total fishery harvest for the 2008–09 financial year was approximately 12% higher than in 2007–08 (Figure 2).

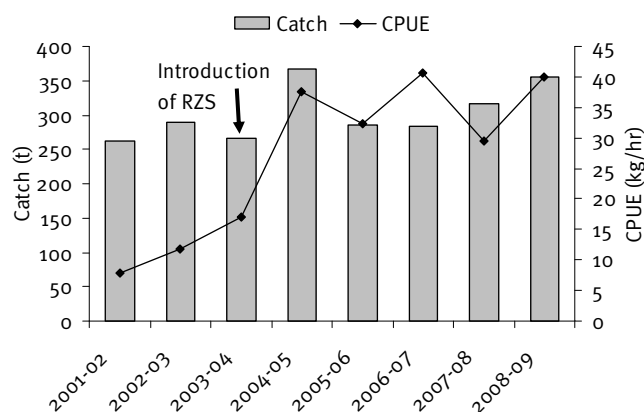


Figure 2: Total catch (t) and CPUE (kg/hour) for the ECBDMF from 2001-02 to 2008-09 financial years (Source: Fisheries Queensland CFISH database 23 October 2009).

Burrowing Blackfish represented the majority of the total catch weight (approximately 56%), followed by White Teatfish (approximately 19%) and Prickly Redfish (approximately 11%) (Figure 3). These patterns in reported pieces composition of commercial catch mirror those reported for 2007–08, except for the Prickly Redfish which was only 4% of the catch last year.

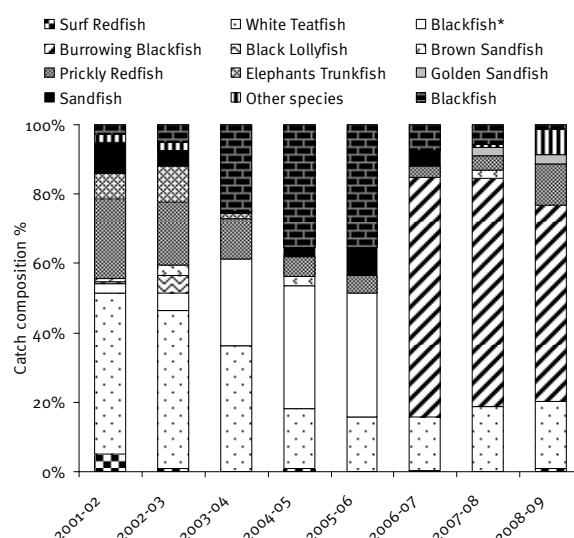


Figure 3: Species contribution to total catch weight for the ECBDMF from 2001-02 to 2008-09 financial years (Source: Fisheries Queensland CFISH database 23 October 2009).

*includes Burrowing Blackfish.

Fisheries Queensland 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.

Approximately 14% more White Teatfish were caught in the 2008–09 quota year compared with the 2007–08 quota year. The annual catch per unit effort (CPUE)⁷ for White Teatfish reached its highest level and may be a result of a high abundance of this species in the fished zones in 2008–09 (Figure 4). Fisheries Queensland plan to assess and report on the effectiveness of harvesting White Teatfish under the RZS in 2010.

There was no reported catch of Sandfish or Brown Sandfish in the 2008–09 quota year (Figure 5)⁸.

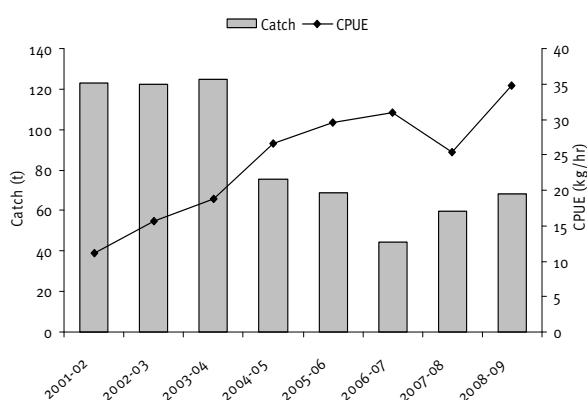


Figure 4: Total catch (kg) and CPUE (kg/hour) for White Teatfish in the ECBDMF from 2001-02 to 2008-09 financial years. (Source: Fisheries Queensland CFISH database 23 October 2009).

