

Sea cucumber fisheries in Malaysia, towards a conservation strategy

by Mark Baine¹ and Choo Poh Sze²

Introduction

Baine and Forbes (1998) provided some background information to the UK Darwin Initiative funded research project into the taxonomy, life history and conservation of Malaysia holothurians, which began in April 1996. This research has been completed, the results now available within a set of conference proceedings (Baine 1999). Abstracts from the conference are presented on page 4 in this bulletin and include contributions from Thailand, from experts from ICLARM (Solomon Islands) and La Reunion University, and other Malaysian researchers.

The aim of this paper is to summarise the results and recommendations of the Darwin project group in terms of the existing fisheries in Malaysia and their future management. Malaysia presents us with three contrasting case studies.

Firstly, there is Pulau Langkawi, an island off the West Coast of Malaysia and close to the border of Thailand, where it enjoys strong sea cucumber trade links with the island of Adang (see Map 1).

Secondly, there is the low-effort fishery further down the West Coast in Pulau Pangkor.

Thirdly, we have the multi-species, multi-national fishery that exists along the entire coast of the state of Sabah in Northeast Borneo (Map 2).

Pulau Langkawi

A combination of over-intensive fishing practices in Langkawi, with a purported decline in *Stichopus* spp. (referred to locally as *gamat*), and a strong market demand, led to the regular importation of sea cucumbers from Adang, Thailand during the 1990s. Although little fishing is undertaken in Langkawi waters, the demand for the product from Thailand sees existing overfished sea cucumber populations under even more pressure. This is

readily identified by the encroachment of fishers into Thailand's national parks, a worrying trait identified by Bussarawit and Thongtham (1999). The level of trade between these two islands is not clearly understood with no official statistics available but discussions with local traders have indicated that each season (approximately October–April) sees the arrival of at least the equivalent of around 90 tonnes of fresh sea cucumber. These are used not only for beche-de-mer but also in the production of oils, lotions, cosmetics and tablets. This level of trade in itself raises a number of serious questions. Questions of legality, stock health and future sustainability demand immediate attention if one is to avoid a potential future collapse of the fishery in Thailand. Langkawi traders are aware of the possible ramifications of such a collapse on their industry. Here are some possible scenarios if the situation persists:

- market demand in Langkawi is met elsewhere, most likely the under-utilised fishery in neighbouring Pulau Pangkor to the south;
- market demand in Langkawi is met from within through a programme of culture and restocking;
- a combination of the above;
- the sea cucumber processing and trade industry declines in Langkawi.

The Fisheries Departments of both Malaysia and Thailand, in collaboration, should cautiously address the ecological ramifications of trade relationships between these two islands. Much of the catch landed in Langkawi is illegal and should be phased out over a set period of time. This will help allow stocks in Thailand waters to recuperate, although a system of regulation for the Thailand fishery will need to be put in place. In the meantime every effort should be made to quantify landings from Thai fishers in terms of species and their processed nature. In the long-term, agreement could be reached whereby a Thailand fishery may supply a set percentage of the Langkawi market.

1. Dr Mark Baine, International Centre for Island Technology (ICIT), Heriot-Watt University, The Old Academy, Stromness KW16 3AW Orkney Islands, Scotland UK.

Tel: +44 1856 850 605; Fax: +44 1856 851 349; E-mail: ioemspb@icit.civ.hw.ac.uk or E-mail: markbaine@hotmail.com

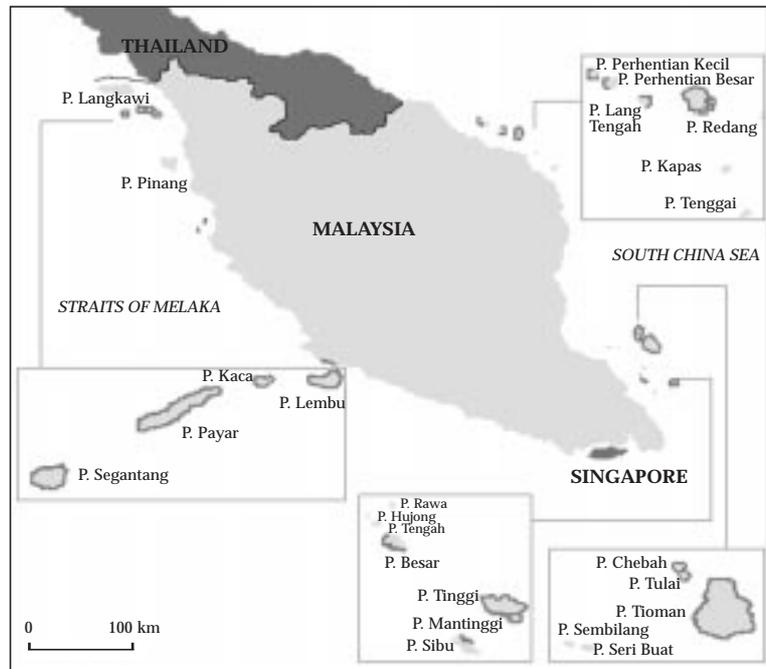
2. Institut Penyelidikan Perikanan, Pulau Pinang, Malaysia

A survey of processors and traders in Langkawi should also be undertaken to produce a more detailed examination of the socio-economic importance of the industry in Langkawi.

