



Australian Government

Department of the Environment and Water Resources

Assessment of the
Queensland Mud Crab Fishery

August 2007

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ISBN: 978 0 642 55354 8

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This document is an assessment carried out by the Department of the Environment and Water Resources of a commercial fishery against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. It forms part of the advice provided to the Minister for the Environment and Water Resources on the fishery in relation to decisions under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999*. The views expressed do not necessarily reflect those of the Minister for the Environment and Water Resources or the Australian Government.

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Table 1: Summary of the Queensland (QLD) Mud Crab Fishery

<p>Publicly available information relevant to the fishery</p>	<ul style="list-style-type: none"> • <i>QLD Fisheries Act 1994</i>; • <i>QLD Fisheries Regulation 1995</i>; • <i>Great Barrier Reef Marine Park Act 1975</i>; • <i>QLD Marine Parks Act 2004</i>; • Annual Status Report – QLD Mud Crab Fishery, 2005; • Annual Status Report – QLD Mud Crab Fishery, 2006; • Annual Status Report – QLD Mud Crab Fishery, 2007; and • Department of the Environment and Water Resources' (DEW, formerly the Department of the Environment and Heritage) Assessment Report of the <i>QLD Mud Crab Fishery 2004</i>.
<p>Area</p>	<p>The area of the Mud Crab Fishery encompasses all QLD tidal waters. Pots and traps are set on the substrate, generally in shallow water estuarine or nearshore coastal areas. In 2006, regions of high effort included Moreton Bay, Hinchinbrook Channel, Gladstone, Hervey Bay and Kowanyama in the Gulf of Carpentaria (GoC).</p>
<p>Fishery status</p>	<p>The 2007 Annual Status Report for the QLD Mud Crab Fishery notes that total reported commercial catch has decreased from 959 tonnes (t) in 2005 to 898 t in 2006. In 2004, the total reported commercial catch was 1135 t. In contrast, Catch Per Unit Effort (CPUE) has remained fairly stable during 2000-06, ranging between approximately 23-26 kg/day.</p> <p>The QLD Department of Primary Industries and Fisheries (DPI&F) considers that the decrease in commercial mud crab harvest in 2006 is likely to be a result of the decrease in commercial fishing days (from approximately 45,000 days in 2004 to approximately 40,000 days in 2005 to approximately 36,000 days in 2006) and a reflection of the lower number of boats accessing the fishery following the Great Barrier Reef Marine Park (GBRMP) Structural Adjustment Package (SAP).</p>
<p>Target Species</p>	<p>Mud crab (<i>Scylla serrata</i>).</p> <p>Information on the biology of this species can be found in DEW's initial assessment of the fishery at: http://www.environment.gov.au/coasts/fisheries/qld/mud-crab/index.html</p>
<p>Byproduct Species</p>	<p>A second species, <i>S. olivacea</i> is also found in the fishery but is only taken in negligible quantities.</p>
<p>Gear</p>	<p>Commercial fishers are permitted to use a maximum of 50 baited collapsible traps or crab pots. Prescriptions also apply on the size of the float that may be used.</p> <p>Recreational fishers are permitted to use a maximum of four traps, pots or dillies.</p>
<p>Season</p>	<p>All year.</p>
<p>Commercial harvest 2006</p>	<p>Approximately 898 t. CPUE – based on kilogram per boat day – has remained relatively stable during 2000-06, ranging between approximately 23-26 kg/day.</p>

	<p>In the East Coast region catch has shown a general increasing trend, although the catch decreased from 796 t in 2005 to 754 t in 2006. CPUE has remained relatively stable since 2000, hovering around 25 kg/day.</p> <p>Commercial catch in the GoC region reduced from 162 t in 2005 to 142 t in 2006. While there was a major decline in CPUE in 2002/03, DPI&F believes it was associated with a major drought in the region. DPI&F report that the observed increase in CPUE from 2003-04 suggests that mud crab stocks are healthy in the GoC.</p> <p>DPI&F indicate that the decrease in commercial mud crab harvest in 2006 is paralleled by a decrease in the number of commercial fishing days and fewer boats accessing the fishery following the licence buyout under the GBRMPSAP.</p>
Commercial gross value of production	Approximately \$9.4 million (2006).
Take by other sectors	<p>Preliminary results from the 2005 Recreational Fisheries Information System diary survey indicate that approximately 689 t of mud crabs were harvested by the recreational sector in 2005 – a decrease from the 2002 estimate of 800-1000 t. This represents approximately 43% of the estimated total annual harvest of mud crabs in QLD waters.</p> <p>It is estimated that in 2001 indigenous fishers harvested approximately 12 t of mud crabs, representing less than 1% of the estimated total annual harvest of mud crabs for the 2006 season in QLD waters. Indigenous fishers mainly use hand (58%) and spear (27%) fishing methods.</p> <p>The charter sector is the smallest component of the total annual harvest and represents less than 1% of the commercial catch. Data from compulsory charter logbooks indicate that in 2006, 1,526 kilograms of mud crabs were caught, of which 429 kilograms were released.</p>
Commercial licences issued	As of June 2006, 859 licences are allocated for the QLD Mud Crab Fishery. DEW had purchased 77 C1 crab fishing licences as a result of the GBRMPSAP, however have since surrendered the licences, which will not be available for reallocation. As of 30 June 2006, 406 boats were accessing the fishery.
Management arrangements	<p>The fishery is managed under the QLD <i>Fisheries Act 1994</i>, in accordance with the QLD <i>Fisheries Regulation 1995</i>. A range of input and output controls are in place to manage the fishery including:</p> <ul style="list-style-type: none"> • a minimum legal size limit applied to commercial and recreational fishers (150 mm carapace width); • a prohibition on the take of all female mud crabs; • gear restrictions; • limited entry (C1 endorsement required); • prescriptions on the size of float that may be used; • mandatory commercial catch logbooks; and • spatial closures under the Commonwealth <i>Great Barrier Reef</i>

