Fisheries, Long Term Monitoring Program Sampling Protocol
Mud Crab: (2008 onwards)
Section 1
This document may be cited as:


Acknowledgments:

This sampling protocol has been contributed to by many government and non-government staff, in particular members of the long term monitoring team (north and south).

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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Section 2 - Operational Protocols

Section 2 of this sampling protocol can be obtained by contacting the Fisheries Data Coordinator:
Telephone +61 7 3224 2175, Fax +61 7 3224 2805 or
Email FishDataCoordinator@dpi.qld.gov.au

Acronyms

CFISH Commercial Fisheries Information System, Fisheries Queensland
DEEDI Department of Employment, Economic Development and Innovation, Queensland
LTMP Long Term Monitoring Program, Fisheries Queensland part of DEEDI
Rationale

The Queensland Mud Crab (*Scylla serrata*) fishery is primarily a pot fishery. Mud Crabs are taken by commercial, recreational (including charter) and indigenous fishers. Mud Crabs are also a bycatch of the Queensland set gillnet fishery which targets estuarine species like barramundi and threadfin salmon. These net-caught crabs must be released.

The Mud Crab fishery is managed by restrictions on gear, size and sex (only male crabs are permitted to be taken) and recreational bag limits under the *Fisheries Regulation 2008*. Catch can be exported under a Wildlife Trade Operation exemption, which was granted for a five year period from 2007 ([http://www.environment.gov.au/coasts/fisheries/qld/mud-crab/index.html](http://www.environment.gov.au/coasts/fisheries/qld/mud-crab/index.html)).

Fisheries Queensland, part of the Department of Employment, Economic Development and Innovation (DEEDI) has undertaken an annual fishery-independent survey of Mud Crabs since 2000. The survey provides a fishery-independent index of relative abundance in key river systems throughout the state and provides estimates of the size and sex structure of Mud Crabs for a long-term comparison of population parameters. The survey uses a fixed sampling design, where the same sites are surveyed each year using the same methods.

The Mud Crab monitoring program (DPI&F 2005) underwent a review in 2007 to ensure that the data collected were sufficient for managers to ensure the sustainability of the fishery. Underpinning the review was a statistical analysis of the data to determine the ‘power’ to detect a change in catch rate, and some testing of the experimental design (soak time, pot placement).

There were very few changes to the program except —

- a modification of some sampling locations to better reflect areas at high risk of overfishing and
- the introduction of a commercial fisher monitoring logbook, to help determine inter-annual variability in the catch rate of Mud Crabs.

The revised program was implemented in 2008.
Objectives

Objectives of the monitoring program for Mud Crabs from 2008 onwards are to:

- estimate an annual index of relative abundance (catch rate) of Mud Crabs in key areas of Queensland, and
- document bycatch captured and interaction with species of conservation interest during the monitoring program.

Sampling locations

Mud Crabs are monitored throughout the State (Table 1, Figure 1). Sampling locations were selected to correspond to areas of high commercial catches as well as their proximity to large population centres (where recreational fishing pressure is assumed to be higher). Additional locations have been sampled, to fulfil shorter term monitoring requirements e.g. monitoring of the effects of an oil spill.

Table 1. Long Term Monitoring Program Mud Crab sampling locations from 2008.
* represent river systems sampled for oil spill monitoring.

<table>
<thead>
<tr>
<th>North</th>
<th>North east coast</th>
<th>South</th>
<th>Moreton Bay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gulf of</td>
<td></td>
<td>Broadsound</td>
<td></td>
</tr>
<tr>
<td>Carpentaria</td>
<td></td>
<td>Waverly Creek</td>
<td>Power Island</td>
</tr>
<tr>
<td>Norman River</td>
<td>Trinity Inlet</td>
<td>Connor Creek</td>
<td></td>
</tr>
<tr>
<td>Staaten</td>
<td>Hinchinbrook Island</td>
<td>Deception Creek</td>
<td>Maaroom</td>
</tr>
<tr>
<td>Weipa</td>
<td>Bowling Green Bay</td>
<td>Thirsty sound</td>
<td>Pannikin Island</td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Gladstone Harbour</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>*Calliope River</td>
<td></td>
</tr>
</tbody>
</table>
Figure 1. Sampling locations of the fishery-independent Mud Crab monitoring, excluding areas sampled for oil spill monitoring.
Catch locations

In each sampling location, pots are set in four catch locations, which are representative of key habitat areas—foreshore, mouth, mid-estuarine and upper estuarine (Figure 2).

River systems such as Weipa, Trinity Inlet, Hinchinbrook Island, Bowling Green Bay, Power Island, Maaroom, Pannikin Island and Long Island are large complex estuaries and don’t have a defined river structure as outlined above. In these systems, catch locations were selected that best represented either the foreshore, mouth, mid-estuarine or upper-estuarine environment based on water quality and habitat in the area.

The same catch locations are re-sampled each year unless there have been dramatic changes to the river morphology. If changes do occur in a particular catch location that make it no longer practical to sample then an alternate catch location, close to the original may be selected.

Figure 2. Example of catch locations within a sampling location
Sampling dates and times are not fixed as they are determined by tidal cycles (Table 2). At sampling locations with a large tidal range sampling is conducted during neap tides when the reduced tidal run limits crab pot displacement. At other locations sampling is conducted during spring tides to allow vessel access to the sampling locations for longer periods. The sequence in which sampling locations are sampled is identical between years to reduce variability associated with the tidal cycle.