In parallel with the above, research should be initiated into the potential for restocking Langkawi waters. This should be a joint University and Fisheries Department initiative which aims to assess the viability of supplying sea cucumbers to meet the market demand within Langkawi. The backing and involvement of processors and traders should be sought for such research, with the ultimate aim of transferring management of restocking programmes, if successful, to the community itself. It is important, however, to understand that there is a number of research prerequisites to the practical initiation of any stocking programme. For example, given the high degree of pollution in Langkawi and its as yet unquantified impact on the local environment, most notably water quality, it would be advisable to ascertain the availability of adequate food supplies for sea cucumber populations. One possibility, using Pulau Payar (a Marine Park found further south), is to identify the preferred food supply for natural populations. An assessment of their availability in Pulau Langkawi can then be undertaken, thus ensuring identification of those sites that would prove more congenial to the needs of a restocking programme.

It is possible that a future scenario will exist whereby the demand in Langkawi is supplied from three directions: from within through restocking initiatives, from Thailand in a trade agreement and from Pulau Pangkor as part of a managed fishery. Pulau Langkawi may yet prove to be the heart of a complex system of sea cucumber fisheries and trade in peninsular Malaysia.

It should therefore be approached as such, with careful handling of the issues and the implementation of a system of collaborative and proactive management.



Map 1. Malaysia and South Thailand



Map 2. State of Sabah in Northeast Borneo

Pulau Pangkor

Only one fisher targets sea cucumber populations (*Stichopus horrens*) at various sites in Pulau Pangkor, fishing by hand at low tide approximately five days in each month. He operates a submerged cage system in which he keeps up to 1000 individuals at a time. These sea cucumbers are mainly used for the collection of coelomic fluid (termed *gamat* water). Approximately 100 specimens are slit and drained to enable the production of one small bottle of this product, which is subsequently boiled. Sea cucumbers, once drained, are returned to the cage. Little is known about their survival rate after such stress. On

demand, the fisher also produces *gamat* oil and beche-de-mer, but this is not a common practice. His market is mainly local with some interest from peninsular Malaysia. This fisher appears to operate within a certain conservation ethic, however, he is unaware that a considerable portion of his catch is comprised of juveniles. Concern is levied at this, even at such low effort.

It is important that this is approached carefully and with sensitivity. Although not his sole income, the sea cucumber fishery is his main source of livelihood. It has been recommended that the Fisheries Research Institute (Institut Penyelidikan Perikanan), with input from the Universiti Kebangsaan Malaysia which has conducted related research in Pulau Pangkor, arrange a meeting with the resident fisher to discuss his targeting of *Stichopus horrens*, and to impress upon him the need to steer away from juvenile catches, thus realising long-term benefits.

If willing, the fisher will also be asked to record his catch in terms of date, weight, length, area fished and effort employed (hours fished). The Fisheries Research Institute would develop a self explanatory logbook system for this purpose. The fisher would be reassured that this is only for research and that his livelihood is not under threat. It has also been recommended that the logbook should be completed by the fisher against a background of stock assessments in the area. The combined data can then be used to determine the status of the fishery and its limits for expansion. This is considered important as there is always the risk that as supplies of sea cucumber from Adang to Pulau Langkawi become depleted or are prohibited, the market demand in Langkawi is met by increased pressure on the stock in Pangkor waters. Such stock surveys are necessary to ensure baseline information for the identification of sustainable yields. It is essential that the Pangkor fishery be monitored in line with developments in Langkawi.

Sabah

Sabah is the most significant state in Malaysia for sea cucumber fisheries. The Sabah fisheries department estimated landings at around 155 tonnes in 1995, although this is widely thought to be an underestimate. It is, however, an increase of 9.2% on the previous year's estimate. This information is collated as part of the national SMPP (Sistem Maklumat Pengurusan Perikanan) programme which is the only monitoring surveys undertaken on the state's sea cucumber fisheries as part of an overall approach to monitoring landings of all marine species. It is also unclear as to the origin of the catch. It is commonly thought that a significant pro-

portion of the catch could be from Philippine waters. Sabah, with over 1600 km of coastline, employs no regulation on its sea cucumber fisheries, with little baseline information available on the health of the stocks, although observation does suggest a decline in some areas. There are four main fishing areas in Sabah: Kudat, Semporna, Sandakan and the West Coast (Kota Kinabalu and surrounding areas). The majority of fishing is undertaken by hand collection, free diving and trawl, the latter comprising an estimated 15% of the total catch.