	<i>Marine Park Act 1975, the QLD Marine Parks Act 2004 and the Fisheries Regulation 1995 (section 43 Schedule 2 and section 42 Schedule 3.</i>
Export	Small export trade to Asia; live domestic market.
Bycatch	DPI&F introduced bycatch monitoring as part of the Long Term Monitoring Program (LTMP) from the 2002 fishing season. Bycatch mainly consists of discarded undersize or female mud crabs with other species occasionally present in pots. Survival of released crabs is believed to be high but uncertain. Commercial QLD mud crab fishers are not required to report bycatch species in their general logbooks (excluding protected species interactions), however DPI&F are considering implementing a commercial fisher research logbook in the fishery to collect information on bycatch species in addition to the bycatch information collected through the LTMP.
Interaction with Protected Species	<p>QLD mud crab fishers are required to record interactions with protected species in the ‘Species of Conservation Interest’ (SOCI) logbooks.</p> <p>A total of seven interactions with Threatened, Endangered or Protected (TEP) species were recorded by commercial net and crab fisheries between 2003 and 2004. Four interactions occurred with crocodiles (three released alive), two with hawksbill turtles and one with a green turtle (all released alive).</p> <p>A total of eight interactions with TEP species were recorded for all crab fisheries over the 2005 fishery season. This included two sea snakes (released alive), three false water rats (released dead), a humpback whale (released alive) and two saltwater crocodiles (released dead).</p> <p>No interactions with a protected species were reported by crab fishers in QLD in 2006.</p> <p>While it is difficult to determine in which crab fishery these interactions occurred (as interactions are reported by gear type), it is likely that the false water rats, saltwater crocodiles and marine turtles interacted with fishers in the QLD Mud Crab Fishery. DPI&F have indicated that it is extremely unlikely that the interaction with the humpback whale occurred in the Mud Crab Fishery due to the shallow waters in which mud crabs are harvested.</p>
Ecosystem Impacts	The impact of the fishery on the broader ecosystem is considered minimal given the benign harvesting method used and the habitat (muddy/sandy bottom) in which the fishery operates.
Impacts on World Heritage property	While the QLD Mud Crab Fishery operates mainly in inter tidal areas outside the GBRMP, the assessment considered the possible impacts on the World Heritage values of the GBRMP World Heritage Area (WHA).

DEW notes that some areas of the fishery are subject to fishing closures through marine park zoning established under the Commonwealth *Great Barrier Reef Marine Park Act 1975* and the *Marine Parks Act 2004*, and serve to protect areas of the WHA from the impacts of this fishery.

DEW considers that an action taken by an individual fisher, acting in accordance with the fishery management regime, would not be expected to have a significant impact on the World Heritage matter protected under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Table 2: Progress in implementation of conditions and recommendations made in initial assessment of the QLD Mud Crab Fishery

Condition	Progress	Recommended Action
<p>Operation of the fishery will be carried out in accordance with the QLD Mud Crab Fishery management regime in force under the Queensland <i>Fisheries Act 1994</i> and <i>Fisheries Regulation 1995</i>.</p>	<p>The fishery has operated in accordance with the legislated management regime over the course of the current export approval.</p>	<p>This condition has been met and will continue to apply under the new export approval for this fishery, as a condition to including on the List of Exempt Native Specimens, specimens that are or are derived from fish or invertebrates taken in the QLD Mud Crab Fishery, as defined in the management regime in force under the <i>QLD Fisheries Act 1994</i> and the <i>Fisheries Regulation 1995</i>.</p>
<p>DPI&F will inform DEW of any intended amendments to the QLD Mud Crab Fishery management regime that may affect sustainability of the target species or negatively impact on bycatch, protected species or the ecosystem</p>	<p>There have been no changes to the management arrangements that may affect sustainability of the target species or negatively impact on bycatch, protected species or the ecosystem.</p>	<p>This condition has been met and will continue to apply as a recommendation under the new export approval for this fishery (Recommendation 1, Table 4).</p>
<p>Reports to be produced and presented to DEW annually, and to include:</p> <ul style="list-style-type: none"> ○ information sufficient to allow assessment of the progress of DPI&F in implementing the recommendations made in the <i>Assessment of the QLD Mud Crab Fishery 2004</i>; ○ a description of the status of the fishery and catch and effort information; 	<p>DPI&F have produced publicly-available Annual Status Reports on the QLD Mud Crab Fishery in 2005, 2006 and 2007. The reports contain information on progress in implementing recommendations, catch and effort trends and research undertaken or completed relevant to the fishery. The 2007 Annual Status Report included reporting against the Performance Measurement System (PMS). These report can be found at: http://www2.dpi.qld.gov.au/fishweb/17451.html</p>	<p>DEW considers that this condition has been met and notes that, as part of the new export approval, this will continue to apply as a recommendation for this fishery (Recommendation 2, Table 4).</p>

<ul style="list-style-type: none"> ○ a statement of the performance of the fishery against objectives, performance indicators and measures once developed; and ○ research undertaken or completed relevant to the fishery. 		
Recommendation	Progress	Recommended Action
<p>DPI&F to inform DEW of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on bycatch, protected species or the ecosystem.</p>	<p>There have been no changes to the management arrangements that may affect sustainability of the target species or negatively impact on bycatch, protected species or the ecosystem.</p> <p>DPI&F has advised DEW that a proposal has been put forward to prescribe a maximum size opening in crab apparatus to minimise interactions with juvenile sea turtles. The DPI&F Crab Management Advisory Committee (MAC) is currently investigating funding to trial these modified crab pots, however the current status of the project and the outcome of attracting funds is unknown. DPI&F are also considering the implementation of commercial fishery research logbooks for commercial fishers to provide information on incidental catch of female mud crabs and bycatch. The implementation of this monitoring program will be subject to further stakeholder consultation.</p> <p>It is anticipated that DPI&F will develop draft management changes for consideration by the QLD Government before the end of 2007. If approved, these management changes will then be subject to public consultation with a view to implement in</p>	<p>DPI&F to continue to inform DEW of any amendments to the accredited management arrangements, particularly the anticipated management changes planned for 2008 (Recommendation 1, Table 4).</p> <p>A recommendation for the QLD Mud Crab Fishery will also involve DPI&F to produce and present annual reports to DEW regarding the status and the performance of the fishery, research undertaken and progress in implementing DEW recommendations (Recommendation 2, Table 4).</p>

