Driving innovation in environmental performance in the Queensland fishing industry

K.A. Williams and Dr D.P. McPhee

FRDC Project No. 2003/062

Moreton Bay Seafood Industry Association — Providing Environmentally Sustainable Seafood For All

Australian Government — Fisheries Research and Development Corporation

Catching Fish for Everyone! QSIA Queensland Seafood Industry Association Inc

Queensland Government — Department of Primary Industries

The University of Queensland — Australia

Seafood Services Australia

CRC Reef Research Centre

Queensland Government — Environmental Protection Agency

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The Fisheries Research and Development Corporation plans, invests in and manages fisheries research and development throughout Australia. It is a statutory authority within the portfolio of the federal Minister for Agriculture, Fisheries and Forestry, jointly funded by the Australian Government and the fishing industry.

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1. Non-technical summary

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OBJECTIVES:

1. To develop and implement two Environmental Management System (EMS) projects for industry participants that will have utility for the fishing industry throughout Queensland.

2. To further refine the existing Green Chooser EMS methodology with a focus on identifying and overcoming any impediments to on-ground implementation.

3. To improve awareness of the triple-bottom line benefits of EMS amongst both the seafood industry and broader community in the pilot regions.

4. To provide EMS project officers, industry champions and industry participants with the necessary knowledge and skills to optimally carry out their roles and responsibilities.

5. To establish a grass roots culture amongst pilot regions of continual improvement in environmental performance, and to motivate the development of an industry-driven framework to demonstrate ongoing improvements in environmental performance post the life of the project.

NON TECHNICAL SUMMARY:

OUTCOMES ACHIEVED

Several major outcomes have been achieved to date through FRDC Project 2003/062. These outcomes are of benefit to the Australian seafood industry, State and Federal Government, as well as the general public.

The key outcomes to date have been:

1. the development of a ‘continual improvement’ culture amongst pilot region seafood industry participants and the demonstrated use of EMS amongst project participants at the individual fishing enterprise level;

2. the adoption of an adaptive framework that provides for continual improvement and reporting of the seafood industry’s environmental performance within the pilot regions;

3. an increase in community and consumer confidence in the seafood industry’s performance within the pilot regions. The public benefit of this is that with improved awareness of fishing activities and impacts on the environment, the broader community will be better equipped to develop informed opinions on the management of fisheries resources.

4. an increasingly refined seafood industry EMS methodology that is relevant to the needs of grass roots participants, provides a framework to meet the evolving aspirations of the broader community, and retains few impediments to widespread uptake amongst the broader seafood industry;

5. strengthening of relationships between various groups of fishers who have traditionally been in conflict. With a common vision and goals, the seafood industry groups involved will be well placed to negotiate with other stakeholders on a range of key issues. This unified approach will also assist the State Government (and other stakeholders) as they will only have to work with one group, instead of a disparate range of industry groups and individuals. Thus this project has significant benefit for the Queensland seafood industry and other stakeholder groups such as the State Government;

6. increased social capacity within seafood industry groups and fishing communities. By being involved with the project, industry members have gained skills and knowledge that will assist them in maintaining viable businesses. In addition, by communicating environmental achievements to local communities, industry groups have improved community perceptions of professional fishers. This has strengthened relationships between fishers and other members of coastal communities;

7. the challenges and critical success factors associated with developing a *regional, multi-fishery EMS* have been identified through this project. This is a national first and will be used by other fishing groups in Australia and elsewhere as they attempt similar projects;

8. by carrying out the actions developed in their EMS, fishers aim to achieve their primary goals of maintaining security of access to fishing resources and conserving resources for the future. These are major projected outcomes of the project for Queensland industry members; and

9. a long term goal of this project is to improve the management of fisheries resources, minimize impacts on water quality and conserve fish stocks. It is hoped that future actions, building on this EMS, may eventually result in measurable improvements in terms of fish stocks.

There has been a very positive response from Moreton Bay seafood industry participants in relation to the project results to date. However the response from industry members from far north Queensland has been less positive, as the lack of funding for the project (from one funding body) resulted in only one project officer hired. Consequently, limited time was spent in some regions. In addition, the fallout from the Great Barrier Reef Marine Park Authority's (GBRMPA) Representative Areas Program (RAP) has slowed progress in the far north Queensland region, which is disappointing to many fishers. The RAP implemented commercial fishing closures to large areas of the Great Barrier Reef region. Many fishers lost their businesses through this process.

There has been a positive response from the Queensland Environmental Protection Agency (EPA) and Seafood Services Australia (SSA) in relation to the project results. They are pleased that such a large project could be completed by one EMS officer, within the allotted time period. The degree of cultural change that has occurred, particularly amongst commercial fishers in the Moreton Bay region, is a major outcome that beneficiaries have responded positively to. All beneficiaries are impressed with the level of EMS uptake amongst fishers, not only in the pilot regions, but also elsewhere along the Queensland coast.

In response to the success of the Green Chooser Case Studies (FRDC 2000/146) carried out in Queensland from 2000 – 2002 (the Rock Lobster Association and the Gulf of Carpentaria Commercial Fishermen), the Queensland Seafood Industry Association (QSIA) sought funding to trial the development of large scale Environmental Management Systems (EMSs).

The QSIA obtained expressions of interest from two regional professional fishing industry associations – the Moreton Bay Seafood Industry Association (MBSIA) and Ecofish of far north Queensland. This coincided with the creation of a National Seafood EMS Program, building on the Green Chooser studies, with the aim of trialing the development of full EMSs within regions or fisheries. This pilot program was funded by the Natural Heritage Trust (NHT), administered by the Federal Department of Agriculture, Fisheries and Forestry (DAFF) and was coordinated by Seafood Services Australia (SSA).

The QSIA achieved a grant from NHT to establish a pilot EMS study in Queensland, which formed part of the National Seafood EMS Program. In order to trial EMS at a large scale within Queensland, a partnership approach

to funding the project was employed. The Fisheries Research and Development Corporation (FRDC), the Queensland Environmental Protection Agency (QEPA), the Queensland Department of Primary Industries and Fisheries (QDPI&F), the QSIA, MBISA and Ecofish became the primary funding/support bodies for the project in addition to SSA.

The scope of the project was set so that two pilot project groups were established in Queensland. One group was affiliated with Ecofish and positioned in far north Queensland. The other was tied to the MBSIA and located in Moreton Bay (south-east Queensland). The original FRDC contract stipulated that two EMS officers would facilitate the development of EMSs, with one officer based in each region. The total budget originally allocated by all sources, including salaries and operational expenses was $684,433.

In May 2003, a steering committee consisting of representatives of the funding bodies, experts and key stakeholders met to discuss the implementation of the project. At this meeting it was decided that due to QEPA and QDPI&F funding constraints, a single EMS Officer based in Brisbane would facilitate EMS development for both regions.

In November 2003 the EMS Officer was employed and initial regional workshops with fishers were held in December 2003. Over the following two years, EMS development progressed well despite significant cuts in funding (QDPI&F did not provide any financial support until 2006), numerous staff changes (to primary and co-investigators) and reduced in-kind support for the EMS Officer. Increased responsibility for project management was transferred to the EMS Officer and shortfalls in mentoring and support were provided by Dr Daryl McPhee (Co-investigator who later became Primary Investigator) and SSA. The total budget contributed to the project ended up being approximately $196,610, with $145,000 cash and approximately $51,610 in-kind support.

Overall the EMS pilot groups in Queensland progressed very well. The Moreton Bay regional EMS was completed and implementation has commenced. However the EMSs for fisheries in far north Queensland were not completed within the project timeframe. Given the critical success factors established for the effective development of EMSs within the seafood industry (see appendix 3), it is not surprising that the goal of developing and implementing so many EMSs for multiple fisheries over large geographic areas was ambitious given the original timeframe, with only one EMS officer employed. It is a significant achievement to have completed an EMS for the whole Moreton Bay region, covering multiple fisheries, involving hundreds of professional fishers.