Processing in Sabah is mainly a cottage-level industry involving families of collectors or middlemen (those who buy from fishers and sell the processed animal on to retailers or exporters). The dominant product from processing is beche-de-mer. A variety of species are targeted including prickly redfish (*Thelenota ananas*), teatfish (*Holothuria nobilis* and *H. fuscogilva*) and mainly sandfish (*Holothuria scabra*). The majority of the catch ends up in the export market, particularly when channelled through companies with factory level processing facilities.

A number of informal interviews with fishers was conducted during the course of the research. Common issues that arose included the decrease in catch compared with 3-5 years previous, an increase in effort and the lack of any community-based resource management. It must be stated that these informal interviews only relate to two island communities off Semporna in Southeast Sabah, namely Pulau Kulupuan and Bohey Dulang, and must certainly not be viewed as a widespread attitude.

In general Sabah is seen to present a host of problems in developing a workable strategy towards management of holothurian fisheries.

These include:

- the lack of Fisheries Department personnel to enforce management measures in the wide geographical area involved;
- the lack of incentive to divert manpower to this problem of limited economic importance in terms of the state's overall fishing industry;
- the lack of data relating to the origins of catch landed in Sabah, and resulting lack of clear indication statistically of which grounds are being heavily fished and what proportion of the catch originates from Philippine waters;
- the understanding that existing landing statistics are vastly underestimated and thus prove inadequately indicative;
- the above two points mean that there is little accurate baseline data available for future determination of the effects of regulation;

- the majority of the catch is undertaken by hand collection with localised cottage processing industries;
- the questions of implementability and acceptability of imposed regulations in areas where community management is dismissed; and which, against a background of a lack of true understanding of what the problems are from any regulatory body, is likely to lead to social and political repercussions.

It is therefore difficult to find an immediate solution to the problem of potential overfishing in Sabah waters. There are arguments for both a policy of strict regulation and one of no regulation, and it must be noted that the Fisheries Department has indicated its need of hard statistical data to convince it to develop a management plan for sea cucumber fisheries in Sabah. This is difficult to achieve, considering that the body that should be responsible for the collation of such statistical data is the Fisheries Department and that personnel resources and research/monitoring funds are tight given the current economic climate in Malaysia.

In recognising the difficulties facing Sabah Fisheries Department in allocating manpower to the gathering of data on sea cucumber fisheries, the research team has recommended the consideration of a minimum level of data collection. This could be achieved through the use of personnel in direct collation of data at landing ports (as is already practiced, but with increased scope) and/or through the voluntary participation of processors in a limited logbook scheme. The latter has its difficulties, particularly as much of the catch is processed at cottage industry level, which in many cases will go unrecorded. One does, however, feel that there will always be constraints on data collection in Sabah and additional conservative estimates may be required. Basic information that would be of use to future management of the fishery includes:

- catch location;
- species composition;
- method of collection;
- quantity;
- destination (where possible to avoid repetition of data from landings with that of processors).

Those processors willing to participate in a logbook scheme could record the details from their suppliers.

The situation in Sabah requires careful appraisal. If the state does not instigate a rigorous monitoring programme soon and persists in maintaining the open-access fishery that exists at present, there is a

very real danger that in the next few years the situation will worsen to the point where regulation is rushed into place but too late.

Another issue in Sabah is the verve with which officials wish to install a programme of restocking (in itself an admission and realisation of the impending problem), and to this end research projects are underway. This drive has gathered momentum without the hard statistical data necessary to qualify the programme (data which, coincidentally, has been designated as of the utmost importance by the Fisheries Department in Malaysia). As things stand at present there will also be little background data available by which to measure the success of such a programme. In this instance it should be stated that a programme of restocking is not the sole answer to problems of holothurian fisheries management. It should complement a well-structured and effective management plan.

Concluding comments

This research culminated with the formation of the Malaysian Network for Holothurian Conservation and Sustainable Management (HCSM), a network comprising representatives from academia, fisheries and conservation sectors. There has been little collaboration between these different sectors over the years in addressing the problems facing sea cucumbers and their dependent industries. It is hoped that the spirit of co-operation that has developed with this research continues in the future.