	<p>2008. There is currently no timetable for developing a specific management plan for the fishery.</p>	
<p>DPI&F to continue to actively engage with the Northern Territory and New South Wales in pursuit of collaborative or complementary management and research of shared mud crab stocks.</p>	<p>DPI&F advise that they meet with the New South Wales (NSW) Department of Primary Industries and Northern Territory (NT) Fisheries annually to pursue opportunities for collaborative or complementary management and research of shared species.</p> <p>In June 2007, DPI&F research staff met with Northern Territory Fisheries staff at a Fisheries Research and Development Corporation (FRDC) funded workshop to formulate a strategy for mud crab research in tropical waters over the next 5-10 years. The workshop focused on alternative methods for tracking changes in population size and recruitment success.</p> <p>In addition, DPI&F are continuing to work with the NT on research projects related to mud crab. For example, a joint DPI&F and NT Mud Crab Fishermen's Association research project is investigating the survival of mud crabs during post-harvest transportation and aims to develop procedures to maximise survival.</p>	<p>DEW notes that DPI&F have collaborated with NSW and the NT in pursuit of complementary management and research of shared mud crab stocks including the development of a strategy for mud crab research in tropical waters over the next 5 to 10 years.</p> <p>DEW commends DPI&F for pursuing this collaborative work and recommends DPI&F ensure that priority research is undertaken to improve the ecologically sustainable management of the fishery (see Recommendation 3, Table 4).</p>
<p>As part of the management planning process, DPI&F to develop fishery specific objectives linked to performance indicators and performance measures for target,</p>	<p>DPI&F held a workshop with fisheries managers, researchers and industry representatives in May 2006 to develop a PMS outlining operational objectives and performance measures for the mud crab fishery. Outcomes of this process were</p>	<p>DEW commends DPI&F for developing and implementing the PMS in relation to target, bycatch and protected species and is confident that DPI&F will regularly monitor and assess the fishery against the</p>

<p>bycatch, protected species and impacts on the ecosystem.</p>	<p>reviewed by the CrabMAC and other stakeholders.</p> <p>The PMS was implemented in 2007 and is a formal instrument for measuring performance of the QLD Mud Crab Fishery, containing objectives, performance indicators and performance measures for target, bycatch and protected species.</p> <p>Objectives for the QLD Mud Crab Fishery include:</p> <ul style="list-style-type: none"> • maintain fishery viability in all sectors by maintaining catch levels within acceptable ranges. Ensure sustainability of mud crabs through reducing the likelihood of overfishing; • minimise the impact of the fishery on bycatch species; and • to minimise the impact of mud crab pot fishing operations on stocks of protected species, particularly marine turtles and crocodiles. <p>Performance measures will be reported on annually in the QLD Mud Crab Fishery Annual Status Reports and will be reviewed after the first year of reporting to ensure that the performance measures are precautionary, responsive and meaningful.</p>	<p>PMS.</p> <p>The performance of the fishery against the PMS was reported in the <i>Annual Status Report – QLD Mud Crab Fishery, 2007</i> and will be included in future annual status reports. DEW notes from the 2007 Annual Status Report, that there was a breach of a trigger in 2006 regarding low catch levels in the northern GoC region. After significant discussions with stakeholders, DPI&F’s response to the measure being triggered is that low annual catch in the Northern Gulf region can be attributed to extrinsic factors such as the loss of the major air cargo carrier from Weipa. Notwithstanding this, DEW agrees that DPI&F needs to continue to closely monitor catch and effort in this region and develop management responses to ensure sustainable catch levels in this region.</p> <p>In addition, while DPI&F have developed performance indicators relating to the impact of the fishery on bycatch species as part of the PMS, DEW notes that limited information is currently available to inform the performance indicators and monitor the impact of the fishery on bycatch. A recommendation has been made for DPI&F to ensure that appropriate information is collected from the fishery to ensure that these indicators</p>
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		can be monitored effectively (see Recommendation 4 , Table 4).
DPI&F to monitor the status of the fishery in relation to the performance measures once developed. Within 3 months of becoming aware of a performance measure not being met, DPI&F to finalise a clear timetable for the implementation of appropriate management responses.	DPI&F advise that performance measures will be regularly assessed and reported against in annual status reports for the QLD Mud Crab Fishery. Within three months of becoming aware that a performance measure has been triggered DPI&F, in collaboration with the CrabMAC and stakeholders, will finalise a clear timetable for the implementation of appropriate management responses (as specified in the PMS).	DEW expects that DPI&F will monitor the fishery against the PMS and respond to any triggers in a timely manner.
DPI&F to develop a compliance strategy for the mud crab fishery. The strategy will explicitly address the following issues and provide for the periodic review of the effectiveness of the strategy: <ul style="list-style-type: none"> • catch and effort data validation; • compliance with commercial pot number restrictions; • compliance with restrictions on the take of female and undersize crabs; • the potential for QLD harvested female and undersize crabs to be laundered in other jurisdictions with different management measures; • the appropriateness and effectiveness of existing recreational bag and size limits; • the 'black market' sale of recreationally caught crabs; and 	DPI&F conducted a compliance risk assessment for the QLD Mud Crab Fishery in November 2006 to determine compliance priorities and allow for the most effective targeting of QLD Boating and Fisheries Patrol resources to higher risk issues. The assessment identified several activities in the fishery as having a high or an extreme level of risk. These include: <ul style="list-style-type: none"> • interference with fishing apparatus; • use of unauthorised fishing gear in the recreational fishery; • leaving fish in fishing apparatus out of the water; • take/possession of regulated fish (undersize males) by recreational and commercial fishers; • take/possession of regulated fish (female) by recreational fishers; and • recreational fishers taking crabs for 	The compliance risk assessment will be used by the QLD Boating and Fisheries Patrol in undertaking operational planning activities associated with management of the fishery. DPI&F indicate that through identification and prioritisation of compliance risks associated with the fishery, planning and operational processes at the district level should be improved and risks mitigated. <p>DEW expects that DPI&F and the QLD Boating and Fisheries Patrol will closely monitor compliance within the fishery and DEW will monitor compliance reports through the QLD Mud Crab Fishery Annual Status Reports.</p>