Despite the challenges encountered, the results of the pilot project exceeded its objectives. In addition to establishing EMSs for key regional groups in Queensland, fishermen involved increased their knowledge and skill-base in terms of facilitation, communication, risk assessment and reporting practices. In the pilot regions, the traditional culture of conflict and resistance to change has slowly transformed into a culture of unity, common goals and

performance planning. Attitudinal change of fishers is one of the most significant outcomes of the project. The power of this attitudinal change, in terms of generating significant outcomes for the seafood industry, is demonstrated by the fact that several fishing groups outside of the pilot regions (along the Queensland coast) have become motivated to develop EMSs for their own fisheries/regions (including Mackay, Rockhampton, Bowen, Bundaberg and Hervey Bay).

Community perceptions and awareness of fishing industry issues have significantly improved throughout the duration of the project. This has been achieved through a coordinated and strategic approach to communication between fishers and the broader community. Fishers in the pilot regions now have a coordinated approach to proactively communicating EMS-related and other good news stories, and handling negative media appropriately.

Development and implementation of a seafood EMS at such a large scale is a national first and potentially an international first. The analysis of the challenges encountered, strategies formulated and lessons learnt contained in this document will be invaluable for application of such a model to other large-scale regional EMSs for the seafood industry. These findings also have significant application for other primary industries.

Further research evaluating the social impacts of EMS on fishing communities may reveal that following the implementation of an EMS, fishing operations are recognized as being more 'credible' by their fellow community members and that professional fishing is now considered a more socially acceptable career option. Anecdotal evidence suggests that the community is generally embracing fishers more as part of their 'social fabric'.

KEYWORDS: Environmental Management Systems, Ecologically Sustainable Development, natural resource management, fisheries, commercial fishing

2. Acknowledgements

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- Natural Heritage Trust
- Queensland Environmental Protection Agency
- Queensland Seafood Industry Association
- Moreton Bay Seafood Industry Association
- Queensland Department of Primary Industries and Fisheries
- CRC Reef
- University of Queensland
- Ecofish

- Seanet

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3. Background

The critical need for 'on-ground' implementation of ESD principles was one of the major recurring themes at the 2002 World Environment Summit held in Johannesburg. The development and adoption of Environmental Management Systems (EMS) is widely recognised as one of the most effective tools for implementing the global principles of ESD on the ground, at the local level. Moreover, the adaptive management approach offered by EMS provides a framework for the seafood industry to meet evolving community aspirations and continually improve environmental performance.

An EMS framework involves a systematic proactive approach that demonstrates continual improvement in environmental management. The Fisheries Research and Development Corporation (FRDC), Government agencies and industry have recognised the need for and invested in initiatives aimed at developing such a framework, including:

- Greening Australia's Fisheries (1999/147);
- National Application of Sustainability Indicators for Australian Fisheries (FRDC 2000/145);
- Green Chooser project (FRDC 2000/146);
- The establishment of a training resource and information service to underpin the successful adoption of EMS by the Australian seafood industry (FRDC 2002/303);
- Environmental Certification including ISO 14000 certification of a tuna company in SA and MSC certification for Western Rock Lobster;
- SeaNet – an extension service for industry aimed at promoting environmental best practice; and
- Various environmental codes of practice and action plans developed by individual fisheries and industry sectors.

This project (2003/062) involved a unique partnership between agencies involved in environmental management and grass roots industry to establish two EMS pilot projects for Queensland seafood industry participants. The proposal brought together agencies with significant expertise in EMS, such as the United Nations Environment Program (UNEP), the University of Queensland and the Queensland Environmental Protection Agency (QEPA). Agencies such as the QEPA and the Queensland Department of Primary Industries and Fisheries (QDPI&F) have strong regulatory interests in

fisheries and may in the future seek EMS as a cost-effective pathway to alternative compliance. Leading national fisheries agencies (FRDC and Seafood Services Australia (SSA)) were called upon to link the EMS to national policy frameworks and industry developments. To ensure solid industry ownership and implementation, the comprehensive partnership was led by the Queensland Seafood Industry Association (QSIA) and two regional industry associations (Moreton Bay Seafood Industry Association (MBSIA) and EcoFish). Moreton Bay and the far north Queensland regions were chosen as the two areas for undertaking the pilot projects. These areas were chosen because of a groundswell of grass roots support for the implementation of EMS in these areas.

This project built on existing previous work (particularly the Green Chooser project), and importantly it has taken this work to the next critical stage - its on-ground implementation.

The development of these EMS' has also assisted with the production and fine-tuning of a raft of EMS support resources, published by SSA. These resources include the Seafood EMS Chooser, the Seafood EMS Self Assessment and Training Manual, Seafood EMS CD ROM, Seafood EMS fact sheets and the Seafood EMS Communication Support Package.

Through the linkages between both the Moreton Bay and far north Queensland EMS groups, and through the feedback mechanism provided by the national Seafood EMS Pilot Program (coordinated by SSA), a number of critical success factors for the EMS process and relevant national support initiatives have been identified. For example the need for a national seafood EMS mentoring program has been identified through these on-ground trials and SSA has now established this as a critical support pathway.

4. Need

Environmental performance will be one of the most important drivers of future fishing industry profitability. There is a growing recognition amongst the industry's grass roots that long-term profitability will require maintenance of existing resource and market access - access that is only possible with improved environmental performance and demonstrated triple bottom line sustainability. Projects that assist in motivating and demonstrating continual improvement in the industry's environmental performance are clearly within industry's interest, and will assist in increasing community and consumer confidence in the sustainability of wild capture fisheries.

Methodologies to assist in motivating and demonstrating continual environmental improvement in the seafood industry have been the subject of significant investment at the policy level but remain largely unimplemented on the ground at broad scale. This project aimed to roll out 'green chooser' (FRDC 2000/146) derived EMS methodologies across two broad scale pilot project areas both subject to a high degree of community scrutiny (Moreton Bay and Cairns inshore fisheries). In doing so the project road-tested the

existing green chooser EMS model and refined it where necessary to ensure it is relevant to the needs of grass roots industry.

In addition, improvement of incentives for adoption of best practice will greatly assist industry environmental performance while providing significant opportunities to reduce management and compliance costs. In the long term, the project aims to improve overall industry profitability by assisting Queensland fishers demonstrate the benefits of low cost and high performance co-management arrangements.

For collaborative agencies involved in fisheries regulation there is a strong recognition that EMS can provide reform mechanisms which are industry driven. Further, for these agencies the project provides an alternate tool to demonstrate that state (e.g. QDPI&F), national (e.g. Department of Environment and Heritage (DEH)) and international sustainability obligations are being met. Moreover, the proposed project can offer relevant agencies the opportunity to further streamline, co-ordinate and integrate parallel programs (incl. extension & compliance) at fisher level. These needs are reflected in the high number of collaborative agencies involved in this project.

The mid-review findings of the Seafood Industry Training Package Review recommended a stronger emphasis on environmental awareness and promotion of ESD and environmental management throughout the training package - a need which is also reflected in the Seafood Training Australia's Strategic Training Plan for 2001-2002.

The project operationally delivered QFIRAC and FRDC priorities, as envisaged by the FRDC's Environmental Management Systems Initiative (FRDC Project 2000/084). FRDC, in creating its EMS initiative allocated funds to ensure the persons employed under this initiative and associated industry champions were appropriately trained for their roles. The project further added value and extended both current (e.g. 2002/231) and previous research investments (e.g. FRDC 2000/146 and FRDC 2002/303).

5. Objectives

5.1 Objective 1

To develop and implement two EMS projects for industry participants that will have utility for the fishing industry throughout Queensland.

5.2 Objective 2

To further refine the existing Green Chooser EMS methodology with a focus on identifying and overcoming any impediments to on-ground implementation.

5.3 Objective 3

To improve awareness of the triple-bottom line benefits of EMS amongst both the seafood industry and broader community in the pilot regions.

5.4 Objective 4

To provide EMS project officers, industry champions and industry participants with the necessary knowledge and skills to optimally carry out their roles and responsibilities.

5.5 Objective 5

To establish a grass roots culture amongst pilot regions of continual improvement in environmental performance, and to motivate the development of an industry-driven framework to demonstrate ongoing improvements in environmental performance post the life of the project.

6. Methods

6.1 Establishment of steering group and working groups

A higher level steering group was established to oversee the overall structure of the project. This group comprised representatives of each of the industry associations and major funding contributors, industry leaders, EMS project officers and other persons with relevant high level expertise in EMS or related disciplines. The purpose of the steering group was to provide advice on national and international developments in EMS and to act as a reference group to the working groups and project officers.