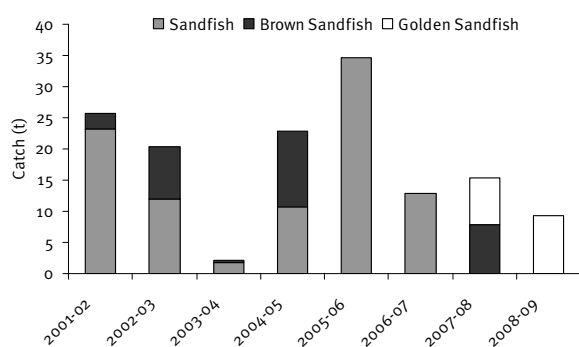


Figure 5: Total catch (kg) of Sandfish species in the ECBDMF from 2001-02 to 2008-09 financial years. (Source: Fisheries Queensland CFISH database 23 October 2009).

⁷ Where fisher hours were not reported, an average of previous fishing hours by licence was calculated.

⁸ Historical Sandfish figures reported previously over-estimated harvest in 2002–03 to 2005–06 financial years due to problems with extraction of data from Fisheries Queensland databases. This issue has been addressed. Corrected historical estimates of Sandfish catch have been reported here. Total BDM catch has been correctly reported in all previous annual status reports.

The decrease in catch is likely a result of improved species identification between the skippers and buyer return records. The issue of discrepancies in species identification was raised at the Fisheries Queensland Sea Cucumber Working Group meeting in May 2009. The industry has undertaken to improve their reporting on catches.

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

Recreational

There is no recreational fishery information available for bêche-de-mer. However, the take from this sector is considered negligible.

Charter

There is no charter fishery for bêche-de-mer.

Indigenous

There is no Indigenous fishery information available specifically for bêche-de-mer, however the take from this sector is considered to be negligible.

Possession and size limits do not apply to traditional and customary fishing. However, amendments to the *Fisheries Act 1994* in October 2008 include the restriction of traditional and customary fishing to:

- personal, domestic and non-commercial communal use only
- recreational fishing or prescribed traditional apparatus.

Spatial issues / trends

Fisheries Queensland 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).

The voluntary RZS is part of an industry Memorandum of Understanding designed to distribute effort across the fishery area and to mitigate the risk of localised depletion which is commonly associated with sea cucumber fisheries. The RZS is an innovative industry led initiative that demonstrates the commitment of operators to the long-term sustainability of the fishery.

Of the 154 available RZS zones, four were nominated for Blackfish harvest and 52 were nominated for the harvest of other species in the 2008–09 quota year, of which

compliance is monitored through the vessel monitoring system. Figure 6 demonstrates the locations of the nominated zones along the Queensland coast. For species other than Blackfish, operators were limited to 15 days in any one nominated zone, whereas there were no limits on effort in the Blackfish zones.

Socio-economic characteristics and trends

The GVP of the ECBDMF has risen from approximately \$4.1 million in 2007-08, to \$4.6 million in 2008-09. The GVP is calculated on the price paid to fishers at the first point of sale (i.e. beach price).



Figure 6: RZS zones nominated by industry for harvest of Blackfish and 'other species' in 2008-09.

The prices for sea cucumber products (per processed kg) were relatively stable in the 2008-09 financial year with Burrowing Blackfish at \$11.50/kg, Golden Sandfish at

\$15/kg, and White Teatfish at \$23.50/kg. The price paid depended on size and quality of handling.

Biological and ecological information

Monitoring programs

The ECBDMF is monitored using catch and effort data collected through the Fisheries Queensland compulsory logbook program (see Catch statistics section). Mid year harvests were reviewed during the Fisheries Queensland Sea Cucumber Working Group in May 2009.

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 select the most marketable-sized animals during collection suggest that minimal discarding would occur.

Interactions with protected species

No interactions with protected species have been reported by fishers in the ECBDMF in 2008-09.

Ecosystem impacts

The ECBDMF operates within the boundaries of the Great Barrier Reef Marine Park which is managed by the Great Barrier Reef Marine Park Authority (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.

Sustainability Assessment

Performance against fishery objectives

Fisheries Queensland implemented a Performance Measurement System (PMS) for the ECBDMF in 2008. An assessment of the fishery in meeting its management objectives is provided in Table 1. The ECBDMF PMS can be found at http://www.dpi.qld.gov.au/documents/Fisheries_SustainableFishing/Fisheries-PMS-Beche-de-mer-2008.pdf

Table 1: Performance measures and outcomes for the East Coast Bêche-de-mer Fishery in 2008.

