



Australian Government

Department of the Environment and Heritage

Assessment of the
Queensland Marine Specimen Shell Collection Fishery

November 2004

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Assistant Secretary
Wildlife Trade and Sustainable Fisheries Branch
Department of the Environment and Heritage
GPO Box 787
Canberra ACT 2601

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This document is an assessment carried out by the Department of the Environment and Heritage 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 Heritage 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 Heritage or the Australian Government.

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Assessment of the ecological sustainability of management arrangements for the Queensland Specimen Shell Collection Fishery

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EXECUTIVE SUMMARY

Background

The Queensland Department of Primary Industry and Fisheries (DPI&F) has submitted a document for assessment under Parts 13 and 13A of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act). The draft document *Ecological Assessment of Queensland's Marine Specimen Shell Collection Fishery* (the submission) was received by the Department of Environment and Heritage (DEH) in May 2004. The submission was released for a thirty-day public comment period that expired on 10 September 2004. Two public comments were received and DPI&F provided a response to those comments. No changes were made to the submission as a result of public comment.

The submission reports on the Queensland Marine Specimen Shell Collection Fishery (MSSCF) against the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. The DEH assessment considers the submission, associated documents, public comments and DPI&F's response to the comments.

Table 1: Summary of the MSSCF

Area	Official fishery area covers the entire length of the Queensland coast, but the majority of fishing occurs in northern coastal and reef waters.
Fishery status	Unknown.
Target Species	A broad range of animals from the phylum Mollusca.
Gear	Mainly based on hand collection and some use of shell dredges. Shells may also be collected from beaches.
Season	Commercial collection occurs throughout the year, usually related to periods of good weather at offshore reefs.
Commercial harvest 2002/03	240 live and 818 dead specimens taken (total 1058 individual specimens).
Value of commercial harvest	Annual export market estimated to be valued at \$2 million nationally. No estimates available for the Queensland fishery alone.
Recreational harvest	No quantitative information available, but likely to be high.
Commercial licences issued	There are currently 5 authority holders and 2 vessel licences. Three research permits are also current.
Management arrangements	<u>Commercial Fishery</u> : limited entry, gear restrictions (type and dimensions), spatial closures, possession limits, species restrictions. <u>Recreational Fishery</u> : possession limits, spatial closures, species restrictions.
Export	Specimen shells traded domestically and internationally.
Bycatch	Bycatch is low to non-existent. Occasionally a benthic species may be collected by a shell dredge, but it would be returned to the water immediately.
Interaction with Threatened Species	Considered low. Possible interactions with dugongs and marine turtles through boat strike.

The area of the fishery includes waters adjacent to the east coast of Queensland out to the outer edge of the Australian Exclusive Economic Zone. Part of the fishery area is in Commonwealth waters, however the entire fishery is managed by Queensland under an Offshore Constitutional Settlement between the Australian Government and the Government of Queensland. The fishery operates along the entire length of the Queensland coast, except in areas closed to fishing and through Marine Parks zoning, although most of the commercial collection of shells occurs in the northern coastal and reef waters.

Australia has approximately 19 000 species of marine, land and freshwater molluscs. Many of the marine molluscs found in Australian waters are not collected or traded and many species are common. Queensland fisheries management effort focuses on monitoring collection of those species that warrant particular attention, such as endemic or rare species, or the most commonly traded species. Species collected by commercial and recreational shell collectors include volutes (family Volutidae) and baler shells (*Melo* spp.). This fishery does not include take of oysters, trochus shell, pearl oysters, squid, cuttlefish, octopus or scallops, the harvest of which is managed under separate arrangements. In addition, the collection of certain species is prohibited, including helmet shell (*Cassis cornuta*), giant triton or trumpet shell (*Charonia tritonis*) and giant clams (family Tridacnidae). Fossilised shells are also not permitted to be taken.

A large number of taxa are collected as part of the MSSCF, however the most common by number in 2002/03 was the red-lipped stromb (*Strombus luhuanus*). This species is a medium-sized (shell length approximately 5 cm) gastropod mollusc, which is widely distributed in subtropical and tropical soft-substrate environments throughout the Indo-Pacific, often in association with coral reefs (Catterall *et al.*, 2001). *Strombus luhuanus* often forms local aggregations that may persist for years at a location on tidal flats and shallow subtidal slopes. Most of the lifecycle is spent as benthic snails that graze epiphytic microalgae or detritus from surface structures (mainly sand, rock and the leaves of macroscopic plants). Individuals also frequently bury themselves up to 1-2 cm beneath the sand surface, possibly to avoid predation and the effects of wave surge in rough weather (Catterall *et al.*, 2001). A study of this species on Heron Island has shown that *Strombus luhuanus* reproduces during August to March, with a peak in early summer. Egg masses contain 50 000-400 000 eggs, which are deposited on the sand surface. These release larvae after a week or less and the benthic life is likely to begin after a few weeks (Catterall *et al.*, 2001).

During the study by Catterall *et al.* (2001), predation on the benthic life-stages was frequently observed. Shell fragments common in the field included sliced off spires indicating calappid crab predation, shells intact except for holes in the dorsal body (implicating stromatopod crustaceae), and scattered small pieces (stingrays). Hermit crabs were also commonly seen in *S. luhuanus* shells, and were also seen attacking live strombs. Recruits and juveniles would be most vulnerable to predation since their shells are relatively thin.

Limited information is available on the biology of other species taken in this fishery, although most are thought to have a wide Indo-Pacific distribution.

During 2002/03, three active collectors reported a catch of 240 live shells and 818 dead shells from eight reefs/locations. This catch included 98 taxa, but ten or more specimens (either alive or dead or both) were only taken for 29 species. The remaining two operators did not collect specimen shells during the financial year. It is unclear from the submission whether it is usual for only a small number of licence holders to fish in any one year, however a number of the participants in this fishery are likely to only harvest shells on an intermittent basis (Dunning *pers. comm.*, 2004). Shells are traded both domestically and internationally, although no estimate is available on the value of the Queensland fishery.