A working group was established in each area (Moreton Bay and far north Queensland) consisting of the relevant industry partners, industry representatives and a project officer with expertise in developing EMSs in other industries.

The working groups were the primary body responsible for overseeing the development of the regional EMS template documents, for the preparation and conduct of workshops and for the extension of the project to regional seafood industry participants. The working groups were the primary reference group for the project officers.

The project officer engaged in significant one-on-one consultation with grass roots industry participants.

The Principal Investigator was to oversee the working/steering groups and ensured that appropriate co-ordination and cross-fertilization occurred between pilot regions.

6.2 Development of template EMSs through holding regional workshops within each region or fishery

Two pilot projects were established (in South East Queensland and far north Queensland) to develop EMSs for fishing industry participants.

This was an industry-driven process whereby working groups engaged industry participants to attend workshops. These workshops were lead by key industry leaders, the EMS officer and working groups.

Initial workshops identified the scope and realistic goals for the project and industry leaders to drive the wide spread adoption of EMS methodology amongst industry. Subsequent meetings focused on following the EMS development process as set out in the Seafood EMS Chooser (developed under the Green Chooser project FRDC 2000/146), guided by the EMS project officer.

The project officer was to be responsible for development of relevant EMS documentation, for the preparation and distribution of relevant draft materials and for the preparation and conduct of workshops.

The majority of seafood EMS development was carried out by small fishery-specific working groups. After each major step of the EMS process was completed (according to the Seafood EMS Chooser), large regional workshops were held to engage the broader industry and to ensure that the EMS was representative of the industry sector or region as a whole.

Workshops assisted industry members to discuss realistic and relevant incentives to promote wide-scale adoption of EMS. It was intended that the development of regional EMSs would lead to development of individual enterprise EMSs.

Due to the industry driven nature of the project and the critical need for industry ownership, it was recognised from the outset of the project that some internal timelines and processes would need to be flexible to best achieve the objectives of the project.

6.3 Contribution to development and refinement of related FRDC projects

In addition to developing EMS templates, the project methodology was to:

- extend and refine the EMS model for the seafood industry developed under the Green Chooser project (FRDC 2000/146); and
- contribute to the development of EMS related resources under the project "The establishment of a training resource and information service to underpin the successful adoption of EMS by the Australian seafood industry" (FRDC 2002/303).

6.4 Promotion of widespread adoption of EMS methodology amongst industry through use of completed EMS templates

Once an EMS was drafted it was reviewed by industry members. This draft was then sent to key external stakeholders and made available to the general public for comment. Once consultation was complete, the industry working groups approved the final EMS Plan and it was published. This EMS was then promoted by industry leaders and working groups. Other seafood industry groups then utilised this EMS as a template to develop their own regional, fishery-specific or individual enterprise EMSs.

6.5 Adoption and implementation of actions outlined in the regional EMS template, at the individual business level

Following the completion of the EMS document, the actions outlined for the region or fishery were implemented within individual fishing operations. This was achieved through identification of who is responsible for specific actions, deadlines for actions to be achieved and implementation of monitoring mechanisms.

A variety of supporting resources for on-board implementation of EMS actions will developed and distributed after this project is completed to enhance industry adoption of the EMS actions (the timeframe for this project allowed for development but not implementation of the Moreton Bay EMS).

Subsequent to the project, FarmBis programs were already available to provide assistance for further workshops to help fishers use the template to develop EMS for their businesses and to continually improve the existing EMS.

6.6 Key industry leaders assist with mentoring other fishers through the EMS process

It is envisaged that key industry leaders identified through the project will provide their time in subsequent FarmBis workshops to help the next generation of fishers adopt and improve EMS systems.

6.7 Provision of training to support EMS officers and industry champions

Relevant training to support workshop attendance was to be partly funded by FarmBis with further rebates possible through the DAFF EMS budget commitment and other incentives to be explored throughout the project.

6.8 Changes to original methods

Strategic guidance

A steering group was to be established to oversee the overall structure of the project and to provide advice on national and international developments in EMS. This group was to act as a reference group to the working groups and project officers. Membership was to comprise representatives of each of the industry associations, each of the major funding contributors and other persons with relevant high level experience in EMS or related disciplines.

This group was established and had an initial meeting on 6 May 2003 in Brisbane. However this group did not meet again throughout the life of the project. This was due to high staff turnover within the peak industry body responsible for the project and budget constraints. Instead, the EMS officer obtained strategic guidance through the Technical Reference Panel (TRP) and Annual Review Forum meetings run by SSA as part of the National Seafood EMS Pilot Program. The participants of these meetings included EMS officers from around the country, in addition to key EMS experts.

EMS project officers

In the original project application it was stated that there would be two project officers employed full-time to work specifically on the development of EMS plans for the far north Queensland and Moreton Bay regions, with one officer allocated per region. The project officers were to be responsible for development of relevant EMS documentation, for the preparation and distribution of relevant draft materials and for the preparation and conduct of workshops.

One project officer was hired to assist with EMS development in both regions. This was due to the fact that at the time of project commencement, one key funding body (QDPI&F) had not formally committed to contributing funds.

The project officers were to be employed in March 2003. The project officer was not hired until November 2003. Under a project variation approved in early 2004, the dates for all milestones were rescheduled due to the late start to the project.

EMS templates

EMS templates were to be developed for both far north Queensland and Moreton Bay. One EMS template was fully completed and published (for Moreton Bay). However an EMS template for far north Queensland was only partially completed.

There are three reasons for this:

- due to the size and extent of the EMS templates attempted (multiple fisheries, multiple species, 100’s of fishermen, over large geographical areas);
- the project officer had to share time between both regions; and
- the Great Barrier Reef Marine Park Authority (GBRMPA) Representative Areas Program (RAP) was implemented in 2005 which

resulted in major negative social impacts on fishing communities in far north Queensland. This has significantly delayed the EMS development process (due to fishers leaving the industry and general reduction in morale).

Scope of the EMS templates

It was intended that template EMSs would be developed at a regional level for both far north Queensland and Moreton Bay. Due to the industry-based nature of the projects, the scope was decided by the fishermen. In far north Queensland the fishermen decided to attempt two fishery-specific EMSs instead of one regional EMS. The Moreton Bay fishermen developed a regional EMS covering multiple fisheries.

Time frame

The EMS templates were to be developed within one year after hiring the project officers, with a total project length (including implementation and evaluation post-completion of EMS templates) of one year and eight months.

This time frame was estimated before any similar-scale EMS projects had been completed elsewhere in Australia (or internationally). Given that only one project officer was hired (instead of two) and due to the large scale of the projects, the project took much longer than anticipated.

In addition it was noted in the original application that progress between each of the regions (and fisheries) would vary. This is due to the industry-based nature of the project. Fishers are out at sea and therefore unavailable at different times of the year, depending on the fishery.

The draft Moreton Bay EMS template was completed after two years and the final document published after two and a half years. The far north Queensland EMS template development process is approximately 70 per cent complete. However drafting of the template has not commenced.

Resources

As per a project variation approved in August 2003, the FRDC funding ($80, 000) was used for salary instead of operational funds. One of the key contributors (QDPI&F) did not contribute until late in the project and this severely limited the operational budget for EMS development.

7. Results/discussion

7.1 Establishment of steering group and working groups

7.1.1 Hiring EMS officers

The original funding application specified that two EMS project officers would be employed. However one project officer has been employed to facilitate and

provide support to both the Moreton Bay and Cairns regions. The project officer (Kellie Williams) was employed in November 2003.

7.1.2 Establishment of steering group

In May 2003 a steering group was established to:

- oversee the overall structure of the project;
- provide advice on national and international developments in EMS; and
- to act as a reference group to the working groups and project officer.

The steering group was comprised of representatives of each of the industry associations, major funding contributors and other persons with relevant high level expertise in EMS or related disciplines. (Please see attachment for list of steering committee members.) The first steering group meeting was held on the 6th May 2003 at the University of Queensland.