<ul style="list-style-type: none"> the occurrence of crab pot 'drying'/stranding. 	<p>commercial purposes.</p> <p>DPI&F also recognised that issues such as the possession or sale of certain crabs and the failure to maintain daily logbooks are important enforcement tools and should be addressed. It should also be noted that most offences in the mud crab fishery are committed by recreational fishers. Detailed strategies to address the risks identified by this assessment will be developed through the QLD Boating and Fisheries Patrol strategic and operational planning processes that are reviewed annually.</p>	
<p>From 2005, DPI&F to report publicly on the status of the fishery on an annual basis, including explicit reporting against each performance measure once developed.</p>	<p>DPI&F have produced publicly-available Annual Status Reports on the QLD Mud Crab Fishery in 2005, 2006 and 2007. The 2007 Annual Status Report included reporting against the PMS. These report can be found at: http://www2.dpi.qld.gov.au/fishweb/17451.html</p>	<p>It is important that reports be produced by DPI&F and presented to DEW annually in order for the performance of the fishery and progress in implementing the recommendations in this report and other managerial commitments to be monitored and assessed throughout the life of the declaration.</p> <p>A recommendation has been made for DPI&F to continue to produce and present annual reports to DEW regarding the status and the performance of the fishery, research undertaken and progress in implementing DEW recommendations (see Recommendation 2, Table 4).</p>
<p>DPI&F to develop a system to ensure that catch data collected in compulsory logbooks is validated on an ongoing</p>	<p>Since 1999, fishery-independent catch rate trends for 17 estuarine areas throughout QLD are available from the fisheries LTMP annual surveys.</p>	<p>DEW expects that DPI&F will use LTMP data in future fishery assessments and cross-check LTMP data against data</p>

<p>basis and to investigate methods for documenting and validating effort in the fishery.</p>	<p>Collapsible crab pots, as used in the commercial fishery, are set at equal intervals in a staggered pattern along either side of the estuary and at equal intervals parallel to the shore along the foreshore. Each crab is identified, measured, sexed, the presence of any parasites or abnormal features is noted and eggs, if present, are recorded for females. The presence of other species of fish and crabs caught in the pots is also recorded to document the potential bycatch of the fishery. Habitat characteristics are measured because of the recognised close association of mud crab distribution with certain habitat types. Water quality is also measured at each site.</p> <p>DPI&F will use LTMP data in future fishery assessments and are currently investigating any other cost-effective means to validate catch and effort data collected through logbooks. For example, DPI&F are investigating the use of commercial fisher research logbooks to provide a reliable source external to the LTMP on commercial catch rates and the level of bycatch associated with the fishery.</p> <p>The 2000-06 summary report for all years in which the LTMP was conducted is currently being developed.</p>	<p>collected though the compulsory commercial fishing logbooks. DEW supports the potential implementation of commercial fisher research logbooks to provide a reliable source external to the LTMP on commercial catch rates and the level of bycatch associated with the fishery. DPI&F also indicate that as a result of the compliance risk assessment conducted in 2006, the failure to keep daily logbooks will be monitored and enforced by DPI&F and the QLD Boating and Fisheries Patrol.</p> <p>In addition, a recommendation has been made for DPI&F to develop and implement a system to ensure that effort in the fishery is annually documented and monitored (see Recommendation 6, Table 4).</p>
<p>DPI&F to develop and implement separate management arrangements for the Gulf of Carpentaria mud crab stock by 30 June 2005.</p>	<p>As a step towards implementation of separate management arrangements, an allocation method using catch history is currently being considered by DPI&F. Allocation is subject to industry and</p>	<p>As part of the PMS, performance measures have been developed for the average commercial catch and catch rate for the entire East Coast and the entire</p>

	<p>community consultation, with consultation subject to government approval and other management priorities.</p> <p>DPI&F have indicated that East Coast and Gulf of Carpentaria fishery management arrangements will not be separated until the Mud Crab Fishery management arrangements are reviewed. While a timetable for the review of the Mud Crab Fishery management arrangements has not yet been finalised, DPI&F anticipates that draft management changes dealing with the Gulf Fishery and other high priority issues will be developed for consideration by the QLD Government before the end of 2007. If approved, these management changes will then be subject to public consultation with a view to implement in 2008.</p>	<p>Gulf separately, as well as regions within these two divisions (i.e. the Northern Gulf and the Southern Gulf). DEW will monitor the status of the fishery on an annual basis as well as the anticipated changes to be developed for the fishery by the end of 2007, including separate management arrangements for the Gulf sector of the fishery.</p>
<p>DPI&F to develop a strategy to remove or substantially reduce the amount of latent effort in the fishery, which includes clearly defined management actions linked to specific timeframes, by 31 December 2004. DPI&F to implement the strategy prior to the introduction of the management plan.</p>	<p>DPI&F anticipates that the new licensing and fees policy introduced from 1 July 2006 should result in a reduction in latent effort. DPI&F expects that the policy will considerably reduce the retention of unused licences.</p> <p>DPI&F intends to monitor the effects of the new licensing and fee arrangements to determine whether C1 licence holders surrender previously unused fishery symbols. If this does not result in the removal of latent effort, DPI&F will investigate alternative approaches.</p>	<p>While the GBRMP SAP removed 77 crab licences from the fishery, DEW notes that 859 commercial crab licences remain with only 406 commercial fishing boats accessing the fishery in 2006.</p> <p>DPI&F indicate that, in theory, the minimum legal size limit and prohibition on the take of females limits the proportion of the population that may be harvested to approximately 25%. With no mud crab stock assessment or biomass estimates, DEW considers that latent effort issues is still a potential hindrance facing the QLD Mud Crab Fishery. A</p>