Performance Measure	Performance
Principle species–target Catch reported through compulsory daily fisher logbooks exceeds individual species review reference points (total catch per quota year) (t): Sandfish (<i>Holothuria scabra</i>)–15t; Golden Sandfish (<i>Holothuria scabra</i> var. <i>versicolor</i>)–10t; Prickly Redfish (<i>Thelenota ananas</i>)–40t; Surf Redfish (<i>Actinopyga mauritiana</i>)–25t; Deep Water Redfish (<i>Actinopyga echinities</i>)–25t; Stonefish (<i>Actinopyga lecanora</i>)–10t; Blackfish (<i>Actinopyga miliaris</i>)–25t; Burrowing Blackfish (<i>Actinopyga spinea</i>)–15t; Tigerfish (<i>Bohadschia argus</i>)–25t; Greenfish (<i>Stichopus chloronotus</i>)–50t; Curryfish (<i>Stichopus vastus</i>)–25t; Curryfish (<i>Stichopus hermanni</i>)–50t; Brown Sandfish (<i>Bohadschia marmorata</i>)–25t; Amberfish (<i>Thelonota anax</i>)–50t; Flowerfish (<i>Bohadschia graeffei</i>)–25t; Lollyfish (<i>Holothuria atra</i>)–50t; Snakefish (<i>Holothuria coluber</i>)–25t; Pinkfish (<i>Holothuria edulis</i>)–50t; Elephant Trunkfish (<i>Holothuria fuscopunctata</i>)–50t	<i>Triggered</i> Prickly Redfish triggered with catch exceeding reference point at 41.7 t. Burrowing Blackfish A preliminary analysis of the Burrowing Blackfish catches taken between 1 July and 31 December 2008 indicates that the review reference point for Burrowing Blackfish has been exceeded by the catches taken outside of the defined BFZ areas. The catches taken in one grid area are predominantly responsible for the review reference point being exceeded. Fisheries Queensland is investigating the issue further to determine the underlying cause.
Principle species–target Surveyed populations undergo a repeated measures re-survey in the third year following their initial survey.	<i>Triggered</i> It was noted by the ECBDM Working Group that the requirement to resurvey areas every 3 years imposed significant time and monetary cost upon the industry given the number of burrowing blackfish zones has increased from 2 to 5. It was acknowledged by the group that as the fishery developed, constant refinement of the fishery’s management arrangements would be necessary. As a way of addressing this issue the ECBDM Working Group agreed that the PMS would be amended to include the following provision: <i>Should a burrowing blackfish zone TAC be exceeded in a season, then a re-survey of that area will be instituted. If the re-survey is not conducted however, a TAC of 15t per season will be instituted in that area until such time as a re-survey is completed.</i> Industry members will undertake a resurvey the Gould Reef burrowing blackfish area in the 2009–10 season.
Principle species–target Results of repeated measures surveys on target populations in spatially discrete areas indicates that the estimated standing biomass has decreased by ≥15%.	<i>Not assessed</i>
Principle species–target 1. Effort in any MOU zone exceed 15 days per year	<i>Triggered/Not triggered</i> 1. <i>Triggered</i>

Performance Measure	Performance
<p>2. Operators fish outside the MOU zones allocated for a particular fishing year.</p> <p>3. Population density is estimated to be at least 70% of the unfished population density.</p>	<p>One zone had 16 days of effort recorded. Fisheries Queensland is investigating the issue further.</p> <p>2. <i>Not triggered</i></p> <p>3. <i>Not measured</i></p> <p>This measure is industry dependent and relates to the re-opening of a fishery for a species—Black Teatfish is the only species in the ECBDMF meeting this requirement and no population density estimates were made in 2008–09.</p>
<p>Protected, endangered and threatened species</p> <p>The percentage of protected animals released alive is less than 90%.</p>	<p><i>Not triggered</i></p> <p>No interactions with protected species were reported in 2009.</p>
<p>Ecosystem impacts</p> <p>A significant negative impact on the ecosystem is identified as a direct result of fishing activities in the ECBDMF.</p>	<p><i>Not triggered</i></p> <p>Fisheries Queensland are not aware of any information in 2009 indicating unsustainable negative impacts of removing commercial target BDM on the ecosystem.</p>
<p>Compliance</p> <p>More than 30% of the active vessels in the fleet are used to commit an offence under the Fisheries Regulation.</p>	<p><i>Triggered</i></p> <p>Three of the six active vessels (50%) in the fleet were used to commit an offence under the Fisheries Regulation during 2008–09.</p> <p>The offences were considered to be of a minor nature. QFAC will address this in the process of reviewing the compliance risk assessment which is due in 2010.</p>

Current sustainability status and concerns

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 in 2004 have greatly reduced the likelihood of localised and serial depletions occurring (Lowden 2005; Roelofs 2004). 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 by the Australian Government Department of Environment, Water, Heritage and the Arts (DEHWA), as evidenced by the renewal of the fishery's WTO accreditation in 2007.