The fishery is based primarily on the hand collection of shells, although some operators are also permitted to use a shell dredge. Broken remnants of molluscs can be collected by hand or by handheld non-mechanical implements, while whole specimens can only be collected by hand or through the use of a shell dredge (digging or sieving implements are not permitted to be used). If a shell dredge is used, the device must conform to specific dimensions. Specimen shells may be alive or dead at the time of collection and beach-washed shells can also be harvested. Management of the MSSCF is also based on possession limits (which are outlined in Part II of this report), species restrictions, limited entry and spatial closures.

There are five commercial marine specimen shell fishery authority holders and two vessel licences with a similar authorisation in Queensland. Currently the authorities are non-transferable, although it is expected they will become transferable in the future. The boat licences are transferable. Marine shells may also be taken for scientific research purposes and for *bone fide* shell collections and three research permits were current as of April 2004.

Due to the highly selective fishing methods employed in the MSSCF, this fishery is reported to produce no bycatch. The fishing methods are also expected to minimise the likelihood of operators interacting with protected species. No interactions with such species have been reported, and the only potential for interaction with protected species is likely to be through boat strikes or through damage to the sea floor during anchoring. However, such impacts are considered to be negligible.

Specimen shells are incidentally caught in the East Coast Trawl Fishery, however they are not permitted to be retained, as specified in the *Queensland Fisheries (East Coast Trawl) Management Plan 1999*. Recreational fishers also take specimen shells, although there is no quantitative information available on the level of recreational shell collection in Queensland. Some information is available on the indigenous harvesting of shells for food from the National Recreational and Indigenous Fishing Survey (Henry and Lyle, 2003) but there is no information on any indigenous take of specimen shells.

The MSSCF is managed under the Queensland *Fisheries Regulation 1995* under the legislative framework of the Queensland *Fisheries Act 1994*.

Overall assessment

The material submitted by DPI&F indicates that the MSSCF operates in accordance with the Australian Government *Guidelines for the Ecologically Sustainable Management of Fisheries*. DEH considers that the MSSCF is a well managed fishery that is unlikely to have an unacceptable or unsustainable impact on the environment in the short to mid term. Recommendations have been developed to ensure that the risk of impact is minimised in the longer term. Overall, the sophisticated management regime of spatial closures, possession limits and the benign harvesting methods suggests that the fishery is being managed in an ecologically sustainable way.

In making its assessment, DEH considers that the information collection system and management arrangements 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. Considering the management arrangements in place and the particularly selective and benign characteristics of the fishery operations, DEH considers that fishing operations are managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem. Management of this fishery has a history of reacting appropriately to threats to sustainability and DEH is confident that DPI&F will continue to provide this high quality management.

The assessment finds that the fishery is managed in an ecologically sustainable way and its operation is consistent with the objects of Part 13A of the EPBC Act. DEH recommends that the export of species taken in the fishery should be exempt from the export requirements of Part 13A of the EPBC Act, with that exemption to be reviewed in 5 years. DEH considers that the fishery, as managed in accordance with the management regime is not likely to cause serious or irreversible ecological damage over this period.

As the official fishery area encompasses Commonwealth as well as State waters, consideration under Part 13 of the EPBC Act is required regarding the impact of the fishery on listed threatened species, listed migratory species, cetaceans and listed marine species.

Protected species occurring in the area of the fishery include marine turtles, dolphins, dugongs and seabirds. However, the nature of the fishing methods makes it highly unlikely that interactions with protected species would occur. The only potential impacts to protected species are those associated with small vessel operations generally, such as boat strikes. However, given the small number of operators within this fishery, this type of interaction is also considered to be low. Therefore, the actual and potential impact on Part 13 species under the management arrangements is considered low and adequate protection is provided. There are no listed threatened ecological communities in the fishery area.

DEH recommends that the MSSCF management regime be declared an accredited management plan under Sections 208A, 222A, 245 and 265 of the EPBC Act. In making this judgement, DEH considers that the fishery to which the regime relates does not, or is not likely to, adversely affect the survival in nature of listed threatened species or population of that species, or the conservation status of a listed migratory species, cetacean species or listed marine species or a population of any of those species. DEH also considers that the management regime requires that all reasonable steps are taken to avoid the killing or injuring of protected species, and the level of interaction under current fishing operations is low. On this basis, DEH considers that an action taken by an individual fisher, acting in accordance with the management regime, would not be expected to have a significant impact on a listed threatened species or listed migratory species protected by the EPBC Act.

The assessment also considered the possible impacts on the World Heritage values of the Great Barrier Reef World Heritage Area and listed threatened ecological communities. However, given the low level of harvest in this fishery, the benign fishing methods employed, and the fact that large areas of the Great Barrier Reef Marine Park (GBRMP) are now closed to fishing through the Representative Areas Program, it is considered that the MSSCF is unlikely to compromise the world heritage values for which the GBRMP was listed. On this basis DEH considers that an action taken by an individual fisher, acting in accordance with the MSSCF management regime, would not be expected to have a significant impact on the World Heritage values of the GBRMP World Heritage Area (WHA).

To further strengthen the effectiveness of the management arrangements for the MSSCF, and to contain the environmental risks in the medium to long term, DEH has developed a series of recommendations. The implementation of these and other commitments made by DPI&F in the submission will be monitored and reviewed as part of the next DEH review of the fishery in 5 years time.