Sampling is planned to coincide with periods of maximum catch in each sampling location, as determined by local commercial fishers and logbook data (Table 2).

Table 2. Mud Crab Long Term Monitoring Program sampling dates.

<table>
<thead>
<tr>
<th>Sampling Location</th>
<th>Sampling dates</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gladstone, Hervey Bay and Moreton Bay</td>
<td>January and February</td>
</tr>
<tr>
<td>Trinity Inlet, Hinchinbrook and Bowling Green Bay</td>
<td>March and April</td>
</tr>
<tr>
<td>Broadsound</td>
<td>April</td>
</tr>
<tr>
<td>Weipa, Staaten River and Norman River</td>
<td>April and May</td>
</tr>
</tbody>
</table>
Monitoring Procedures

Gear and Deployment

Round, collapsible crab pots are used as they are easy to transport, assemble and replace. Twenty pots are set at each of the four catch locations within a sampling location. Each pot is marked with a unique number to ensure that they can be easily identified. Future detail is available in Fisheries Queensland (In Prep.).

Broadsound, Gladstone, Hervey Bay and Moreton Bay

Pots are baited with a whole mullet. To reduce the chance of the pot drifting with the tide, floats are placed in the mangroves where possible and, depending on pot weight, a one kilogram weight may be used. Pots are set approximately two hours before the late afternoon or night time high tide and checked approximately four hours after the morning low tide, a soak time of approximately twelve hours for each pot. Ten pots are set at 50 m intervals on each side of the creek or river mouth (foreshore) and as close as possible to the mangroves.

Gulf of Carpentaria, Trinity Inlet, Hinchinbrook and Bowling Green Bay

Pots are baited with half a mullet (or one whole small mullet). Depending on pot weight a one kilogram weight may be added to the pot to stop pots drifting. Pots are set approximately three hours before the low tide and checked approximately three hours after the low tide allowing a soak time of approximately six hours for each pot. Pots are set at 100 m intervals along either side of the creek, and staggered so that any one pot is 50 m ahead or behind those on the opposite bank. On the foreshore, and at some other catch locations where banks are a great distance apart (e.g. Hinchinbrook catch locations), all pots are set at 100 m intervals, parallel to the shore or bank.
Field Procedures

For each sampling location, the following details are recorded for each survey:

- catch location (foreshore, mouth, mid, upper)
- date
- water quality (temperature, salinity)
- set time for each pot
- lift time and date for each pot.

All Mud Crabs (Scylla spp) caught are:

- identified to species
- sexed
- carapace width measured (from notch to notch) to the nearest millimetre
- released at the site of capture.

Bycatch species and number of individuals in each pot is recorded, as well as any interaction with species of conservation interest. All bycatch is released alive.

More detail on procedures is provided in Fisheries Queensland (In Prep).

Commercial Fisher Monitoring Logbook

Selected commercial fishers are requested to keep a record of catch and bycatch throughout the main fishing season (1-2 months before and after the LTMP surveys) in a monitoring logbook.

Data collected includes:

- date
- location
- number of pots sampled
- number of legal male Mud Crabs caught
- number of undersize males Mud Crabs caught
- number of female Mud Crabs caught
- number of bycatch species (e.g. fish, sharks, etc)

The data collected will add context to the catch rates from the fishery-independent survey.
Permits and Approvals

Permits and Permissions

This project requires current permits or approval from:

- General Fisheries Permit (*Fisheries Act 1994*)
- Department of Environment and Resource Management, Queensland Parks and Wildlife Service
- Marine Parks Permit (Bowling Green Bay, Hinchinbrook Channel, Gladstone)
- National Parks Permit (Bowling Green Bay National Park).

Survey staff familiarise themselves follow all permit conditions and have a copy with them during the project.

Notifications

The following notifications are sent at least one week prior to the surveys, quoting relevant permit numbers and any variations to the methods:

- Queensland Boating and Fisheries Patrol, Fisheries Queensland (Pinkenba, Hervey Bay, Gladstone, Rosslyn Bay, Cairns, Townsville, Karumba and Weipa)
- Queensland Parks and Wildlife Service (Cairns, Townsville, Toowoomba)
- Girringun Aboriginal Corporation.

Any interactions with protected species are reported in a timely manner to the appropriate agencies (Australian Government Department of the Environment, Water, Heritage and the Arts, Canberra and/or Department of Environment and Resource Management, Brisbane).

Stakeholders and the general public are kept informed of the survey through a variety of media resources including press releases, pamphlets, reports and web site information, as documented in the Assessment and Monitoring Communication Strategies.
Data access

All use of assessment and monitoring data is subject to a data agreement between the Department and the party requesting the data. The data agreement covers how data must be acknowledged in publications and other restrictions that may be placed on data use. If the publication is based substantially on LTMP data and on LTMP survey design then co-authorship may be requested or advised. All documents that utilise LTMP data must be sent to the Fisheries Data Coordinator as drafts for perusal before they are published. Copies of final documents utilising LTMP data must be provided to the Fisheries Data Coordinator free of charge for lodgement in the departmental library.

The Fisheries Data Coordinator is to be contacted for all applications:
Telephone +61 7 3224 2175, Fax +61 7 3224 2805 or
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References


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1 Section 2 of LTMP Sampling protocols can be obtained by contacting the Fisheries Data Coordinator: Telephone +61 7 3405 6822, Fax +61 7 3224 2805 or Email FishDataCoordinator@dpi.qld.gov.au