



new info

beche-de-mer

The Torres Strait beche-de-mer (sea cucumber) fishery

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Brief history

The beche-de-mer fishery is an important commercial fishery for Torres Strait Islanders. There is no definite record of when beche-de-mer fishing began in Torres Strait but by the early 18th century it had become important to the economies of both Torres Strait and coastal Papua communities (Williams 1994). In the past, the fishery was based primarily on sandfish (*Holothuria scabra*); however, harvesting of this species has since been discontinued. Current fishing effort focuses on surf redfish (*Actinopyga mauritiana*), black teatfish (*Holothuria nobilis*), white teatfish (*Holothuria fuscogilva*) and to a lesser extent, a couple of lower value species.

Management arrangements

Commercial and traditional fishing within the Australian section of the Torres Strait Protected Zone (TSPZ) is managed under the Commonwealth *Torres Strait Fisheries Act 1984* by the Protected Zone Joint Authority (PZJA). The PZJA is comprised of the Commonwealth and Queensland Ministers responsible for fisheries.

Fisheries resources of the TSPZ are managed in accordance with the provisions of the Torres Strait Treaty, ratified in 1985. The Treaty requires Australia and Papua New Guinea to cooperate in the conservation, management and optimum utilisation of resources of the region primarily for the benefit of traditional inhabitants of the two countries.

Management and licensing tasks are administered by the Australian Fisheries Management Authority (AFMA) and the Queensland Fisheries Service (QFS) based at Thursday Island and Brisbane, respectively. The Queensland Boating and Fisheries Patrol (QBFP) perform surveillance and enforcement duties from officers based on Thursday Island.

This fishery, in common with all other Torres Strait fisheries, has the policy that if an increase in fishing effort is allowed, then it must be reserved exclusively for Torres Strait Islanders.

Key management measures

Regulations implemented in the fishery include: limiting the method of collecting beche-de-mer to either hand, or hand-held, non-mechanical implements; a ban on the use of hookah gear; limiting Islander dinghies to less than 7 metres in length; and a competitive total allowable catch (TAC — measured in wet weight gutted) for commercial species and minimum size limits.

Current fishery trends

Fishing for beche-de-mer in Torres Strait is mainly by free diving from dinghies crewed by 2–3 fishers or by hand collection along reefs at low tide. Once collected, the animal is gutted, graded, cleaned, boiled, smoked and dried. This is a labour-intensive process usually carried out on processing vessels or at shore-based facilities.

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Beche-de-mer are especially susceptible to overfishing because they are large, easily seen and collected, and do not require sophisticated fishing techniques (Skewes et al. 2000). As a result, the Torres Strait beche-de-mer fishery is subject to a suite of output and input controls aimed at preventing overfishing but also allowing Islanders to benefit from the use of beche-de-mer stocks.

A total of 148 traditional vessels are presently licensed for the fishery. One non-islander operator is licensed in the fishery with additional conditions that primarily involve the participation of islanders in those activities.

Overexploitation of sandfish

Sandfish is a high-value species occurring in relatively shallow waters and vulnerable to over-harvesting. The population on Warrior Reef has been subject to excessive levels of fishing effort during the early 1990s and 1995 in particular. A similar boom on the PNG side of the TSPZ preceded this in the late 1980s and early 1990s.

Following concerns of serious resource depletion and overexploitation of sandfish stocks on Warrior Reef, two independent fishery surveys were commissioned to assess the level of reduction in sandfish abundance from November 1995 to January 1996 and in January 1998. The collection of sandfish was primarily for export to Asia. Harvesting has been prohibited since early 1998, following recommendations from Commonwealth Scientific Industrial Research Organisation (CSIRO) researchers who surveyed the remaining stock on Warrior Reef, and determined it was approximately 80 per cent less than in November 1995. In 1995, the sandfish stocks were considered overexploited, therefore the subsequent reduction indicated a serious depletion (Skewes et al. 2000).

Sandfish stocks were regarded as being in a downward spiral, with progressively smaller breeding populations leading to smaller and smaller recruitments. The CSIRO survey also led to the introduction of severe management measures. Further fishing pressure on sandfish may have led to a total collapse of the stock and a continued closure was recognised as the only feasible strategy for rehabilitation.

Because the fishery had been closed for two years, it was decided that another survey should be carried out to determine if there had been any recovery in the population. This was recognised as a high priority by management agencies and Islander fishing representatives at a beche-de-mer workshop held on Thursday Island in July 1999.