Recommendations

1. DPI&F to inform DEH of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on protected species or the ecosystem.
2. By December 2005, DPI&F to develop fishery specific objectives linked to performance indicators and performance measures for species representative of those listed in Groups 1-3 (Appendix 1 of the report – *Ecological Assessment of Queensland's Marine Specimen Shell Collection Fishery July 2004*) including, but not necessarily limited to, most commonly caught species in the fishery.
3. 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.
4. DPI&F to conduct, within 12 months, a compliance risk assessment to determine the most effective use of resources and to specify the measures needed to ensure adequate compliance with the management regime. Within two years, DPI&F to develop and implement a compliance strategy for the fishery that includes clear management actions to address compliance risks.
5. 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.
6. DPI&F to review the research information needs and priorities to meet the management information and performance measurement needs of the fishery. Analysis of research needs should take into account any gaps in the basic biological parameters required for the ecologically sustainable management of specimen shell species. DPI&F to develop a research strategy to address identified priority areas and explore ways to cooperatively share in or take advantage of research done in other specimen shell fisheries.
7. DPI&F to ensure that reliable estimates of recreational harvest of specimen shells are obtained and factored into the assessment and management of the MSSCF.

PART I - MANAGEMENT ARRANGEMENTS

The Queensland Marine Specimen Shell Fishery (MSSCF) is managed by the Department of Primary Industry and Fisheries (DPI&F).

The management regime is described in the following documents, all of which are, or will be publicly available:

- The *Fisheries Act 1994*;
- The *Fisheries Regulation 1995*;
- Zoning arrangements under the *Great Barrier Reef Marine Park Act 1975*;
- Zoning arrangements under the *Queensland Marine Parks Act 1982*; and
- Relevant Gazetted notices and licence conditions.

A number of other documents including research reports and scientific literature are integral to the management of the fishery.

DEH considers it important that management arrangements remain flexible to ensure timely and appropriate managerial decisions. Due to the importance of the management plan and documents referred to above to DEH's assessment of the fishery, an amendment could change the outcomes of the assessment and decisions stemming from it. Export decisions relate to the arrangements in force at the time of the decision. In order to ensure that these decisions remain valid, DEH needs to be advised of any changes that are made to the management regime 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.

Recommendation 1: *DPI&F to inform DEH of any intended amendments to the management arrangements that may affect sustainability of the target species or negatively impact on protected species or the ecosystem.*

The Harvest Management Advisory committee (HarvestMAC) provides advice to DPI&F on fisheries management arrangements and plans and administration of aspects of the *Fisheries Act 1994*. HarvestMAC is comprised of representatives with a range of expertise, and includes a DPI&F appointed Chair, fisheries managers, a member of the Queensland Boating and Fisheries Patrol (QBFP), commercial and recreational fishers, scientists, a representative of the Malacological Society of Australia and the Great Barrier Reef Marine Park Authority (GBRMPA) and a DEH observer. DPI&F also liaises with the Environmental Protection Agency/Queensland Parks and Wildlife Service in administering harvesting activities within Queensland jurisdictional waters. Officers from these agencies are also representatives on HarvestMAC. DEH considers that the representation of stakeholders on HarvestMAC is sound and that this committee contains appropriate expertise to guide management of the MSSCF.

Currently, there are no fishery specific objectives, performance indicators and measures for the MSSCF. DEH believes that such objectives and indicators and measures for target species need to be developed to ensure that the performance of the fishery can be measured and management action taken as required. In particular, performance measures (which may include review events and reference points) should be capable of detecting and responding to changes in stock status. DEH recognises that, given the large number of species taken in the MSSCF, it would be difficult for DPI&F to develop performance measures for all species. The submission describes how marine mollusc species have been allocated to one of four Groups based on their life history characteristics, spatial distribution and level of trade. The Groupings detail an increasing level of management prescription, with species included in Group 4 prohibited from being taken in the MSSCF. Given that these schedules were developed based on information from a number of reports and advice

from the Malacological Society of Australia, DEH considers that this list would provide a good basis from which DPI&F could choose representative species for the development of objectives and performance measures. DEH suggests that the representative species chosen include those that are most commonly taken in the MSSCF.

Recommendation 2: *By December 2005, DPI&F to develop fishery specific objectives linked to performance indicators and performance measures for species representative of those listed in Groups 1-3 (Appendix 1 of the report – Ecological Assessment of Queensland’s Marine Specimen Shell Collection Fishery July 2004) including, but not necessarily limited to, most commonly caught species in the fishery.*

Once developed, performance measures should be regularly reviewed and made publicly available. A clear process for responding to breaches of performance measures is also required to ensure that prompt management action is taken to address any threats to sustainability.

Recommendation 3: *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.*

Management of specimen shells is based on a range of measures. Take by the recreational sector is managed through spatial closures (recreational collectors may not collect in waters closed to shell collecting under Queensland Fisheries or Marine Parks legislation) and possession limits (recreational fishers are able to have in possession no more than 50 shelled molluscs). In the MSSCF, both commercial and research collectors are limited to taking no more than ten of any taxon live in any year, and are permitted to have no more than 50 dead and live shells in total in possession, unless specified on the authority or permit. The MSSCF also benefits from additional restrictions imposed by GBRMPA. GBRMPA enforces possession limits, with fishers not being able to collect more than five shells of any one species in General Use (light blue), Habitat Protection (dark blue) or Conservation Park (yellow) Zones within the Great Barrier Reef Marine Park (GBRMP) without a permit. For all collectors, taking of protected species, such as those included in Group 4 (Giant triton or trumpet shell, Giant clams and Helmet shell), is prohibited. Precautionary management in the fishery is also facilitated through the prohibition on collection of molluscs from an egg mass or of those depositing an egg mass, and through harvesting restrictions, with shells only being able to be taken by hand or, for some licensees, with a small shell dredge.