This group did not meet again throughout the life of the project. This was due to high staff turnover within the peak industry body responsible for the project and budget constraints. Instead, the EMS officer obtained strategic guidance through the Technical Reference Panel (TRP) and Annual Review Forum meetings run by SSA as part of the National Seafood EMS Pilot Program. The participants of these meetings included EMS officers from around the country, in addition to key EMS experts. The EMS officer's participation in the TRP and other meetings was advantageous as interaction between the officer and other EMS officer's working on similar projects in other states of Australia facilitated sharing of knowledge and problem solving challenges encountered.

In addition to this national support network, the EMS officer received guidance from the QSIA, SSA and the project primary investigator, an environmental expert and lecturer at the University of Queensland.

7.1.3 Establishment of working groups

An initial workshop was held for fishers of each region to communicate the positive tangible benefits of EMS to industry participants and to generate interest. These workshops were run by the EMS officer. At these workshops the regional working groups were established.

Within Moreton Bay, the commercial fishers decided to develop a regional EMS Plan that is inclusive of all commercial fisheries in the region. The fishermen decided to use the legislative boundaries for Moreton Bay which meant that fishers who operated between Caloundra to Coolangatta and Stradbroke were eligible to be involved in the process. Those fisheries that demonstrated sufficient industry commitment to the EMS development process were included - the otter and beam trawl, inshore net, and specimen shell collection fisheries. Thus small working groups were formed within each of these fisheries to individually go through the Green Chooser eight-step process, while developing an overall regional EMS plan that is relevant and

accurate for each of the various fisheries. Other fisheries, for example crab, may be included at a later date if sufficient industry commitment is achieved.

The approach in far north Queensland was different, with separate regional working groups being established for each of the fisheries. A trawl fishery regional working group for far north Queensland was established with three key industry members. A line fishery regional working group for far north Queensland was established, with three key members. Both far north Queensland groups agreed that the geographical boundaries for the fishery-specific regional EMSs should be inclusive of any industry members who fish from Klump Point (north Townsville) to Cape York (the tip of Queensland).

The working groups were deliberately kept small to ensure that development progressed speedily. Over time these working groups have expanded to up to eight fishers per group.

7.2 Development of template EMS' through holding regional workshops within each region or fishery

7.2.1 Linkages between existing "Green Chooser" methodology and development of EMS templates

The process for EMS development has closely followed procedure set out in the Seafood Services Australia (SSA) Seafood EMS Chooser (the Chooser) document. This involves following an eight-step process:

1. establishment of a vision for the particular fishery, business or region;

2. defining the scope of the Environmental Management System (EMS) to be developed;

3. developing a group EMS policy in order to implement the vision;

4. undertaking a thorough risk assessment process;

5. develop an EMS action plan;

6. implementation of the actions contained with the EMS plan;

7. report - develop an effective communication plan to support the EMS; and

8. audit, certify and review.

In addition to the Chooser, supporting worksheets (supplied by SSA) have provided further detail on how to complete each step of the process.

Green Chooser process for EMS development adopted or improved where necessary

At certain steps of the process it has been necessary to modify parts of the worksheets to make them more relevant to a particular fishery or region. For example, the worksheets pertaining to environmental risk assessment

detailed risk ranking mechanisms. While these were helpful, the definitions used for each ranking classification were often broad and ambiguous. This made it difficult to allocate ranks to various activities. Thus the fishers and the EMS officer slightly modified the list to come up with definitions that best fitted the particular fishery (while ensuring that consistency was maintained).

There have been other examples within the SSA EMS worksheets where modifications have been made and these recommendations and feedback have been provided to SSA throughout the process.

Implementation of the Chooser model within commercial fisheries in Moreton Bay and far north Queensland has been successful to date.

The Chooser is an effective resource that clearly and concisely sets out the EMS development process. Going through the EMS process with the fishers was fairly straight forward as the Chooser steps are set out in language that fishers understand and at a level that they can comprehend. For example, the risk assessment process was straight forward as the steps set out in the supporting worksheet material provided by SSA allow the fishers to be flexible with how they interpret the process, as long as it is relevant to the specific fishery or region and has a certain degree of rigour.

7.2.2 Identification of industry leaders or 'champions'

Before EMS development commences it is essential to identify key industry leaders or 'champions'. Industry champions in this context are fishers who are natural leaders of an industry group. They are generally confident, proactive and willing to contribute their time for the overall group benefit.

During initial industry workshops it is the responsibility of the facilitator or EMS officer to identify industry champions. These people will lead the EMS development and implementation process and will help to promote EMS within the wider industry.

During initial workshops, the first few fishers to volunteer their time are usually the industry champions. Other industry champions may be identified through the EMS development process and these people are usually outspoken.

In the Moreton Bay and far north Queensland groups the industry champions were identified during the first regional workshops. These fishers remained proactive throughout the life of the project (two years), contributed much time to EMS development and have played a key role in encouraging other industry members to become involved.

Once the EMS officer is no longer working with these groups, the industry champions will be the ones who continue to drive or lead the EMS process.

7.2.3 Challenges encountered and strategies to overcome challenges

While progressing through the various stages of EMS development in both regions, some challenges have been encountered. These challenges have generally been associated with facilitation of the EMS development process. A variety of skills are required to facilitate such a process. These skills include:

- effective communication skills;
- ability to facilitate and guide large groups of people;
- organisation and time management skills;
- ability to communicate with commercial fishers, people of various education and cultures, in addition to external stakeholders including Government and researchers;
- knowledge of various fisheries and operations;
- knowledge of and understanding of the media and communication strategies; and
- understanding Ecologically Sustainable Development (ESD) principles.

While the facilitator for the Queensland EMS projects (the EMS officer) possessed all the required skills, other challenges were encountered.

These challenges included:

Getting sufficient numbers of fishers involved

Initial regional workshops were held (one in each region) inviting all members of the Queensland Seafood Industry Association (the State's peak body) within the branches of each of the two regions (Moreton Bay and far north Queensland). Although attendance was not huge, there were sufficient numbers to progress EMS development. As the project progressed, many fishers became involved in the process by hearing about the EMS through word-of-mouth.

Another key factor in getting sufficient numbers of fishers involved has been the facilitator talking to the fishers about the tangible benefits of doing an EMS and what the outcomes could be for the industry. Once fishers understood what they were going to get out of the process, they were very keen to get involved and tell others about it.

Once the EMS plans were drafted and then released, many more fishers became interested in being involved with the EMS process. Many fishers did not have the time to attend all of the necessary meetings to work through the EMS development, however they were very interested in the process and the outcomes. To maintain fisher's interest and keep them involved, the EMS

officer sent out updates and drafts to all interested parties, making the process inclusive rather than exclusive.

Developing a positive relationship between the facilitator and the fishers

Initially, many fishers were wary or cautious of becoming involved with the EMS process as the facilitator was not a seafood industry member. However once fishers realised that EMS development is a voluntary initiative and not a government requirement, many fishers expressed interest. In addition, the facilitator went out on boats with fishers from the various fisheries to ensure a closer understanding of the fishing operations being evaluated. This helped build trust and positive relationships between the facilitator and the fishers, as it demonstrated that the facilitator was willing to get their 'hands dirty' and show a genuine interest in their businesses. The key to building effective relationships between facilitators and fishers is effective communication skills on the part of the facilitator and allowing time to develop trust. This is a crucial factor that must be addressed in order to effectively go through the EMS Chooser process.

Getting the fishers to take ownership of the EMS plan

This has been one of the most significant challenges to effective implementation of the EMS Chooser process. Whilst many fishers were involved or interested in being involved in the EMS process, it was difficult to get fishers to take the lead on decision-making and organisational issues. This was largely due to fishers' lack of spare time to address issues other than those associated with day-to-day fishing operations. In addition many fishers either lack the confidence and/or the skills necessary to coordinate such a project on their own. It is evident in literature and anecdotally that fishers generally do not possess effective communication or inter-personal skills and often experience difficulty with regard to organisational activities.

It is fundamental that this issue is addressed as it is a key part of making the EMS development process a success. Fishers must take ownership of the plan and take leadership for the organisational aspects of the EMS plan in order for the process to continue once the facilitator is no longer assisting them.

Over time this issue has been addressed by continual efforts by the facilitator to encourage industry champions to take leadership for the direction of the EMS plans. Whilst it has been a slow process, fishers are now taking the lead on EMS development. It is suggested that training of key industry champions may be necessary to provide them with the necessary skills to effectively drive their EMS projects.