Figure 1 (see next page) provides an overview of some of the issues that will need to be addressed by the HCSM. The Darwin research programme incorporated aspects of training in holothurian ecology and survey methodology which should be utilised to the full in learning more about the population dynamics of the many species that exist in Malaysian waters, particularly within the Marine Parks. Such ecological research can be complemented with an integrated approach to fisheries management in Malaysia and further afield in Southeast Asia where issues of illegal fishing and trade warrant future consideration. Depending on how circumstances develop within Malaysia, particularly in terms of the economy, it will be important for the HCSM, in its discussions and actions, to strike a balance between monitoring, regulation, research, culture and restocking. It will be difficult. A demanding task for the HCSM will be achieving prioritisation for sea cucumber research and regulation in such difficult economic times. This will need to be examined in terms of the nation's growing participation in biodiversity and biotechnology research and also with knowledge of the existence of external funding sources (including the EC pro-

gramme for scientific and technological co-operation with developing countries, the Darwin Initiative and others). Prioritisation is a large hurdle to overcome, but one must additionally not lose sight of the importance of participatory management in ensuring that any initiatives stand a chance of being successful. Inevitably there will be conflict between conservation and fishery interests. This should be anticipated and planned for.

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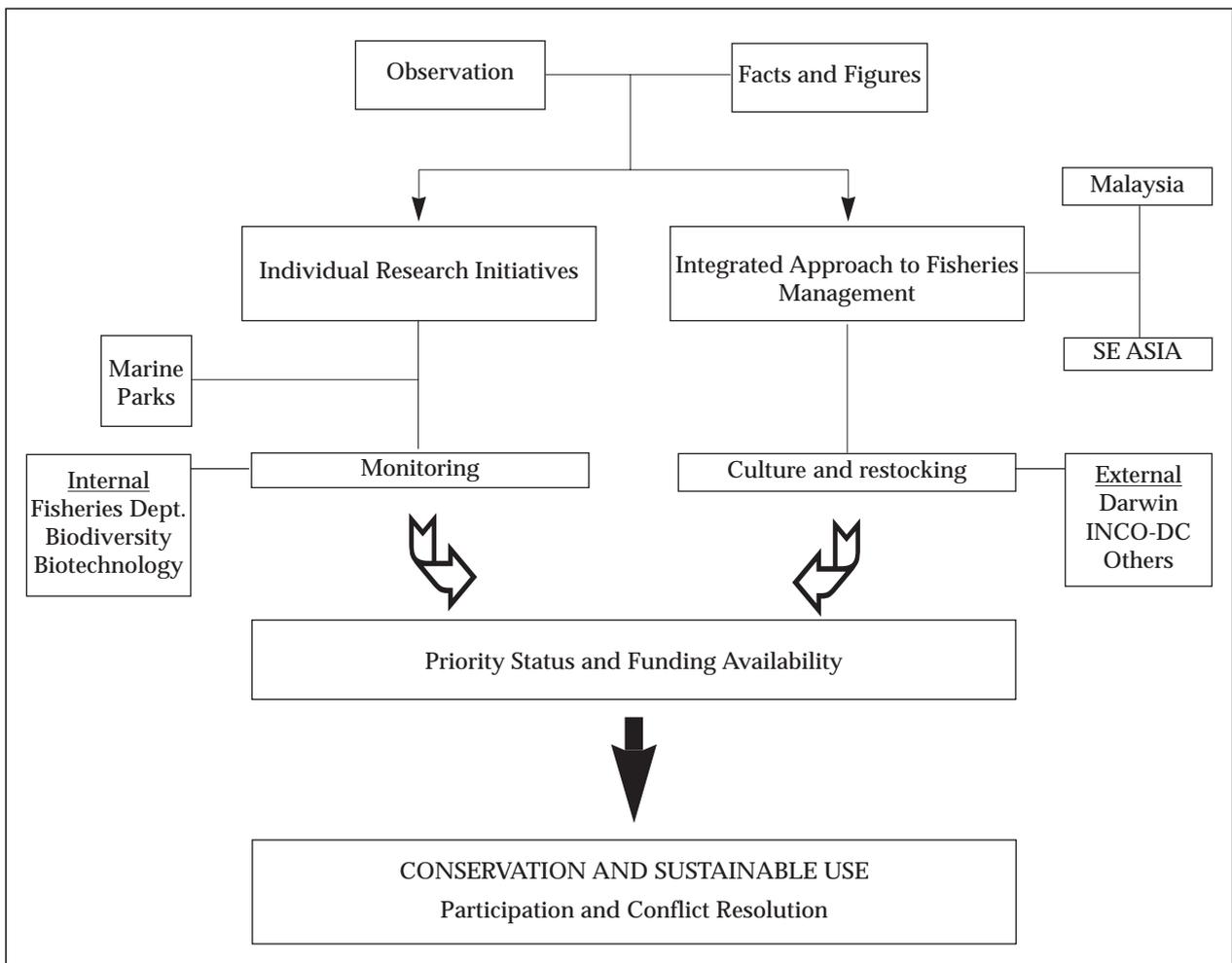


Figure 1. A holistic approach to holothurian research and fisheries management