The QBFP is responsible for the enforcement of the MSSCF management arrangements. DPI&F allocates compliance and enforcement resources commensurate with the size of a fishery. Consequently the amount of compliance and enforcement resources allocated to the MSSCF is limited. Compliance and enforcement of the commercial fishery is primarily based on the provision of compulsory daily logbook sheets and through the work of the QBFP. While recognising that compliance resources are limited and that the MSSCF is relatively small in scale, DEH considers that a compliance risk assessment should be conducted, particularly given the reliance on management measures such as possession limits and prohibition on the take of particular species.

Recommendation 4: *DPI&F to conduct, within 12 months, a compliance risk assessment to determine the most effective use of resources and to specify the measures needed to ensure adequate compliance with the management regime. Within two years, DPI&F to develop and implement a compliance strategy for the fishery that includes clear management actions to address compliance risks.*

DPI&F undertakes an annual review of the catch of important species and effort in major areas in consultation with HarvestMAC. This review helps to give a general indication of the status of harvested species. More detailed, species-specific population assessments for this fishery have not been conducted because of the low catch rates and broad spatial and temporal distribution of fishing effort in the commercial fishery.

DEH considers that public reporting is an important part of good fisheries management in contributing to transparency and public accountability. Annual reporting of performance on a fishery-by-fishery basis would enhance such transparency and public accountability. DEH suggests that for each fishery, including the MSSCF, DPI&F publicly report against each fishery performance measure on an annual basis (note that a requirement for the development of performance measures for the fishery is expressed in **Recommendation 2**).

Recommendation 5: *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.*

Fishery dependent data relating to harvested species is collected on a regular basis in the fishery. A limited amount of fishery independent information has also been collected. Discussion of the information collection system can be found in Part II of this report.

An analysis of the fishery's capacity for assessing, monitoring and avoiding, remedying or mitigating any adverse impacts on the wider marine ecosystem in which the target species lives and the fishery operates is contained under Principle Two of this report.

DEH considers that the current management arrangements comply with the National Policy on Fisheries Bycatch. DEH expects that DPI&F will also ensure compliance with any future plans or policies as they are developed. No threat abatement plans, recovery plans or regional and international management regimes, to which Australia is a party, are of direct relevance to the fishery. The prime international regime affecting the fishery is the United Nations Convention on the Law of the Sea (UNCLOS). The management regime essentially complies with this. Other international regimes are applicable to fisheries management but do not explicitly involve this fishery, for example the 1992 Convention on Biological Diversity and in particular the 1995 Jakarta Mandate requiring that, in relation to the sustainable use of marine and coastal biological diversity, the precautionary principle should apply in efforts to address threats to biodiversity. While these agreements are not specifically addressed in the Submission, the fishery's compliance with their requirements can be assessed by examination of Part II of this report.

DEH considers it is incumbent on all authorities to develop a thorough understanding of the framework of national, regional and international agreements and their applicability to export-based fisheries for which they are responsible.

The area of the MSSCF encompasses the GBRMP WHA. Under the EPBC Act, a person may not take an action that has, will have or is likely to have a significant impact on the world heritage values of a declared World Heritage property. People who are taking actions that are a lawful continuation of a use of land, sea or seabed, that was occurring immediately before the commencement of the EPBC Act, may continue to take those actions. An enlargement, expansion or intensification of a use is not a continuation of a use. The GBRMP listed World Heritage values are protected from the impacts of specimen shell harvesting through fishing closures, possession limits, restrictions on species able to be taken and the benign nature of harvesting methods. For this reason, and the outcomes of the assessment as listed throughout Part II of this assessment report, DEH considers that fishing activities as currently practiced in this fishery are unlikely to have a significant impact on the World Heritage values of the GBRMP in the next five years. Any

significant change to existing practices, which is likely to significantly impact on the GBRMP World Heritage values, may require approval by the Australian Government Minister for the Environment and Heritage.

Conclusion

DEH considers that the MSSCF management regime is documented, publicly available and transparent, and is developed through a consultative process. The implementation of **Recommendation 2** will ensure that management arrangements are adaptable and underpinned by appropriate objectives and performance criteria by which the effectiveness of the management arrangements can be measured, enforced and reviewed.

The management arrangements are capable of controlling the harvest through a combination of input and output controls appropriate to the size of the fishery. Periodic review of the fishery is provided for, as are the means of enforcing critical aspects of the management arrangements.

The management regime adheres to arrangements established under Australian laws and international agreements.

DEH considers that there is scope to further refine the management arrangements and has provided a number of recommendations for improvements in the longer term.

PART II – GUIDELINES FOR THE ECOLOGICALLY SUSTAINABLE MANAGEMENT OF FISHERIES

Stock Status and Recovery

Principle 1: *‘A fishery must be conducted in a manner that does not lead to over-fishing, or for those stocks that are over-fished, the fishery must be conducted such that there is a high degree of probability the stock(s) will recover’*

Maintain ecologically viable stocks

Objective 1: *‘The fishery shall be conducted at catch levels that maintain ecologically viable stock levels at an agreed point or range, with acceptable levels of probability’*

Information requirements

Fishery dependent data from the commercial sector of the MSSCF is collected through compulsory daily logbooks, which must be provided monthly to DPI&F. In the logbooks, commercial operators are required to keep a daily record of:

- Catch (numbers, species and alive or dead)
- Effort (fishing time)
- Fishing locations (beach or reef name)

Because the logbook data is submitted monthly, it allows DPI&F to follow up with the collector in the event that questions arise regarding the identification of species, or any other issues from the data submitted. This measure helps to ensure that the data provided by commercial collectors is reliable. DPI&F considers that the logbook data provides valuable catch and effort information necessary for any future resource assessments, and that the level and reliability of information is appropriate to the size of the fishery. DEH concurs with this assessment and believes that data reliability for target species is reasonable and that compliance and enforcement activities, particularly through the implementation of **Recommendation 4**, will have the capacity to ensure the ongoing reliability of data in the fishery.