		<p>recommendation has been made for DPI&F to develop and implement specific management measures to accurately monitor and respond to the potential activation of latent effort in the QLD Mud Crab Fishery on an annual basis (see Recommendation 6, Table 4).</p>
<p>As part of the management planning process, DPI&F to review existing management measures designed to control mud crab harvest by recreational fishers to ensure that these measures are appropriate, adequately constrain recreational effort and minimise impacts on bycatch and protected species. Should the review indicate that existing measures are not appropriate DPI&F will develop new measures in a timely manner.</p>	<p>Management planning process for mud crab has not yet commenced due to priority being given to other fisheries such as the QLD East Coast Inshore Fin Fish Fishery.</p> <p>Preliminary results from the 2005 Recreational Fisheries Information System (RFISH) diary survey indicates that approximately 689 t mud crabs were harvested in 2005 – a decrease from the 2002 estimate of 874 t.</p>	<p>DEW expects the DPI&F, based on the information available, will take into account the mud crab harvest from the recreational sector in assessments and should also acknowledge the take of mud crabs by the recreational sector when reviewing the PMS (see Table 4).</p>
<p>DPI&F to identify fishery areas at risk of overfishing within two years. DPI&F to undertake independent surveys in these areas with a view to detecting any significant changes in crab abundance and take appropriate management action to address resource sustainability concerns.</p>	<p>DPI&F commissioned a review of the Mud Crab Fishery LTMP in 2005-06, which identified higher risk areas in the commercial and recreational fisheries and enabled DPI&F to assess whether the 17 sites monitored annually as part of the LTMP were still appropriate and reflected regions of high harvest. DPI&F have indicated that a revised monitoring strategy to better target higher risk areas and resource assessment needs will be developed for implementation in 2007. Areas at higher risk from overfishing were assessed in a review of commercial and recreational catch and effort data.</p> <p>DPI&F also conducted an Ecological Risk</p>	<p>DPI&F indicate that any impacts ranked as ‘moderate’ or above as a result of the ERA will require a management response regarding the mitigation of the risk. DEW commends DPI&F on completing the ERA process for the QLD Mud Crab Fishery and considers these actions in response to high risk issues to be a priority for the fishery and as such reinforces this commitment by DPI&F with a recommendation (see Recommendation 5, Table 4).</p> <p>Through Annual Status Reports, DEW</p>

	<p>Assessment (ERA) in 2006, the results of which will be incorporated into ongoing management planning processes.</p> <p>In addition, DPI&F is currently considering a proposal to implement a commercial fisher research logbook in the fishery. Volunteer commercial fishers would be required to collect information on catch of legal and regulated crabs and bycatch species, providing a reliable source external to the LTMP, which should assist in identifying fishery areas at risk of overfishing.</p>	<p>will monitor the revised monitoring strategy to better target higher risk areas and resource assessment needs.</p>
<p>DPI&F to develop a system for the collection and monitoring of information on discarded undersize and female mud crab and key bycatch species sufficient to enable identification of long-term trends in bycatch and discards. In the event that catch levels of any bycatch species or discards change, DPI&F will investigate suitable management responses.</p>	<p>In 2005-06, DPI&F conducted a comprehensive review of the current mud crab LTMP. The review aimed to reassess the program objectives to ensure that data collected was appropriate to monitor mud crab stocks in QLD. The review also enabled DPI&F to assess whether the 17 sites monitored annually were still appropriate and reflected regions of high harvest and regions in close vicinity to a large resident population. The 2000-06 summary report for all years in which the LTMP was conducted is currently being developed.</p> <p>DPI&F are also investigating other opportunities for commercial and recreational fishers to provide information on discarded female and undersize crabs and other bycatch (e.g. implementing commercial fisher research logbooks). The DPI&F RFISH survey collects information from participants regarding why crabs were released.</p>	<p>DEW acknowledges the review of the LTMP and the possibility of introducing commercial fisher research logbooks. DEW also notes that a post-release survival in crab pot fisheries project has been completed by DPI&F which included an analysis of historical data. The study concluded that post-release survival of discarded undersize and female mud crabs in the fishery appears to be high, based on field observations and mark-recapture studies.</p>

<p>Within 1 year, to support the implementation of the Species of Conservation Interest logbooks, DPI&F to ensure that an education program for fishers, both recreational and commercial, is developed and implemented, to promote the importance of protected species protection and accurate incident reporting.</p>	<p>DPI&F launched a comprehensive education program in September 2005 to increase awareness about protected species interaction reporting by both commercial and recreational fishers. The program included reviewing and updating the Endangered and Threatened Species Awareness Course that new master fishers are required to undertake.</p> <p>DPI&F anticipates that the education package should increase the level of confidence in the data obtained from the SOCI logbooks.</p>	<p>DEW considers that the education program is likely to enhance the reliability of data on protected species interactions and commends DPI&F on their efforts in developing and implementing it.</p> <p>DEW will continue to monitor and assess the level of interactions with TEP species in the fishery through the Annual Status Reports.</p>
<p>DPI&F to conduct a risk assessment to determine the likely impact of protected species interactions in the fishery (including the recreational sector) within two years. In the event that a species is found to be at risk, DPI&F will investigate measures to mitigate interaction with the species, to ensure that any risks to protected species can be minimised.</p>	<p>DPI&F conducted an ERA for the QLD Mud Crab Fishery in May 2006. The ‘Ecological Risk Assessment for Effects of Fishing’ Level One model, developed by the Commonwealth Scientific and Industrial Research Organisation (CSIRO), was selected as the most appropriate methodology to assess ecological risks in the QLD Mud Crab Fishery.</p> <p>The outcomes of the ERA process were presented to the CrabMAC for review and finalisation. The ERA identified the following issues as high risk (with consequence scores of three or above):</p> <ul style="list-style-type: none"> • capture of TEP species through fishing activity; • direct impact without capture of TEP species through gear loss; • addition of non-biological material through gear loss; 	<p>DPI&F indicate that any impacts ranked as ‘moderate’ or above will require a management response regarding the mitigation of the risk. DEW commends DPI&F on completing the ERA process for the QLD Mud Crab Fishery and considers these actions in response to high risk issues to be a priority for the fishery and as such reinforces this commitment by DPI&F with a recommendation (see Recommendation 5, Table 4).</p>

