

## Survey of *Trochus niloticus* in Torres Strait

### Background

The Torres Strait Trochus Fishery (TSTF) is a single species (*Trochus niloticus*) fishery, having both commercial and subsistence aspects (AFMA, 2008). Subsistence fishing of the TSTF has been undertaken for centuries by the traditional owners of Torres Strait. Islanders have one of the highest recorded per capita seafood consumption rates in the world (Skewes *et al.*, 2004). Trochus meat provides a valuable source of protein for Islanders and the nacreous shell is used in arts and crafts (Crowe *et al.*, 2002; AFMA, 2008).

The commercial fishery is the larger of the two industries, beginning in 1912 when the nacreous layer of the trochus shell became popular for making buttons (AFMA, 2008; GBRMPA, 1995). In addition to buttons, the shell is used for jewellery, with the ground shell also used in floor tiles, metallic paints and shampoo (AFMA, 2008). The main importers of commercial products from the modern day trochus fishery are the countries of Asia and Europe (Crowe *et al.*, 2002; AFMA, 2008).

Around 500 tonnes per year of trochus were reportedly fished from Torres Strait up to 1917, although the definition of catch area from the old Queensland records is ill-defined. Reports of overfishing of trochus stocks in Torres Strait occurred within four years of the commencement of the commercial fishery in 1912 (Wright & Hall, 1993). When catches began to decline in Torres Strait, fishers spread down the coast of Queensland as far south as Mackay. By 1927, the entire Queensland coast was being searched for trochus (D'Silva, 2001) with 1,027 t exported (Fao, 1992; GBRMPA, 1995). During the 1940's the market for trochus shell declined, as did fishing pressure and only 6 t was taken by 1944 (Fao, 1992; GBRMPA, 1995). In the 1950's the fishery experienced a resurgence with exports amounting to 1,400 tonne in 1952 (GBRMPA, 1985). Since 1952, the fishery has operated in a boom and bust fashion closely linked to international demand; for example between 2005 and 2006, there was a difference of 47 t (less) trochus fished, equating to an income loss of \$200K from one year to the next (Raudzens, 2007).

During 2007-2008, there was reasonable demand for trochus shell and meat, however prices paid for landed product were close to or below the cost of production and operators reduced their efforts in response (QPIF, 2008). While this allows the fishery to recover from potential over harvesting, there is a risk if prices remain high for an extended period, stocks may be overexploited and unable to recover (AFMA, 2008).

Fishing in the TSTF is limited to traditional inhabitants only (AFMA, 2008). Arrangements currently in place include collecting trochus by hand and a minimum size limit of 80 mm (Basal Standard Width) and maximum size limit of 125 mm (BSW) applies (except for traditional fishing). A competitive Total Allowable Catch (TAC) (measured in tonnes with animal in shell) of 150 t per year applies to the fishery (AFMA, 2008).

Trochus stocks in Torres Strait have never been properly assessed at the regional level (D'Silva, 2001). One, localised, small scale study was undertaken where satellite image analysis and limited surveys, were used to estimate the standing stock of trochus on Bourke Isles (Long *et al.*, 1993). Trochus were also sampled during a survey of bêche-de-mer in Eastern Torres Strait in March, 2009. Trochus and beche-de-mer have different habitat requirements and while time was spent during the survey targeting specific trochus habitat, it is believed that a true indication of trochus abundance and location was not obtained. Other than these two studies,

no stock assessment or published estimates of abundance for trochus in Torres Strait exists.

There is also no mandatory reporting of catches or mechanism to assess the suitability of the current TAC of 150 t, or the sustainability of historical catches. It is uncertain whether it would be sustainable to harvest this amount on a yearly basis. Localised depletion of trochus in Torres Strait is also an area of potential concern due to the nature of fisher behaviour and recognised reef tenure among Islanders (AFMA, 2008).

The current TAC is also based on animals within their shell. The existing formula for predicting trochus standing stock is however based on calculating shell weight from shell size, and does not include animal weight. No differentiation in logbooks is presently made between animals in their shell or not. Data, including trochus shell weight with animals in and out of their shells, as well as shell size is needed to reassess the current formula. This will allow for a more accurate account of trochus catch from the fishery.

## **Objectives**

This project would carry out a relative density survey of *Trochus niloticus* to assess the status of trochus in Torres Strait. The outputs from this project will aid in the management of the TSTF and facilitate the move to adaptive co-management in line with aspirations for Torres Strait Traditional communities.

- To assess the size, status and spatial structure of trochus stocks in Torres Strait.
- To determine a sustainable Total Allowable Catch (TAC) for *Trochus niloticus* in Torres Strait based on survey data.
- To record data including shell weight (animals in and out) and shell size, to evaluate and strengthen current trochus stock formulations.

## **Methods**

The survey will be conducted in accordance with techniques used previously (Skewes *et al.*, 1998, Skewes *et al.*, 2000, Skewes *et al.*, 2006). In addition to undertaking repeated measures of trochus sites from the 2009 survey, new sampling sites will be identified. Both snorkelling and SCUBA will be required to survey juvenile and adult habitat for trochus. Given the restrictions on SCUBA with respect to working remotely at depth, a 10 day charter with 3 CSIRO divers is proposed in order to survey around 100 sites.

This project will include a high level of interaction with Torres Strait Islanders, both in the design, undertaking the survey and interpretation of results. Torres Strait Islander representatives will be collaborated with during the lead up to the survey and an Islander (preferably a trochus fisher), will be asked to participate on the field survey.

## **Outputs**

The outputs from the project will include analysis of the relative density of trochus in Torres Strait and a survey report. This information will be used to further develop poorly understood population parameters for input into developing population models, and as a basis for formulating robust sustainable management strategies. We will also gather information on gross environmental parameters, not only for assessing the effects of fishing, but for mapping and monitoring the environment in general.

The information will also be input into developing co-management frameworks being developed for the Torres Strait Hand Collectables fishery, and the Decision Support Tool being developed by CMAR for management strategy development for Torres Strait fisheries.

Information from the project will be provided to AFMA and Torres Strait Island stakeholders in the form of a plain English summary document. CSIRO staff will be available for Island visits to explain the outcomes of the research to Islander communities.

## References

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