The logbooks used in the MSSCF do not provide for fishers to record discards from the fishery. However, DEH does not consider that such information is necessary given that the highly selective nature of the harvesting methods ensures that discards are unlikely. In particular, the requirement for specimen shells to be of the highest quality in terms of markings, size and colouration ensures that individuals are collected with care and, if unwanted, returned to the water immediately. This is likely to ensure high survivability of discarded specimen shell species.

To date, few fishery independent research projects specific to species taken in this fishery have been completed. The exception is a recently completed long-term study that examined the dynamics of populations of the red-lipped stromb (*Strombus luhuanas*) at Heron Island (Catterall *et al.*, 2001). This was the major species harvested (by number) in the MSSCF in 2002/03. The study provided useful information on the resilience of populations to impacts (both natural and human induced) and the need for any studies on population status to take into account significant annual natural fluctuations in local recruitment levels.

While recognising that the level of take in the fishery is small and that fishing activity occurs in a small part of the total fishery area, DEH considers that management of the fishery would be improved by more research into species taken by this fishery to address current knowledge gaps, particularly in relation to the biology and stock status of specimen shells in Queensland. While extensive research on the range of target species may not be possible, DPI&F should clarify what

research is essential for improved management of the fishery into the future. DEH suggests that DPI&F identify the research needs and priorities for the fishery and clearly articulate these in a strategic research plan that can be used to direct research efforts into the future. DEH notes that the strategic research plan will need to be implemented within the constraints of available funds.

Recommendation 6: *DPI&F to review the research information needs and priorities to meet the management information and performance measurement needs of the fishery. Analysis of research needs should take into account any gaps in the basic biological parameters required for the ecologically sustainable management of specimen shell species. DPI&F to develop a research strategy to address identified priority areas and explore ways to cooperatively share in or take advantage of research done in other specimen shell fisheries.*

Overall, DEH considers that there is a reliable information collection system in place appropriate to the scale of the fishery. However, DEH considers that a strategic approach to research needs of the fishery, particularly in relation to species other than the red-lipped stromb, and continuation of existing data collections will be important for the future management of the fishery.

Assessment

It has not been possible to undertake species specific population assessments for this fishery due to the very low catch rates and broad spatial and temporal distribution of fishing effort in the commercial fishery. An annual review of the catch of important species and effort in major areas is undertaken in conjunction with the HarvestMAC to give a general indication of the status of harvested species, including any spatial trends in effort and collection levels.

Currently, no estimate of the potential productivity of fished stocks is available. In 2002/03 only a small number of reefs/locations were fished, and this trend is typical for other years. This, combined with the low level of take in this fishery, means it is likely that only a small proportion of the populations of these species is impacted through harvesting activities. The implementation of **Recommendation 6** is likely to identify current knowledge gaps, which will allow better assessment of the stock status of specimen shell species in the future. The low number of fishing sites does render the specimen shell stocks vulnerable to localised depletion, however DEH considers that the possession limits, in particular limits on the number of live specimens that can be taken for any one species, limit the potential for localised depletion.

The MSSCF officially encompasses a region extending the entire length of the Queensland coast, some 2 400 km. Harvesting predominantly occurs in the waters north of Rockhampton and, since 1997, has only occurred at 43 locations. While limited information is available regarding the biology of species taken in this fishery, it is believed that the species have broad Indo-West Pacific distributions. However, of the species taken in this fishery, two (*Amoria zebra* and *Haustellum tweedianus*) are considered to be endemic to eastern Australia. In addition, *Amoria zebra*, as well as *Cymbiola pulchra*, *Melo amphora* and *Cypraea cribraria*, were considered by Ponder and Grayson (1998) to be potentially threatened due to their life history characteristics and restricted geographic range. However, for the volute *Amoria zebra*, which is considered to be both endemic and potentially vulnerable, only one dead specimen and no live specimens were taken in 1997/98 and in 2002/03. Catches of the three species considered to be potentially threatened are similarly low. Six live specimens of the volute *Cymbiola pulchra* were taken in 2001/02 and none in 2002/03, 30 dead *Melo amphora* baler shells were taken at four reefs in 2002/03, and for the cowry *Cypraea cribraria*, one dead and one live specimen was reported for 2001/02 and none for 2002/03.

DEH has considered the possibility that these low catch rates for individual species could be a signal that there are less available. However, examination of past catches in the MSSCF has shown that, since 1998/99, Group 1 species have consistently comprised the majority of annual catches, while Group 2 and 3 species such as volutes and Melo species (including the species described above) have been regularly caught in small numbers only. Therefore, DEH considers that these low catch rates for individual species, combined with the small number of fishing areas compared to the wide natural distribution of the species will ensure that specimen shell stocks are unlikely to be harvested to an extent where the MSSCF becomes ecologically unsustainable.

In addition to these measures, the monthly logbook data that is submitted to DPI&F by specimen shell harvesters allows DPI&F to monitor areas where collection is concentrated in any given period. The submission states that this allows DPI&F to address issues such as overfishing and introduce area closures or bag restrictions on certain species if required through amendments to permit or licence conditions. DEH considers that the reporting requirements for the MSSCF are sound and is confident that the information generated would allow DPI&F to monitor the status of individual populations of specimen shell species and respond appropriately.

DEH considers that there is currently a reliable estimate of the take of specimen shells by commercial fishers due to the requirement for reporting of catch in logbooks, and the requirement under the *Fisheries Regulation 1995* that specifies ‘the holder of a commercial fishing boat license allowing the holder to take molluscs, may sell them only to a licensed buyer’. This requirement, and the monthly submission of commercial logbooks, allows commercial catches to be validated. DEH therefore considers that removals by the commercial sector are taken into account when assessing the status of the fishery.