EMS development is a time-consuming process and should not be rushed

One of the most significant challenges to the effective uptake of EMS amongst commercial fishers is the situation that is created when EMS development is rushed – either due to funding milestone constraints or other

reasons. In fact much discussion on this topic has occurred at National Technical Reference Panel (TRP) meetings amongst EMS officers from pilot projects from each State of Australia over the past two years. It is widely agreed by facilitators that time is one of the most crucial factors in developing an EMS.

The facilitator needs the time to develop positive relationships with fishers based on trust and mutual understanding in order to coordinate EMS projects. Depending on the fishers involved and the external factors that may be affecting their attitudes towards the concept of an EMS (e.g. if particular regions are experiencing wide-spread bans on commercial fishing, this will result in significant social impacts amongst fishing communities), developing these fundamental relationships can take a considerable amount of time. In addition, once the EMS process has commenced, it can take a significant amount of time, particularly in large geographical regions, for the positive messages about EMS to reach many of the industry members via word-of-mouth. Once there are sufficient numbers and the EMS Chooser process is well under way, there can be obstacles in terms of arranging times when sufficient numbers of fishers can attend meetings to progress through each of the eight steps. Often these meetings occur irregularly and most contact between the facilitator and the fishers was via the telephone. However phone contact is not a very effective method for group decisions or work.

In summary, EMS development within the commercial fishing industry is most effective and will have maximum longevity if the process is allowed a ‘natural’ lifespan – which will vary from fishery to fishery, depending on the size of the region or fishery and the number of fishers involved. As EMS development can be a ‘fragile’ process, if it is rushed to meet early milestones, the process is likely to fall over before tangible outcomes are achieved. This is not only a negative outcome for industry members, but also for funding bodies who have significant investments in these projects.

Development of EMS plans for fisheries in far north Queensland was not as advanced as Moreton Bay. In 2004 the implementation of the Representative Areas Program (RAP) in the Great Barrier Reef Marine Park (GBRMP) resulted in the closure of large portions of this area to commercial fishing. As a result, many fishers have exited the seafood industry and this has severely challenged the progress of EMS within these fisheries. The progress of EMS plans in this region was stalled approximately six months into EMS development. Despite this, there are sufficient numbers of interested fishers remaining in both the line and trawl fisheries in far north Queensland to continue with EMS development beyond the life of this project. The line and trawl groups are almost up to the drafting stage of the EMS process. However this will take several months and will likely require a facilitator to assist with this process.

7.2.4 Critical success factors unique to EMS template development at the regional, multi-fishery level

The critical success factors for EMS development within the seafood industry (referred to above) have been established by Seafood Services Australia (SSA) through the National Seafood EMS Pilot Program. Each EMS facilitator contributed their experiences and "lessons learnt" through submitting monthly reports to SSA, including findings from the Queensland EMS projects. The critical success factors identified include:

- Industry members need to commit to an EMS voluntarily (if EMS development were compulsory it would no longer be a co-management approach);
- fishers need to feel a sense of ownership over the EMS – this means that fishers have to actively participate in EMS development throughout the process;
- fishers must decide on the vision and scope for their EMS themselves;
- EMS development must have a long timeframe (two to six years depending on the scope of the EMS) to:
  - ensure that fishers take ownership of the EMS;
  - enable the facilitator to build trust and positive relationships with the fishers;
  - allow for attitudinal change in order to change operational procedures and mindsets that have been entrenched for years; and
  - ensure effective implementation of actions and codes of conduct (so that an EMS becomes a process and not just a document).
- effective and strategic communication of environmental and other achievements must occur throughout the development and implementation phases (this includes seeking any necessary media training and developing a communication strategy);
- industry leaders must be identified for each fishery and region involved in an EMS, as these people will help drive EMS development; and
- facilitators need to have the skills to identify what the major drivers are likely to be for particular groups of fishers to become involved so that the concept of an EMS can be explained in a relevant manner (main motivation is security of resource access).

Given these findings, full EMSs will not be completed for fisheries within the far north Queensland region during this project. Analysis of the Moreton Bay multi-fisheries regional EMS will provide valuable lessons and future recommendations, as it is such a large project. It is recommended that the far

north Queensland EMS plans be completed using the material developed at a later date, through another project. Salary provided for the EMS officer through this project runs out in June 2006. Further funding would be required for the EMS officer to complete the EMSs with fishers from far north Queensland.

Other critical success factors specific to the Queensland pilot projects include:

Inclusion of fisher's partners or wives

One critical factor in achieving uptake of the EMS concept amongst fishers, has been the inclusion of fishers' partners or wives. In many cases fisher's partners run the administration and management side of a family fishing business, have extensive knowledge of operational aspects that may potentially require environmental improvement and importantly spend the majority of their time on-ground (rather than out at sea), making them more available for meetings. Through this and other techniques, the number of fishers involved in EMS development in both regions has slowly increased over time.

Identifying what fisher's motivations or drivers are for getting involved with EMS

There are variations in the outcomes achieved to date between the various fisheries and between regions. This is partly due to differences in motivations driving fishers to be involved. For example, fishers of far north Queensland have recently faced closures of many prime commercial fishing locations through the Great Barrier Marine Park Authority's (GBRMPA) Representative Areas Program (RAP). Consequently, in many cases, fishers were highly motivated to be involved in EMS development for their fishery as they feel that it may assist with maintaining security of resource access for the future.

In contrast, at the time EMS development commenced (2003), fishers of Moreton Bay were marginally more complacent about resource access issues as this region had not been re-zoned in some years. In this region, negative community attitudes towards the industry was initially the driving factor for fishers to be involved with EMS development. Fishers identified that developing an EMS for the Moreton Bay region would help provide them with the skills necessary to communicate more effectively with local community groups, Government and with the media. By the time EMS development was near complete security of resource access had become the dominant motivator for Moreton Bay fishermen to contribute to the EMS. This was due to imminent re-zoning of the Moreton Bay Marine Park.

Venue and location of meetings or workshops

In order to get fishers to attend meetings it is critical that the EMS facilitator chooses an appropriate venue. The initial Moreton Bay regional EMS workshop was held on Saturday 13th December 2003. There is a history of conflict between fishers from various areas of Moreton Bay, in addition between fishers of various fisheries within the region. One of the most

significant challenges to getting large numbers of fishers together for a meeting in Moreton Bay is that fishers from one side of Brisbane usually will not travel to the other side of Brisbane and vice versa. The first Moreton Bay workshop was held in a function room located on the north side of Brisbane (Virginia), near the Gateway arterial road. This location was chosen for its convenience and accessibility for fishers from all parts of Moreton Bay. Approximately 12 fishers attended the workshop, with a cross-mix of fishers from all fisheries attending. This level of attendance was expected and sufficient to commence EMS development.

The initial far north Queensland regional EMS workshop was held in Cairns on Tuesday 27th January 2004. In contrast to the Moreton Bay region, fishers of far north Queensland are generally more open to driving long distances to attend relevant meetings. This was reflected in attendance on the day, with approximately 25 fishers present on the day, with some travelling from Townsville, Lucinda and Innisfail. Due to seasonal fishery closures at the time, the majority of fishers were trawl fishermen.

Positive tangible benefits of EMS identified and communicated to industry participants

For EMS development to be successful it is critical that the positive tangible benefits of EMS are identified and communicated to industry participants. The benefits must be communicated to fishers in a manner that directly links the benefits with their motivations.

The tangible benefits of EMS were identified early in the pilot project development. The tangible benefits of EMS can be classified into several categories – benefits to:

1. the commercial fishing industry (industry participants);

2. the general public, including local community members and groups, recreational fishers etc.; and

3. Federal, State and local Government.

The benefits of EMS for the industry participants have been identified as:

- maintenance of security of resource access by demonstration of continual improvement in environmental performance and communication of achievements to relevant groups;

- improvement of the public image of the commercial fishing industry by using the EMS plan as a communication tool (which will in turn help achieve the above-mentioned benefit);

- better managed small businesses and fishing industry as a whole, by using the EMS development process to establish a vision, goals, objectives and measurable actions to achieve these goals; and

- demonstration of social responsibility.