The commercial harvest of Black Teatfish was stopped in 1999 following industry raised concerns over sustainability of the stock.

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. The commercial TAC for Black Teatfish will remain at 0 t until such evidence is provided.

Research

Recent research and implications

A study on the ecological role of the commercially important sea cucumber *Holothuria scabra* in Moreton Bay was completed in 2005. 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 (Wolkenhauer *et al.* 2005). Sandfish were also shown to play a role in recycling inorganic nutrients within sub-tropical seagrass beds (Wolkenhauer *et al.* 2009).

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.

Collaborative research

The ECBDMF operates in waters adjacent to the Coral Sea and the Torres Strait Fisheries, both under AFMA management.⁹ 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 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

During the 2008-09 quota year, 31 units, including 30 commercial fishing vessels were inspected in the East Coast Bêche-de-mer Fishery, with an associated compliance rate of approximately 90%. A summary of offences is provided in Table 2.

Offences are reported as either a Fisheries Infringement Notice (FIN); Caution (FIN Caution or

official written caution); or Prosecution (to proceed by complaint summons).

Table 2: Offences recorded in the East Coast Bêche-de-mer Fishery (July 2008–June 2009).

Offence	FIN	Prosecution	Caution
Contravened a condition of an authority involving boat marks	2	0	0
Contravened a condition of an authority involving quota requirements	1	0	0
TOTAL	3	0	0

A compliance risk assessment was conducted for this fishery in June 2005 to determine compliance priorities and allow the most effective use of Queensland Boating and Fisheries Patrol (QBFP) resources. The risk assessment identified exceeding the annual quota; failure to comply with the VMS and manual reporting conditions; and failure to provide buyers return within the required period, as the highest priorities for enforcement and compliance in the fishery. There are also a number of activities rated as moderate risk, which will be addressed, but at a lower priority. Detailed strategies to address the risks identified by this assessment have been developed through QBFP strategic and operational planning processes. The risk assessment will be reviewed every 3 to 5 years or earlier if there are major changes to the management arrangements for the fishery.

Changes to management arrangements in the reporting year

Fisheries Queensland implemented an agreed change with industry that involved stating quota as weights in landed form (salted/frozen boiled) rather than wet gutted form. This resulted from an assessment of the relevance of a quota stated in wet gutted weight given the variability in the weight conversion during processing, both between species and between operators using different processing techniques. A quota stated in landed form was considered more appropriate and meaningful. License conditions were amended to reflect this change. As a result the Total Allowable Catch (TAC) changed from 380 t to 361 t based on an agreed weight conversion.

License conditions were also amended to reduce the quota of White Teatfish (both northern and southern zones) and reallocate that amount of quota to other species. Catches of other species are monitored

⁹ The Torres Strait Fisheries are jointly managed by Fisheries Queensland and AFMA.

against conservative catch review points for each species, which are applied under the industry MOU and the PMS. The sum of review points for all other species remains higher than the TAC for other species combined.

Fisheries Queensland consulted with stakeholders prior to the implementation of these changes.

Communication and education

Future consultation with stakeholders in this fishery will occur through many mechanisms:

- On a strategic level the Queensland Fisheries Advisory Committee (QFAC) shall consider the ECBDMF in the context of all Queensland fisheries and prioritises issues associated with it accordingly. Once fisheries management priorities have been determined, the agency may establish a small number of Technical Advisory Groups (TAGs) to provide technical information that will assist Fisheries Queensland to pursue these priorities (which may or may not impact the ECBDMF).
- Fisheries Queensland may also establish technical working groups to generate information upon which to base decisions. These groups may be permanent or ad hoc, and can be fishery-specific or broader. They may be established to provide advice to the agency or to inform the decisions of a body such as a QFAC.
- The agency consults directly with industry members through attendance at industry association meetings, port visits, newsletters and other means.

There are also legislated requirements for consultation; such as Regulatory Impact Statements (RIS) that ensure stakeholders in the fishery are consulted about significant changes in management arrangements

Complementary management

The ECBDMF is managed by Fisheries Queensland in consultation with GBRMPA (permits are issued by GBRMPA for this fishery).

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Front cover image

Sandfish (*Holothuria scabra*)