	<ul style="list-style-type: none"> • capture of TEP species through other capture fishing methods; and • impact of coastal development on TEP species. <p>The outcomes from the ERA will be incorporated into ongoing management planning processes. DPI&F will develop management responses to issues identified as high risk.</p>	
<p>DPI&F investigate the effects of ghost fishing by lost or discarded mud crab apparatus within two years.</p>	<p>DPI&F has conducted an ERA for the fishery that addressed ghost fishing (impacts of lost fishing gear). While potential impacts regarding ghost fishing on target and bycatch species, habitat and community were assessed as either low (2) or negligible (1), the impact of ghost fishing on TEP species (particularly marine turtles) in the QLD Mud Crab Fishery was assessed as high risk.</p> <p>DPI&F are committed to developing management responses to issues identified as high risk from the ERA, including the impact of ghost fishing on TEP species in the fishery.</p>	<p>DEW acknowledges that the impact on bycatch species and the ecosystem from lost mud crab apparatus is likely to be minimal, as demonstrated by the results of the ERA process. However the ERA did rank gear loss on protected species as a ‘moderate’ level of risk. DPI&F have indicated that management responses to issues identified as high risk (with a score of ‘moderate’ or above) will be developed. DEW considers these actions in response to high risk issues to be a priority for the fishery and as such reinforces this commitment by DPI&F with a recommendation (see Recommendation 5, Table 4).</p> <p>If new information indicates that impacts from ghost fishing is increasing, DEW expects that DPI&F would implement appropriate management responses in a timely manner.</p>

Table 3: The Department of the Environment and Water Resources (DEW) assessment of the QLD Mud Crab Fishery against the requirements of the EPBC Act related to decisions made under Parts 13 and 13A

Part 13

Section 208A Minister may accredit plans or regimes	DEW assessment of the QLD Mud Crab Fishery
<p>Minister may, by instrument in writing, accredit for the purposes of this Division:</p> <ul style="list-style-type: none"> (c) a plan of management, or a policy, regime or any other arrangement, for a fishery that is: <ul style="list-style-type: none"> i. made by a State or self-governing Territory; and ii. in force under a law of the State or self-governing Territory; 	<p>The Management regime for the QLD Mud Crab Fishery, as managed under the Queensland <i>Fisheries Regulation 1995</i> and the Queensland <i>Fisheries Act 1994</i>, was accredited in August 2004. The management arrangements for the QLD Mud Crab Fishery have not significantly changed since this accreditation was granted and reported interactions with a listed threatened species with the fishery are low. Consequently, a new Part 13 declaration is not needed at this time.</p>
Section 222A Minister may accredit plans or regimes	DEW assessment of the QLD Mud Crab Fishery
<p>Minister may, by instrument in writing, accredit for the purposes of this Division:</p> <ul style="list-style-type: none"> (c) a plan of management, or a policy, regime or any other arrangement, for a fishery that is: <ul style="list-style-type: none"> i. made by a State or self-governing Territory; and ii. in force under a law of the State or self-governing Territory; 	<p>The Management regime for the QLD Mud Crab Fishery, as managed under the Queensland <i>Fisheries Regulation 1995</i> and the Queensland <i>Fisheries Act 1994</i>, was accredited in August 2004. The management arrangements for the QLD Mud Crab Fishery have not significantly changed since this accreditation was granted and reported interactions with a listed migratory species with the fishery are negligible. Consequently, a new Part 13 declaration is not needed at this time.</p>
Section 245 Minister may accredit plans or regimes	DEW assessment of the QLD Mud Crab Fishery
<p>Minister may, by instrument in writing, accredit for the purposes of this Division:</p> <ul style="list-style-type: none"> (c) a plan of management, or a policy, regime or any other 	<p>The Management regime for the QLD Mud Crab Fishery, as managed</p>

<p>arrangement, for a fishery that is:</p> <ul style="list-style-type: none"> i. made by a State or self-governing Territory; and ii. in force under a law of the State or self-governing Territory; 	<p>under the Queensland <i>Fisheries Regulation 1995</i> and the Queensland <i>Fisheries Act 1994</i>, was accredited in August 2004. The management arrangements for the QLD Mud Crab Fishery have not significantly changed since this accreditation was granted and reported interactions with a whale and other cetacean with the fishery are negligible. Consequently, a new Part 13 declaration is not needed at this time.</p>
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<p>Section 265 Minister may accredit plans or regimes</p>	<p>DEW assessment of the QLD Mud Crab Fishery</p>
<p>Minister may, by instrument in writing, accredit for the purposes of this Division:</p> <ul style="list-style-type: none"> (c) a plan of management, or a policy, regime or any other arrangement, for a fishery that is: <ul style="list-style-type: none"> i. made by a State or self-governing Territory; and ii. in force under a law of the State or self-governing Territory; 	<p>The Management regime for the QLD Mud Crab Fishery, as managed under the Queensland <i>Fisheries Regulation 1995</i> and the Queensland <i>Fisheries Act 1994</i>, was accredited in August 2004. The management arrangements for the QLD Mud Crab Fishery have not significantly changed since this accreditation was granted and reported interactions with a listed marine species with the fishery are low. Consequently, a new Part 13 declaration is not needed at this time.</p>

Part 13A

Section 303DC Minister may amend list	DEW assessment of the QLD Mud Crab Fishery
<p>Minister may, by instrument in published in the Gazette, amend the list referred to in section 303DB (list of exempt native specimens) by:</p> <p>(a) including items in the list;</p>	
<p>In deciding whether to amend the list referred to in section 303DB (list of exempt native specimens) to include a specimen derived from a commercial fishery, the Minister must rely primarily on the outcomes of any assessment in relation to the fishery carried out for the purposes of Division 1 or 2 of Part 10.</p>	<p>No assessment of the QLD Mud Crab Fishery has been carried out under Part 10 of the EPBC Act.</p>
<p>The above does not limit the matters that may be taken into account in deciding whether to amend the list referred to in section 303DB (list of exempt native specimens) to include a specimen derived from a commercial fishery.</p>	<p>It is not possible to list exhaustively the factors that you may take into account in amending the List of Exempt Native Specimens (LENS). The objects of Part 13A, which are set out below this table, provide general guidance in determining factors that might be taken into account. A matter that is relevant to determining whether an amendment to the list is consistent with those objects is likely to be a relevant factor.</p> <p>DEW considers that the amendment of the LENS to include product taken in the QLD Mud Crab Fishery would be consistent with the provisions of Part 13A as:</p> <ul style="list-style-type: none"> ▪ the fishery will not harvest any Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) listed species; ▪ there are management arrangements in place to ensure that the resource is being managed in an ecologically sustainable way (see Table 1); ▪ the operation of the QLD Mud Crab Fishery is unlikely to be