These benefits were communicated to fishers during the initial regional EMS workshops. During following meetings the EMS officer explained the benefits of EMS to new fishers as they became involved with the EMS development process. To add to this, fishers talk to each other regularly about the tangible benefits of being involved with the pilot project. Thus word-of-mouth has been one of the central ways in which other fishers have become involved with the EMS development process.

Anecdotal evidence suggests that the primary motivation for fishers to be involved in EMS development was to maintain security of resource access – in both Moreton Bay and far north Queensland.

Initial awareness of industry participants of the benefits of EMS assessed.

It is critical that the facilitator monitor participants awareness and understanding of EMS both initially and throughout the EMS development process.

The initial awareness of industry participants (fishers) of the benefits of EMS was assessed at the beginning of the pilot projects. This was achieved through informal discussion with fishers, in addition to conducting formal, written surveys of industry participants. Anecdotal evidence gathered by talking to fishers during small group EMS meetings over the life of the pilot project suggests that fishers were not only unfamiliar with the concept of EMS, but were also very cautious and hesitant about committing themselves to more ”paperwork”. In the initial stages of EMS development, many fishers were concerned that developing an EMS may not have a positive impact on the future of their businesses. They were particularly concerned about divulging information about their businesses and everyday operations (as part of an environmental risk assessment), as in the past this has resulted in changes in State fisheries regulation that have had negative impacts on their businesses (e.g. with regard to fishing nights, effort, catch and legal fishing locations).

As a result it has been vital that the EMS officer establish a positive relationship with industry participants, which is based on transparency and trust. This has been a slow process, however once fishers have understood the benefits that are associated with developing an EMS, they have been instrumental in convincing other fishers to become involved. From these experiences, it is suggested that the attitudes and experience of the EMS officers employed to work with commercial fishers, are critical to successful uptake of the EMS concept amongst industry members.

A formal written survey has been conducted with fishers when they initially become involved in the pilot project (new fishers become involved regularly and therefore surveys are continually carried out). This survey was constructed and designed by a company called URS (this survey is not available in electronic form, however if requested, a hard copy may be sent).

This survey aimed to evaluate:

- how fishers found out about EMS;

- what their motivations are for becoming involved in an EMS pilot trial;

- their experience with EMS prior to commencing the pilot; and

- to provide feedback to help improve the supporting EMS resources available.

Fishers have varying degrees of literacy and comprehension skills and thus the timing of the survey was critical. In some initial cases where fishers were asked to fill out this survey when they first became involved, they felt threatened and were reluctant to fill it out. It became obvious that presenting fishers with the survey so early in the process would jeopardize the relationship between the EMS officer and the fishers. Thus the surveys were conducted after the fishers had been along to a few meetings and felt comfortable enough to provide input into the process.

Often these surveys were conducted one-on-one between the fishers and the EMS officer as some industry participants do not have high-level reading or comprehension skills. This made the process less threatening.

Results from these surveys indicate that fishers had not heard of the EMS concept prior to involvement in the pilot project. However fishers considered the health of the natural environment to be a top priority. The most common way in which fishers found out about EMS was through word-of-mouth. The majority of fishers surveyed suggested that they believe that having an EMS will benefit them in terms of maintaining security of resource access.

An additional survey was carried out mid-process to assess the operator awareness of the value of achieving environmental benefits through adoption of an EMS (see appendix 5). This was designed to evaluate uptake of EMS amongst industry participants who have had exposure to EMS and to assess the awareness of new participants. This survey was conducted with all operators during the final stages of EMS draft development (prior to the launch and subsequent implementation of the EMS plan). This provided insight into changes in the awareness of operators who have participated in the EMS development process and with assessing what the level of uptake has been within the broader Moreton Bay professional fishing industry.

The results of the mid-process evaluation were that most operators had a good understanding of EMS. More will be added here following analysis.

Development of realistic vision and scope

During the initial regional EMS workshops each of the industry groups constructing EMS Plans developed a vision for their fishery (or region in the case of Moreton Bay). In addition, the fishers jointly decided on a scope for their EMS Action plans. Beyond this, fishers gathered in small groups to set further goals and performance indicators.

The visions for each of the plans are slightly different, relating to issues specific to a particular fishery or local region. The visions are in dot-point format, listing what fishers would like to achieve within a certain time period set by them (e.g. in 5-10 years time). It is intended that the vision will change over time. Statements common to each vision include:

- to be able to work in an industry environment where it is possible to run economically viable (as well as ecologically sustainable) small businesses;

- to have security of access to productive fishing areas;

- security and stability for families; and

- to have credibility, support, awareness and recognition from local communities.

Creating a realistic vision and scope sets the scene for an effective risk assessment process. Fishers completed an environmental risk assessment for each of the fisheries involved. Through this, fishermen identified areas where environmental improvement may be necessary and thus set goals and actions to achieve these improvements. Following completion of the risk assessment process, fishers developed an EMS policy or broad list actions to achieve the goals listed in their vision.

7.3 Contribution to development and refinement of related FRDC projects

7.3.1 extension and refinement of the EMS model for the seafood industry developed under the Green Chooser project (FRDC 2000/146)

At each step of the EMS development process, the EMS officer has been providing feedback to SSA on how the Seafood EMS Chooser and other EMS resources (e.g. worksheets and Seafood EMS (SEMS) CD) may need to be modified, to more effectively support the EMS development process. In addition the EMS officer has attended several Technical Reference Panel meetings and Annual National EMS Forums for primary industries to share and learn from other's experiences (achievements and obstacles).

7.3.2 contribution to the development of EMS related resources under the project "the establishment of a training resource and information service to underpin the successful adoption of EMS by the Australian seafood industry" (FRDC 2002/303)

The Queensland seafood EMS pilot projects specifically fed into or provided feedback in relation to the development of the SEMS CD and Seafood EMS Self Assessment and training Manual (developed by SSA). This involved "road-testing" these resources and providing feedback over an extended period of time.

7.4 Promotion of widespread adoption of EMS methodology amongst industry through use of completed EMS templates

7.4.1 Communication strategy

At the inception of the EMS development process for both Moreton Bay and far north Queensland, detailed communication strategies were written. These plans provide broad goals and objectives for communication with various stakeholder groups and actions detailing how to achieve these goals. Implementation of these communication plans commenced at the beginning of 2004 and progress has been good in both regions. Each region has different stakeholder groups, with varying spatial distributions, and local communities often have vastly different core concerns, thus communication must be tailored accordingly. The EMS officer has compiled detailed records of all media and other communication achieved throughout the two pilot projects.

This communication strategy has been developed in consultation with two key media/communication experts (Martin Bowerman and Brian Williams). This strategy is updated every six months to one year.

Internal communication with industry

A range of initiatives were utilised to communicate effectively with industry members. Invitations were mailed out to all QSIA members in the relevant regions, inviting them to a regional EMS workshop. From this initial workshop a database of interested industry members was created. This database has been updated at every regional and small group meeting held.

Periodically, as EMS milestones were achieved, invitations were again mailed out to all QSIA members in the regions, inviting them to attend information sessions and EMS workshops. Through this process interest in the EMS increased at the grass-roots, industry level.

Fishers who were actively involved in EMS development were encouraged to communicate with other fishers through word of mouth about the EMS. This was one of the most successful ways of getting fishers involved.

Regular articles about the EMS progress were written by the EMS officer and published in the Queensland Fisherman magazine (the QSIA monthly fishermen's magazine). In addition, updates on EMS progress were published in the far north Queensland's industry association's (Ecofish) regular newsletters.

The Moreton Bay Seafood Industry Association updates members on EMS progress through monthly newsletters.

Although the process of getting fishers involved in EMS development was slow, over time support for and involvement in the EMS increased. This outcome was expected.

One critical factor in achieving uptake of the EMS concept amongst fishers, has been the inclusion of fishers' partners or wives. In many cases fisher's partners run the administration and management side of the business, have extensive knowledge of potential operational aspects that may require environmental improvement and importantly spend the majority of their time on-ground (rather than out at sea), making them more available for meetings.

External communication with key stakeholders

Part of the communication Plan for both regions has been to have regular communication with key stakeholders throughout the EMS development process. This ensures that various groups have effective input to the EMS process and understand what the benefits and achievements are.