CSIRO Division of Marine Research

Sandfish (*Holothuria scabra*)

A third survey of the sandfish population on Warrior Reef was undertaken by CSIRO in January 2000. The work revealed that sandfish stocks are still severely depleted with only a very slight recovery since the extremely low abundance recorded in 1998. The heavily depleted population was also confirmed by estimates of the standing stock, which suggest it is unlikely there are more than 100 tonnes of adult animals remaining on Warrior Reef. The present stock size is also very low compared to virgin biomass estimates of over 1600 tonnes (Skewes et al. 2000).

The findings from the most recent survey were noted by the PZJA at its meeting in April 2000 and the existing closure for sandfish has been continued. The PZJA referred the findings to the Beche-de-mer Fishery Working Group and requested the group to develop long-term management arrangements, including monitoring and enforcement for the fishery.

Recovery of sandfish stocks

Experience elsewhere in the Pacific indicates recovery of overfished sea cucumber stocks is a lengthy process, taking several years. This is because holothurians, like many other invertebrates are broadcast spawners, and fertilisation success is highly dependent on population density. Reduction of population densities by fishing may render remaining individuals incapable of successful reproduction.

The possibility of reseeded sandfish stocks on Warrior Reef is also being explored as a viable option to assist recovery. The fishery has several characteristics that make it suitable to reseeded and would benefit from recent work conducted by ICLARM in Solomon Islands where propagation techniques for sandfish have been investigated.

While reseedling may be a viable option to assist rehabilitation in future management agencies are more concerned with the effective sustainable management of other commercial species being fished at present.

Recent catch estimates

Combined log returns from individual islands indicate that 15 tonnes of prickly redfish, 23 tonnes of black and white teatfishes, and 12 tonnes of all other species were harvested during 1999. The 1998 catch included 80 tonnes of prickly redfish, 20 tonnes of teatfishes and 15 tonnes of all other species combined. The 1997 catch comprised 57 tonnes of prickly redfish, 29 tonnes of teatfishes and 29 tonnes made up of all other species combined. These figures are in wet weight and gutted.

Official figures for 1995 revealed the total harvest of sandfish was around 1000 tonnes. Industry estimates place the total catch between 1200 and 1400 tonnes wet weight, with all but approximately 50 tonnes being sandfish.

Status of other commercial species

The status of black and white teatfish, surf redfish and other lower value species remains unknown at present. It is possible these species may be the target of increased fishing pressure in future due to the growing export market demands for quality beche-de-mer.

References

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Sexual reproduction of *Stichopus chloronotus*, a fissiparous sea cucumber, on Reunion Island, Indian Ocean

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Introduction

Stichopus chloronotus is a holothurian of the order Aspidochirotetes, family *Stichopodidae*, that is widely distributed across the tropical Indo-Pacific region. It is mainly found on reef flats and slopes with considerable hydrodynamic energy. The species' density is relatively low, but sometimes reaches up to several specimens per m² (Franklin 1980; Conand 1989; Uthicke 1994; Conand et al. 1998).

Similarly to nine other Aspidochirotetes sea cucumbers, they can reproduce both sexually and asexually (Uthicke 1994, 1997, 2001; Conand et al. 1998). Their sexual reproduction has been studied in Australia (Franklin 1980) and Malaysia (Tan Shau-Hwai and Bin Yasin 2000). Asexual reproduction is achieved by transverse fission resulting in two animals that each regenerate the missing part (Uthicke 1997; Conand and Uthicke 1998; Conand et al. 1998).

The aim of this study was to describe the sexual reproduction cycle on Reunion Island. The results

should provide a better understanding of the respective roles of sexual and asexual reproduction and facilitate the interpretation of population genetics (Uthicke et al. 1999 and 2001).

Materials and methods

Sites

The Trou d'Eau station is located on Reunion Island's west coast on the Saline-les-Bains reef complex that spans five kilometres. It is a fringing reef that is swept by the trade winds, but with little hydrodynamic activity. Most sampling was conducted on this site, which is a back reef forming a channel made up mainly of detrital coral sediment littered with large basalt blocks. Small amounts of brackish water well up into this 0.70-m deep area at the shoreline, providing algal cover for the substrate at certain times of the year.

Seawater surface temperature was selected as a reference parameter and recorded hourly throughout the study, ie from March to April 2001, using a