	<p>unsustainable and threaten biodiversity within the next 5 years; and</p> <ul style="list-style-type: none"> ▪ the EPBC Regulations 2000 do not specify fish as a class of animal in relation to the welfare of live specimens.
<p>Before amending the list referred to in section 303DB (list of exempt native specimens), the Minister:</p> <ul style="list-style-type: none"> (a) must consult such other Minister or Ministers as the Minister considers appropriate; and (b) must consult such other Minister or Ministers of each State and self-governing Territory as the Minister considers appropriate; and (c) may consult such other persons and organisations as the Minister considers appropriate. 	<p>Under the EPBC Act, a decision to amend the LENS does not require a public consultation period. However, a public notice, which set out the proposal to grant export approval to the QLD Mud Crab Fishery and included the 2005, 2006 and 2007 Status Reports for the QLD Mud Crab Fishery, was released for public comment which closed on 6 July 2007 with no submissions received. DEW considers that this has provided sufficient opportunity for consultation with other persons and organisations.</p> <p>A letter to the Hon Tim Mulherin MP, QLD Minister for Primary Industries and Fisheries advises him of the intention to declare the fishery exempt from the export provisions of the EPBC Act.</p>

Section 391 Minister must consider precautionary principle in making decisions	DEW assessment of the QLD Mud Crab Fishery
The Minister must take account of the precautionary principle in making a decision under section 303DC and/or section 303FN, to the extent he or she can do so consistently with the other provisions of this Act.	You must consider the precautionary principle when making a decision to include specimens on the LENS.
The precautionary principle is that lack of full scientific certainty should not be used as a reason for postponing a measure to prevent degradation of the environment where there are threats of serious or irreversible environmental damage.	

Objects of Part 13A

- (a) to ensure that Australia complies with its obligations under CITES and the Biodiversity Convention;
- (b) to protect wildlife that may be adversely affected by trade;
- (c) to promote the conservation of biodiversity in Australia and other countries;
- (d) to ensure that any commercial utilisation of Australian native wildlife for the purposes of export is managed in an ecologically sustainable way;
- (e) to promote the humane treatment of wildlife;
- (f) to ensure ethical conduct during any research associated with the utilisation of wildlife; and
- (h) to ensure the precautionary principle is taken into account in making decisions relating to the utilisation of wildlife.

Final recommendations to DPI&F for the QLD Mud Crab Fishery

The material submitted by DPI&F indicates that the QLD Mud Crab Fishery operates in accordance with the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. DEW considers that the fishery is well managed and unlikely to have an unacceptable or unsustainable impact on the environment in the short to mid term. Overall, DEW recognises that a minimum legal size limit applied to commercial and recreational fishers (150 mm carapace width); a prohibition on the take of all female mud crabs; gear restrictions; limited entry (C1 endorsement required); and spatial closures under the Commonwealth *Great Barrier Reef Marine Park Act 1975* and the *QLD Marine Parks Act 2004* are conservative and suggest that the fishery is being managed in an ecologically sustainable way.

In making its assessment, DEW considers that the range of management measures are sufficient to ensure that the fishery is conducted in a manner that does not lead to over-fishing and that stocks are not currently overfished. Taking into account the combination of management arrangements, data gathering and nature of the fishery, DEW considers that fishing operations are managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem.

DEW is satisfied that the fishery will not be detrimental to the survival or conservation status of the taxon to which it relates in the short term. Similarly, it is not likely to threaten any relevant ecosystem in the short term. To contain and minimise the risks in the longer term the recommendations listed below have been made. DEW believes that product taken in the fishery should be exempt from the export controls of Part 13A of the EPBC Act, with that exemption to be reviewed in 5 years.

DEW considers that the operation of the fishery does not, or is not likely to, adversely affect the survival in nature of a listed threatened species or population of that species, or the conservation status of a listed migratory species, cetacean or listed marine species or a population of any of those species. DEW also considers that under the management plan operators are required to take all reasonable steps to avoid the killing or injuring of protected species, and the level of interaction under current fishing operations is low. For these reasons, the management arrangements were accredited under Part 13 of the EPBC Act in August, 2004. Since there have been no changes to the management arrangements since the initial assessment of the fishery and noting the relatively low number of protected species interactions reported in the fishery, management measures in place to minimise the risk of interactions and the implementation of an education program to support the protected species reporting mechanism, DEW considers that the existing Part 13 accreditation remains valid.

Recommendations are provided below with a brief explanation of the related issue/intent. Unless a specific time frame is provided in the recommendation each recommendation must be addressed before the end of the fishery's declaration (5 years).

Table 4: QLD Mud Crab Fishery Assessment– Summary of Issues and Recommendations August, 2007

	Issue	Recommendation
1	<p><u>General Management</u> Export decisions relate to the arrangements in force at the time of the decision. In order to ensure that these decisions remain valid, DEW needs to be advised of any changes that are made to the management regime (particularly the anticipated management changes planned for 2008) and make an assessment that the new arrangements are equivalent or better, in terms of ecological sustainability, than those in place at the time of the original decision. This includes amendments that may affect sustainability of the target species or negatively impact on byproduct, bycatch, protected species or the ecosystem.</p>	<p>Recommendation 1: DPI&F to inform DEW of any intended amendments to the management arrangements that may affect the criteria on which EPBC Act decisions are based.</p>
2	<p><u>Annual Reporting</u> It is important that reports be produced and presented to DEW annually in order for the performance of the fishery and progress in implementing the recommendations in this report and other managerial commitments to be monitored and assessed throughout the life of the declaration (5 years). Annual reports should include a description of the fishery, management arrangements in place, recent catch data for all sectors of the fishery, status of target stock, interactions with protected species, impacts of the fishery on the ecosystem in which it operates, progress in implementing DEW recommendations and research and monitoring outcomes.</p>	<p>Recommendation 2: DPI&F to continue to produce and present reports to DEW annually. Reports to include:</p> <ul style="list-style-type: none"> i. Information sufficient to allow assessment of the progress of DPI&F in implementing the recommendations made in the Assessment of the QLD Mud Crab Fishery 2007; and ii. A description of the fishery, management arrangements in place, recent catch data for all sectors of the fishery, status of target stock including performance of the fishery against objectives, performance indicators and measures, interactions with protected species, impacts of the fishery on the ecosystem in which it operates and research and monitoring outcomes. <p>Information should only be provided on those aspects which are relevant to the fishery and that</p>