Key stakeholders include:

- QDPI&F;
- QEPA;
- SSA;
- QSIA;
- MBSIA;
- Ecofish;
- Researchers;
- Recreational fishers;
- Amateur boaters;
- Conservation/environment groups;
- Ecotourism industry;
- Politicians (both local state); and
- The local community.

Communication with these groups occurred through regular email updates from the EMS officer, accessing the QSIA's Queensland Fisherman magazine, through submission of milestone reports to various funding bodies, through phone contact with the EMS officer, one-on-one meetings and presentations from the EMS officer and key industry leaders.

Who is responsible for communication?

Communicating to each of these groups has involved direct and indirect techniques. Direct communication has involved phone calls, private and public meetings, workshops, newsletters and emails. Indirect communication has

involved utilising the media through print, radio, television and articles in industry-based publications.

During EMS development, the EMS officer initiated most communication with these various groups. However following the development of the EMS plan, key industry members have been taking the lead on communication. Through the EMS development process media spokespersons have been nominated for each fishery sector involved in the Moreton Bay EMS. There are two media spokespersons for each fishery and they have been key in communicating with external stakeholders.

A training plan to support these spokespersons has been developed with a key registered training organisation (RTO) and will be implemented in 2006.

Progress against communication and extension plan

Much progress has occurred in both regions in terms of communication and extension. The majority of media achieved has been in the far north Queensland region. This has included print, radio and television coverage, generated through media releases, public media launches and one-on-one contact established between the EMS officer and media contacts.

In May 2004, a public launch occurred to mark the commencement of an seafood EMS initiative for far north Queensland. This occurred at the Port Douglas Seafood Festival. The project was launched by the Honourable Jason O'Brien (member for Cook). The Queensland Seafood Industry Association organised locally-caught, fresh seafood to be available for consumption on the day. A media release was distributed prior to the event and the EMS facilitator (Kellie Williams) was on television during a news segment the following evening promoting the EMS initiative. The event was a huge success.

The Moreton Bay EMS was officially launched on Saturday 3 June 2006 at the Moreton Bay Seafood Festival, Cleveland, Queensland. Media were invited and attended the event. Media releases were put out leading up to the festival. Television, radio and print media coverage was achieved. Approximately 60 guests attended the launch function, with Grant Hall, Deputy Director-General for Queensland Fisheries officiating. As part of the launch weekend, the MBSIA ran a stand at the festival selling seafood and other products to fundraise for the EMS project. There was also fishing gear, posters and brochures as part of an information stall which was very successful and attracted many festival-goers.

The Moreton Bay EMS was also showcased as part of the 2006 World Environment Day. Information on MBSIA's participation in this campaign can be found at http://www.landcareonline.com/news_details.asp?sType=campaigns&news_id=114 .

In March 2006 the MBSIA won two prestigious awards for their EMS as part of the 2006 Queensland Primary Industries Awards – the Sustainable Primary production Award and the overall Most Outstanding Contribution to Primary Industries Award. The EMS and the MBSIA received much positive media

coverage for this achievement. The MBSIA put out a media release in relation to the event.

Two colour brochures have been published and distributed to wholesale and retail seafood businesses as well as fish and chip shops. These brochures are aimed at communicating with the local community (seafood consumers) what the EMS is about and what fishers hope to achieve through it. Essentially to raise awareness amongst local communities that commercial fishers of Moreton Bay are carrying out a voluntary initiative to improve their practices on the water, to protect the marine environment for the future and to provide the freshest and highest quality seafood as possible. The brochures also promote the Association, it's awards and other environmental achievements and the organisations who have sponsored the EMS and/or the MBSIA.

A more detailed communication plan is currently being constructed to better target key groups in this geographically large and socially diverse region. This plan will be based on demographic research undertaken specific to the region.

A series of articles documenting the progress of the EMS are being published within the Queensland Environmental Protection Agency's (EPA) magazine – the *Compass*. This magazine is distributed throughout the state and is widely read by government agencies, as well as researchers and primary industry representatives. The first article is currently being published. This article provides an overall introduction to the concept of an EMS and the seafood project. Following articles will cover the journey of key fishers from varying fisheries within Moreton Bay as they follow the EMS journey. This will include interviews and colour photographs of fishers out on their boats.

In addition articles are in the process of being written to publish in recreational and professional fishing magazines, as well as other publications.

The EMS facilitator launched the new Seafood EMS Chooser document at the 2005 EMS Summit in Brisbane. A media release was put out by the University of Queensland about the Queensland EMS projects and the EMS officer's contribution to the Summit. As a result the EMS officer participated in radio interviews with ABC Wide Bay (mid-coast or Hervey Bay region) and ABC Cairns. This was a successful communication opportunity where the positive achievements related to EMS were reiterated.

The fishers of Moreton Bay recently participated in the 2006 Business Clean Up Australia Day. Approximately 30 trawlers collected rubbish caught in their nets and brought it to shore in the Clean Up Australia Day bags. The EMS officer assisted the fishers to promote their involvement in this event as it addressed parts of their EMS actions. A media release was sent and as a result, significant media coverage was attained, including mainstream radio, newspapers and on all free-to-air television news programs that evening. The fishers wanted to use this event to put a spotlight on their environmental initiatives being achieved through their EMS.

7.4.2 Identification of realistic and relevant incentives to promote widespread adoption of EMS

Once an EMS was drafted it was reviewed by industry members. This draft was then sent to over 70 external stakeholders and made available to the general public for comment through two public meetings. Once consultation was complete, the industry working groups approved the final EMS Plan and it was published. This EMS was then promoted by industry leaders and working groups. Other seafood industry groups then utilised this EMS as a template to develop their own regional, fishery-specific or individual enterprise EMSs.

The major incentives for promotion of widespread adoption of EMS identified through the pilot groups included fishers:

- trusting the EMS officer;
- understanding the concept of EMS;
- being able to identify the tangible benefits of EMS for themselves; and
- understanding how undertaking an EMS is relevant the major issues/ challenges that they face (e.g. security of resource access and negative community perceptions).

Once these key points were achieved, fishers were very motivated to promote widespread adoption of EMS with other industry members throughout Queensland. This occurred mostly through word of mouth.

As a result several groups along the Queensland coast have commenced development of EMSs, including Rockhampton, Mackay, Bowen and Hervey Bay.

7.5 Adoption and implementation of actions outlined in the regional EMS template, at the individual business level

7.5.1 Challenges encountered with implementation and strategies to overcome these

Once the EMS documentation is developed, a key challenge to implementation is that it can be difficult to get the broader industry to sign-on to the EMS Plan. Small groups of fishers are ideal for developing the EMS documentation. Once development is completed and actions are in place, the benefits of signing on to the plan and committing to the actions and code of conduct contained in the documentation, need to be communicated to the broader industry.

In the case of the Moreton Bay pilot group, sign-on to the EMS increased at the same speed as the industry association strengthened its membership. In addition, as the association started delivering more services to its members by getting organised, interest in and sign-on to the EMS increased. Thus one of the key factors required to ensure sign-on to the EMS after development is completed, is a strong industry association to drive the EMS process.

Getting fishers to sign-on to the EMS is the first step. Following this, a key challenge is to ensure that fishers are implementing the actions and code of conduct in their every day operations. This was a challenge encountered by the Moreton Bay pilot group, although implementation did not occur within the time frame of this project. A full evaluation of implementation will occur outside this project in late 2006. One of the best ways of addressing this issue was to ensure there was regular communication with all of the association members (those signed on to the EMS). This ensured that there were opportunities for fishers to provide feedback to the association board (who managed the EMS implementation) on any issues that were arising with implementation. This regular communication was facilitated through monthly association general meetings (where large numbers of members attended), monthly newsletters to all members following up from general meetings and reporting on the progress of the EMS implementation and any tips for resolving implementation issues. Contacts were provided in the newsletters for fishers to seek one-on-one communication about the EMS or other issues.

In addition to this, the association decided that any fishers who were observed (by other fishers) to be blatantly going against the EMS actions and code of conduct were reported to the association board. These fishers were then sent a written letter from the association informing them that their membership was under review and asking them to provide reasons why their membership should not be revoked.