Take by the recreational sector is potentially significant since, like commercial harvesters, they are allowed to have in possession up to 50 shelled molluscs however unlike the commercial sector, there is no limit on the number of recreational harvesters. The potential take of specimen shells by recreational fishers was raised as a concern in two public submissions for this fishery. While the limited entry to the fishery restrains potential take by commercial harvesters, the potential harvest by recreational fishers is much larger and should be taken into account when assessing the stock status of specimen shell species. DEH is concerned that, since there is currently no data collection on take of specimen shells by the recreational sector, it is unlikely that the impact of removals by this sector are taken into account during annual assessments of the fishery.

Recommendation 7: *DPI&F to ensure that reliable estimates of recreational harvest of specimen shells are obtained and factored into the assessment and management of the MSSCF.*

There is also no estimate of indigenous take of specimen shells, but DPI&F considers that this is likely to be minimal. This conclusion is supported by the results of the National Recreational and Indigenous fishing Survey (Henry and Lyle, 2003), which showed that, while a large number of molluscs were taken by Indigenous participants during the survey, these included species such as mussels, oysters and cockles, and not the specimen shell species taken in the MSSCF. Consequently, DEH does not consider that it is necessary for DPI&F to collect information on indigenous take of specimen shell species.

Management response

The current MSSCF management regime aims to maintain ecologically viable stock levels through a range of input and output controls. These measures are outlined in Table 1 and Part I of this report. In addition, consultation through HarvestMAC, industry meetings, surveys of wholesale/retail outlets, exporting and importing companies, government agencies and the public,

and limited scientific studies assist in the further development of appropriate management procedures for the MSSCF.

The MSSCF has been managed as a limited entry fishery since 1997 and will remain this way unless a management plan is developed for the fishery. The Limited Entry Policy was adopted as a precautionary approach to ensure that harvest levels are controlled and maintained at ecologically sustainable levels. Currently, the authorities are issued for a 12 month period only. The authorities are not transferable but are expected to become transferable in the future. The boat licences are transferable.

Additional management measures employed in the fishery include gear restrictions, total possession limits, limits on the number of individual specimens of species allowed to be taken, spatial closures, prohibition on the take of molluscs from an egg mass and of those depositing an egg mass, and restrictions on species allowed to be harvested.

A report by Willan (1996) recommended a number of management measures that should be employed in shell fisheries to ensure stock levels remain ecologically viable. A number of these, such as possession limits and the requirement for licences to be held by commercial harvesters, are already in place. The submission states that DPI&F will consider other recommendations made by Willan (1996) where issues of sustainability are identified, but notes that a number of the recommendations, such as 'restrictions on the manufacture of jewellery', are outside the management responsibility of fisheries management agencies. DEH acknowledges this restriction and notes that a number of recommendations including 'control on habitat alteration and destruction' are already addressed through the benign harvesting methods allowed in the MSSCF. DEH is confident that the measures currently in place in the MSSCF control the commercial take of specimen shell species and acknowledges that within current levels of harvesting, there is no indication that the resource is threatened.

Currently, no specific authorities are required for the collection of marine shells for private use by the recreational sector. Recreational take is currently managed through a total bag limit of 50 specimen shells and through limits on the number of individuals of any species taken in the GBRMP. As noted earlier, DEH is concerned that the recreational take of specimen shells is likely to exceed the commercial take given that there is no limit on the number of recreational fishers. In addition, there is currently no estimate of take by the recreational sector. DEH has made a recommendation addressing the issue of recreational take previously (see **Recommendation 7**), and is confident that DPI&F will use the information generated to adequately manage the specimen shell resource.

Mollusc species are currently allocated to Groups 1 to 4 in Queensland (Table 2), with the grouping reflecting the relative risk of species to overfishing. These groups are reviewed annually by the Malacological Society representative on HarvestMAC. When DPI&F receives the monthly logbook returns from fishers, species caught are compared against the Groups to ensure that large numbers of species considered to be at higher risk of overfishing are not being collected. The submission notes that, if the number of shells collected from any species or from any location significantly increases, DPI&F will develop appropriate management actions in consultation with HarvestMAC. DEH considers that performance indicators are necessary to allow such changes to be detected and has recommended that these be developed for representative species in the fishery (see **Recommendation 2**).

Table 2: Marine Specimen Shell Species Groupings based on life history characteristics, level of trade and spatial distribution

Group 1 Species	All species within the Phylum Mollusca excepting	
	oyster	Ostreidae
	Trochus shell	<i>Trochus niloticus</i>
	Pearl oysters	Pteriidae
	squid	
	cuttlefish	
	octopus	(coleoid cephalopods)
	scallops	<i>Amusium</i> spp.
and any species listed within Groups 2 to 4 below		
Group 2 Species	Imperial Turban shell	<i>Turbo imperialis</i>
	Common Spider conch	<i>Lambis lambis</i>
	Strawberry conch	<i>Strombus luhuanus</i>
	Greenish cowrie	<i>Cypraea subviridis</i>
	Walkers cowrie	<i>Cypraea walkeri</i>
	Pear-shaped cowrie	<i>Cypraea pyriformis</i>
	Yellow-toothed cowrie	<i>Cypraea xanthodon</i>
	Stolid cowrie	<i>Cypraea stolidia</i>
	Small-toothed cowrie	<i>Cypraea brevidentata</i>
	Porter's cowrie	<i>Cypraea porteri</i>
	Deer-antler murex	<i>Chicoreus cervicornis</i>
	Volutes	Volutidae
Group 3 Species	Thersite stromb	<i>Strombus thersites</i>
	Hungerford's cowrie	<i>Cypraea hungerfordi</i>
	Langford's cowrie	<i>Cypraea langfordi moretonensis</i>
	Hirase's cowrie	<i>Cypraea hirasei queenslandica</i>
	Martin's cowrie	<i>Cypraea martini</i>
	Musume's cowrie	<i>Cypraea musumea</i>
	Great-spotted cowrie	<i>Cypraea guttata</i>
	Sieve cowrie	<i>Cypraea cribraria melwardi</i>
	Bullmouth Helmet shell	<i>Cypraecassis rufa</i>
	Axicornis murex	<i>Chicoreus axicornis</i>
	Hutton's murex	<i>Chicoreus huttoniae</i>
	Australian Trumpet shell	<i>Syrinx aruanus</i>
	Grand Cone shell	<i>Conus pergrandis</i>
	Armenian cowrie	<i>Cypraea armeniaca</i>
	Baler shells	<i>Melo</i> spp.
Group 4 species	Giant triton or Trumpet shell	<i>Charonia tritonis</i>
	Giant clams	Tridacnidae
	Helmet shell	<i>Cassis cornuta</i>

Source: Weis et al, 2004.