		articulate ‘changes’ since the last annual report.
3	<p><u>Cross-Jurisdictional Management</u> DEW notes that DPI&F have collaborated with NSW and the NT in pursuit of complementary management and research of shared mud crab stocks including the development of a strategy for mud crab research in tropical waters over the next 5 to 10 years.</p> <p>DEW commends DPI&F for pursuing this collaborative work and recommends DPI&F ensure that priority research is undertaken to improve the ecologically sustainable management of the fishery.</p>	<p>Recommendation 3: DPI&F to continue to actively pursue the development of collaborative research with other jurisdictions and agencies and ensure that management arrangements for the QLD Mud Crab Fishery continue to take account of the results of research conducted.</p>
4	<p><u>Precautionary Performance Measures (Bycatch Species)</u> There is a paucity of data on the biomass of mud crabs in QLD. DEW considers it important for DPI&F to ensure that performance measures and indicators are appropriately precautionary, particularly when separating management arrangements between the East Coast and the Gulf of Carpentaria, to adequately monitor for significant changes in catch rates to ensure the ecologically sustainable management of the fishery.</p> <p>As part of the PMS, DPI&F have developed performance indicators relating to the impact of the fishery on bycatch species. However, DEW notes that limited information is currently available to inform the performance indicators and monitor the impact of the fishery on bycatch species. This is due to:</p> <ul style="list-style-type: none"> • the seemingly low incidence of bycatch in the mud crab fishery and the short duration the LTMP has been collecting bycatch information for; and • the recent ERA did not assess the risk associated with bycatch species. <p>In the absence of data on the biomass of mud crabs, fishery-dependent bycatch data and an ERA of the fishery’s impact on bycatch species, DEW recommends DPI&F ensure that performance measures for the fishery are accurately informed by the information currently being collected in the fishery. DEW notes that the PMS is designed to be a working document that may be reviewed and updated to reflect available data. The upcoming review of the PMS (after the first year of reporting) is an opportune time for DPI&F to consider the precautionary nature of</p>	<p>Recommendation 4: By the end of 2008, DPI&F to review the Performance Measurement System for the QLD Mud Crab Fishery to ensure that indicators (including that for bycatch) are relevant and are targeted at achieving precautionary management outcomes. DPI&F to ensure that appropriate information is collected from the fishery to ensure that these indicators can be monitored effectively.</p>

	<p>performance measures and indicators and the suitability of the performance measures relating to bycatch. DPI&F should acknowledge the take of mud crabs by the recreational sector and consider collaborating with NT Fisheries when reviewing the Performance Measurement System (PMS).</p>	
5	<p><u>Ecological Risk Management</u> DEW recognises that an ERA on the impact of the mud crab fishery on protected species and ghost fishing by crab pots was completed by DPI&F in May 2006. The ERA identified the following as high risk issues for the QLD Mud Crab Fishery (with a consequence score of ‘moderate’ or above):</p> <ul style="list-style-type: none"> • capture of Threatened, Endangered or Protected (TEP) species through fishing activity; • direct impact without capture of TEP species through gear loss; and • addition of non-biological material through gear loss. <p>DPI&F have noted that any impacts ranked as ‘moderate’ or above will require a management response regarding the mitigation of the risk. DEW commends DPI&F on completing the ERA process for the QLD Mud Crab Fishery and considers that the implementation of management responses to address moderate-high risk issues should be given priority.</p>	<p>Recommendation 5: By the end of 2008, DPI&F to implement management responses for risks ranked as ‘moderate’ or above in the QLD Mud Crab Ecological Risk Assessment.</p>
6	<p><u>Latent Effort</u> Latent effort in the QLD Mud Crab Fishery was identified as a potential risk to the long-term sustainability of mud crab stocks in the 2004 DEW assessment of the fishery. While not the intention to remove latent effort, DPI&F implemented new licensing and fee arrangements on 1 July 2006 and will monitor the effects of these new arrangements to determine whether C1 (mud crab) licence holders surrender previously unused fishery symbols.</p> <p>While the Great Barrier Reef Marine Park Structural Adjustment Package removed 77 crab licences from the fishery, 859 commercial crab licences remain with only 406 commercial fishing boats accessing the fishery in 2006. DPI&F indicate that, in theory, the minimum legal size limit and prohibition on the take of females limits the proportion of the population that may</p>	<p>Recommendation 6: By the end of 2008, DPI&F to review the Performance Measurement System for the QLD Mud Crab Fishery to ensure that it incorporates a precautionary indicator/s to monitor activation of latent effort in the QLD Mud Crab Fishery on an annual basis. DPI&F to ensure that appropriate information is collected from the fishery to ensure that this indicator/s can be monitored effectively.</p>

be harvested to approximately 25%, however this remains uncertain. With no mud crab stock assessment or biomass estimates and the short duration that the LTMP has been collecting information on bycatch species, DEW considers that latent effort issues is still a potential hindrance facing the QLD mud crab fishery.

DEW recommends DPI&F develop and implement specific management measures to accurately monitor and respond to the potential activation of latent effort in the QLD Mud Crab Fishery on an annual basis. DPI&F to ensure that appropriate information is collected from the fishery to ensure that the activation of latent effort can be monitored effectively.

Acronyms

CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CPUE	Catch per Unit Effort
CSIRO	Commonwealth Scientific and Industrial Research Organisation
DEW	Department of the Environment and Water Resources
DPI&F	Department of Primary Industries and Fisheries
EPBC Act	<i>Environment Protection and Biodiversity Conservation Act 1999</i>
ERA	Ecological Risk Assessment
FRDC	Fisheries Research and Development Corporation
GBRMP	Great Barrier Reef Marine Park
GoC	Gulf of Carpentaria
LENS	List of Exempt Native Specimens
LTMP	Long Term Monitoring Program
MAC	Management Advisory Committee
NSW	New South Wales
NT	Northern Territory
PMS	Performance Measurement System
QLD	Queensland
RFISH	Recreational Fisheries Information System
SAP	Structural Adjustment Package
SOCI	Species of Conservation Interest
TEP	Threatened, Endangered or Protected
WHA	World Heritage Area