DEH notes that the submission describes proposed future management arrangements, where differential bag limits would be enforced for species belonging to Groups 1 to 4. DEH considers that such management measures would be sound as they would ensure more specific management for species that are potentially at higher risk from harvesting activities. DEH urges DPI&F to pursue such management arrangements.

No byproduct is authorised to be taken in the MSSCF, therefore no information, assessment or management response regarding byproduct is needed for this fishery.

Conclusion

DEH considers that the management regime in the MSSCF is appropriately precautionary and provides for the fishery to be conducted in a manner that does not lead to over-fishing. DEH considers that the information collection system and management arrangements generally are sufficient to ensure that the fishery is conducted at catch levels that maintain ecologically viable stock levels with acceptable levels of probability.

DEH considers that there is scope to further refine some of the existing information collection, assessment and management responses and has provided a number of recommendations for improvements in the longer term.

Promote recovery to ecologically viable stock levels

Objective 2: *'Where the fished stock(s) are below a defined reference point, the fishery will be managed to promote recovery to ecologically viable stock levels within nominated timeframes'*

This objective is not applicable to the fishery at present, however without established performance indicators and measures, the point at which specimen shell species are considered overfished is not defined. As noted earlier, DEH consider that reference points are important in that they provide a measure against which to assess the sustainability of specimen shell stocks. It is also important that appropriate time frames for management intervention are outlined. A recommendation regarding the development of performance indicators and measures has been made (see **Recommendation 2**).

Conclusion

DEH considers that the specimen shell stock is currently not below a defined reference point but should that occur in the future, the fishery is conducted such that there is a high degree of probability the stock would recover to ecologically viable stock levels within nominated timeframes.

Ecosystem impacts

Principle 2: *'Fishing operations should be managed to minimise their impact on the structure, productivity, function and biological diversity of the ecosystem'*

Bycatch protection

Objective 1: *'The fishery is conducted in a manner that does not threaten bycatch species'*

Information requirements

Specimen shell harvesters are able to record bycatch on their logbooks, although to date no bycatch has been recorded. This is due to the highly selective nature of the harvesting techniques employed that limit the potential for bycatch. No studies on the potential for the MSSCF to impact on bycatch species have been performed. DEH does not consider that such information collection systems are required for this fishery.

Assessment

As noted above, no bycatch has been recorded for the MSSCF, primarily due to the harvesting techniques employed. Clearly bycatch would not occur when specimen shells are harvested by hand, which is the predominant method used in the MSSCF. There is potential for benthic invertebrates to be incidentally collected in shell dredges, however few dredging operations are employed in the MSSCF annually and at few locations within the area of the fishery. In addition, any bycatch caught by this method of harvesting is likely to be returned immediately to the water. No formal bycatch risk assessment has been completed for this fishery, nor does DEH consider it necessary.

Management response

Impacts to bycatch species are primarily avoided through the use of hand harvesting and some use of small shell dredges. The limited scale of the fishery within a large area and the small number of operators also helps to avoid bycatch in the MSSCF. For these reasons, there are no threat abatement plans, recovery plans or bycatch reduction strategies relevant to the MSSCF. As noted above, DEH does not consider that specific bycatch minimisation measures are necessary for the fishery.

Conclusion

DEH considers that there is a high likelihood the fishery is conducted in a manner that does not threaten bycatch species. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that DPI&F would undertake appropriate actions to ensure that bycatch species are not threatened by this fishery.

Protected species and threatened ecological community protection

Objective 2: *‘The fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species and avoids or minimises impacts on threatened ecological communities’*

Information requirements

Currently, information on protected species interaction is not recorded in the logbooks used in the MSSCF. As with bycatch, this is due to the limited opportunity for the fishery to impact on non target species.

A Species of Conservation Interest (SOCI) Logbook is currently being introduced for use in most Queensland fisheries, and the submission reports that DPI&F will consider implementing this logbook in the MSSCF. DEH, while acknowledging that interactions with protected species are unlikely to occur in the MSSCF, encourages DPI&F to incorporate protected species reporting in the MSSCF, through the use of the SOCI Logbook.

Assessment and Management Response

Interactions with protected species in the MSSCF are considered unlikely because there are only seven vessels operating in the fishery, with a maximum of ten participants. The harvesting method (hand harvesting and shell dredging) is unlikely to lead to impacts on protected species, although the submission notes that interactions with dugongs and marine turtles could occur through boat strikes. DEH recognise that interactions of this nature are possible, but considers that the low number of vessels operating in the fishery, combined with the fact that harvesting activity only

occurs in a small number of locations over a large fishery area, minimises the likelihood that such interactions would be significant.

No threatened ecological communities have been identified as occurring in the area of the MSSCF. For these reasons, no assessment has been undertaken and no specific management arrangements relating to ecological communities have been employed in the MSSCF, apart from Marine Park closures. The submission notes that, if the fishery is found to be impacting on ecological communities, assessment and implementation of mitigation measures will be undertaken as appropriate.

DEH considers that the need for a formal risk assessment with regard to protected species is not necessary for the MSSCF, given the low likelihood of interaction with such species. DEH is confident that, if this situation were to change, DPI&F would respond appropriately to mitigate such impacts.

Conclusion

DEH notes that there are minimal interactions with protected species in this fishery and considers that the fishery is conducted in a manner that avoids mortality of, or injuries to, endangered, threatened or protected species. There are no threatened ecological communities in the MSSCF. Should this situation change, or a risk assessment process indicate otherwise, DEH expects that appropriate actions be undertaken to ensure the fishery avoids mortality or injury to these species and avoids or minimises impacts on threatened ecological communities.

Minimising ecological impacts of fishing operations

Objective 3: *'The fishery is conducted, in a manner that minimises the impact of fishing operations on the ecosystem generally'*

Information requirements

No studies have been undertaken to document and quantify the impacts on the ecosystem of activities associated with the MSSCF. An examination of the logbook sheet provided as an appendix to the submission suggests they would not provide information on impacts on the general environment. While aware of the lack of information collection and research covering the fisheries impact on the ecosystem and environment generally, DEH considers that the amount of information available currently is appropriate to the size and scale of the MSSCF.

Assessment

Despite the lack of information collected from the MSSCF regarding ecosystem impacts, the fishery is generally thought to have minimal impacts on the ecosystem generally due to the benign collection methods and the low level of harvest. Consequently, no risk assessment of impacts on the ecosystem has been conducted.

The most likely impact on the natural ecosystem would arise from the exploitation of the target species and its impact on the size of the spawning biomass of molluscs. However, the MSSCF is primarily based on collection of dead shells through hand harvesting, with some collection of live shells with a shell dredge. In 2002/03, 818 dead shells were collected, while only 240 live shells were harvested. DEH considers that the low number of live shells harvested means it is unlikely that the spawning biomass of mollusc species would be significantly impacted.

The removal of mollusc species could also potentially have an impact on marine food chains, given that a number of species are known to feed on molluscs. However, as noted above, only a small number of live specimen shell species are taken in this fishery. The management arrangements currently in place, such as limits on the number of live specimens that can be taken, are likely to ensure that this remains so. In addition, the actual area of harvesting activity is small compared to the distribution of these species. For these reasons, DEH considers that, while some localised, short-term impacts to food chain interactions may occur, such impacts are unlikely to be substantial.

The use of shell dredges in the fishery may have some impacts on the benthos and sediment in areas where they are used, however such impacts are likely to be localised and insignificant given the small number of shell dredges used. DEH consider that the MSSCF is unlikely to impact on water quality, since most harvesting is done by hand, and only a small number of vessels are employed in the fishery.

Management response

No evidence has emerged to suggest that shell collection in Queensland has a significant impact on the ecosystem. The lack of observed impact is likely to be due to the low level of harvest in the fishery, the low number of participants and the benign nature of harvesting methods.

The submission notes that if ecosystem impacts are reported by participants in the fishery or by members of the public, appropriate management responses will be developed by DPI&F and incorporated into management regime for the MSSCF. No performance indicators or performance measures are currently in place for this fishery, although DEH has made a recommendation previously that such performance measures be developed for representative species in the MSSCF (see **Recommendation 2**). The most likely ecosystem impacts, while small, are likely to be associated with removal of the target species from the ecosystem. Therefore, the development of performance indicators and measures for species representative of the target species is likely to ensure that impacts to the ecosystem can also be detected and responded to.

The area of the fishery includes the GBRMP, therefore consideration needs to be given to potential impacts on this matter of national environmental significance by the MSSCF. However, DEH considers that the fishery, if operated consistently with the current management regime, is unlikely to have a significant impact on the World Heritage values of the GBRMP.

Conclusion

DEH considers that the fishery is conducted in a sufficiently precautionary manner, particularly through the use of mainly hand harvesting, the low number of operators and the large area over which harvesting may occur, and that these measures minimise the impact of fishing operations on the ecosystem generally.

The MSSCF operates in the GBRMP WHA, and as such, impacts to this matter of national environmental significance have been considered. DEH considers that the spatial restrictions on fishing within the GBRMP, the benign harvesting methods and the low level of take, ensure that impacts to this WHA are minimal. On this basis, DEH 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 WHA protected under the EPBC Act.

REFERENCES

Catterall, C.P., Poiner, I.R. and O'Brien, C.J. (2001) Long-term population dynamics of a coral reef gastropod and responses to disturbance. *Austral Ecology* **26**: 604-617.

Dunning, M. (2004) Department of Primary Industries and Fisheries, personal communication.

Henry, G.W. and Lyle, J.M. (Ed's) (2003) *The National Recreational and Indigenous Fishing Survey*. Final report to the Fisheries Research and Development Corporation FRDC Project 99/158.

Ponder, W.F. and Grayson, J.E. (1998) *The Australian Marine Molluscs Considered to be Potentially Vulnerable to the Shell Trade*. A report prepared for Environment Australia, 57 pages.

Weis, A., Dunning, M. and Gaffney, P. (2004) Ecological Assessment of Queensland's Marine Specimen Shell Collection Fishery. DPI&F.

Willan, R.C. (1996) *The Sea Shell Trade in Australia*. A report prepared for the Malacological Society of Australia (unpublished report).

LIST OF ACRONYMS

DEH	Department of the Environment and Heritage
DPI&F	Queensland Department of Primary Industry and Fisheries
EPBC Act	Environment Protection and Biodiversity Conservation Act 1999
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
HarvestMAC	Queensland Harvest Management Advisory Committee
MSSCF	Marine Specimen Shell Collection fishery
QBFP	Queensland Boating and Fisheries Patrol
SOCI	Species of Conservation Interest
UNCLOS	United Nations Convention on the Law of the Seas
WHA	World Heritage Area