Further to these actions, the association decided that they will distribute summary versions of the EMS actions and a full code of conduct to fishers. This will be in the form of a flip chart to be kept on board the fishing vessel at all times as a quick reference guide. Deadlines for review of each of the EMS actions were also set out in the EMS. These deadlines will fall outside the lifespan of this project. Each action is to be reviewed and amended to ensure that it is still relevant to fishing issues at the time of the review. The review will include a complete analysis of the risk assessment to ensure that the high risk areas are updated to meet current conditions.

7.5.2 Critical success factors relevant to EMS implementation at the regional, multi-fishery level

The critical success factors relevant to EMS implementation at the regional, multi-fishery level include:

- Identifying and engaging active key industry leaders to drive the EMS process;

- Engaging an EMS officer or facilitator is critical for such large scale EMS development, as it involves coordinating large groups of people over large geographical areas, including multiple fishing sectors and species;

- Several management groups made up of industry leaders need to be established to drive the EMS process and these groups need to have overall coordination with each other (usually this coordination role is fulfilled by the EMS officer);

- Allowing enough time for EMS development and implementation, given that there are large numbers of people involved and multiple sectors to be analysed and reported on;

- Time allowed for EMS implementation should be flexible, without a defined limit set, as it will inevitably take groups longer than originally anticipated, with fishers out at sea (usually a number of years might be required depending on the number of fishers and the amount of time a facilitator dedicates to support the groups);

- Effective and regular communication between the EMS officer (or person driving the EMS process) and fishers on EMS progress;

- Regular drafts of materials developed must be circulated to fishers, even if they do not respond with comments (this makes them feel involved in the process and allows them the opportunity to become more actively involved if they choose to);

- Trust between the EMS officer and the fishers is the key to successful EMS development - the EMS officer should spend time going out on vessels to enhance relationships with fishers and to learn more about fishing operations;

- Effective communication between the EMS officer and external stakeholder groups;

- Incentives for fishers involvement to be identified early in the process and communicated with fishers;

- There needs to be an industry association or body driving the EMS (this assists with industry acceptance, building social capacity and communication with industry and external stakeholder groups);

- Once EMS development is complete, it is critical that by this stage, fishers have taken over the management of the process and are driving implementation themselves;

- There need to be realistic mechanisms in place to monitor performance and compliance with the action plan and code of industry best practice (this includes realistic deadlines for implementation of actions);

- It is essential that each fisher is delegated an individual task or responsibility for the EMS development and implementation phases – this will help them feel a sense of ownership over the EMS and will

ensure that all responsibility does not fall on one person (thus risking the whole process if this person burns out);

- Training needs for key fishers driving the EMS must be identified and appropriate training sought based on this needs-analysis (this will include media or communication training); and

- Fishers need to be spreading the word about EMS to other fishers and the broader community through word-of-mouth and handing out EMS brochures relevant to their region or fishery (this is one of the most important forms of communication that can make or break the success of an EMS).

7.6 Key industry champions assist with mentoring other fishers through the EMS process

Industry leaders are often referred to as industry 'champions'. Industry leaders are the people in the industry or group who are active in attending industry meetings, are generally confident voicing their opinions and are forward thinkers. They tend to naturally encourage others to become involved in meetings and are leaders of the group.

These people are not necessarily the most loud and forceful people in the group. In some cases they are more reserved. These leaders are people that other industry members generally respect.

These people need to be identified and encouraged to lead the EMS process. They also need to be provided with support to help achieve the group's EMS goals. These leaders play an important role in getting other fishers involved in EMS and in leading the way for EMS development.

These leaders form the management group that do a lot of the hard work in developing the EMS. They also lead meetings with wider industry when communicating EMS progress.

For example, in the case of the Moreton Bay pilot group, a small group of industry leaders (3 – 6 people) was identified for each fishery (otter trawl, beam trawl, inshore net and specimen shell collection fisheries). This group undertook a fishery-specific risk assessment and were responsible their findings with fishers from their sector and to other sectors and non-industry groups.

Sharing knowledge between these leaders can be an incentive to encourage widespread adoption of EMS. Further to this, industry leaders who are or have developed EMS in other States or regions can be invited to speak to a new group embarking on EMS development. This helps to outline the pitfalls and successes of the group they worked with, shares knowledge and can build upon and enhance the work of the EMS officer. This sharing of knowledge is referred to as mentoring.

This was one of the key critical success factors identified through the national TRP meetings. SSA have subsequently developing an EMS mentoring program where they match mentors to new EMS groups and offer subsidies for related costs. This is a major national outcome contributed to by the Queensland EMS officer.

7.7 Provision of training to support EMS officers and industry champions

The EMS officer received formal training through involvement with the national EMS pilot program (coordinated by SSA). This training was held in Canberra in 2005 and was a media workshop targeted at EMS facilitators and Seanet extension officers. This training was valuable for the EMS officer to attend and had great outcomes.

Training of industry champions for Moreton Bay is yet to commence. However the EMS specifically sets out actions based on identified training needs. This includes:

- Group workshop for protected species course (getting the old blokes up to date);
- Workshop to train fishers in the proposed regional food safety plan for Moreton Bay being developed by a skilled consultant on behalf of the industry; and
- Media and general communications training for MBSIA board members (EMS champions).

8. Benefits and adoption

FLOW OF BENEFITS

Fishery (including aquaculture)	**Commercial Sector**	**Recreational Sector**	**Traditional fishing sector (by Aboriginal & Torres Strait Islander people)**
Managed by:			
NSW – Other	2	0	0
NT – Other	2	0	0
QLD – Other	80	0	0
SA – Other	2	0	0
TAS – Other	2	0	0
VIC – Other	2	0	0
WA – Other	2	0	0
AFMA - Torres Strait	8	0	0
Total	**100**	**0**	**0**

Summary Flow of Benefits	
Sub Total Commercial Sector	**100**

Sub Total Recreational Sector	**0**
Sub Total Traditional Fishing Sector	**0**
Summary Flow of Benefits	**100**

The benefits and beneficiaries are the same as identified in the original application. Each of the states of Australia ran pilot EMS projects as part of the national EMS pilot program. Through this program a representative from each group met at national Technical Reference Panel (TRP) meetings approximately six times over the life of the project. These meetings facilitated the transfer of knowledge between states in terms of challenges encountered and critical success factors for EMS development. Each state benefited from this process and adopted suggestions based on research from other groups.

The majority of benefit will be for the Queensland seafood industry and supporting beneficiaries, such as the Environmental Protection Agency, the Department of Primary Industries and Fisheries, the Queensland Seafood Industry Association, the Moreton Bay Seafood Industry Association, CRC Reef, Ecofish and Seanet.

Projected benefits are:

- non-market benefits such as strengthened social capacity in fishing and seaside communities;
- short and long term improvement of environmental performance of the Queensland fishing industry;
- increased consumer confidence in seafood products, based on industry meeting justifiably high community expectations;
- increased economic efficiency of fishing operations;
- improved communication between the industry and external stakeholder groups;
- product quality (and safety) assurance; and
- improved occupational health and safety conditions for seafood industry workers.

9. Further development

Further research is required to assess the implementation process more fully. Due to the large nature of the project, the Moreton bay EMS was developed during the project time frame and implementation commenced. However further research and review is required to establish what the key challenges are for EMS implementation at a regional, multi-fishery, multi-species scale over a large geographic area and including hundreds of fishermen. This research should include review in the short and long term. Surveys should assess how fisher's expectations and understanding of the EMS process have changed over time. This should include an assessment of how fishers believe EMS implementation has changed the social, environmental, economic, food safety and quality and occupational health & safety environment in which they work. This could include qualitative and quantitative assessments. That is, examining how each facet of their work environment has changed, how this affects them and how much this has changed on a scale.

10. Planned outcomes

The key planned outcomes of the project will be:

1. The development of a 'continual improvement' culture amongst pilot region seafood industry participants and the demonstrated use of EMS amongst project participants at the individual fishing enterprises level;

2. The adoption of an adaptive framework in the pilot regions that provides for continual improvement and reporting of the seafood industry's environmental performance in an ongoing capacity post the life of the project;

3. Increased community and consumer confidence in the seafood industry's environmental performance amongst the pilot regions;

4. An increasingly refined seafood industry EMS methodology that is relevant to the needs of grass roots participants, provides a framework to meet the evolving aspirations of the broader community, and retains few impediments to widespread uptake amongst the broader seafood industry.

5. Refinements to the SSA's Green Chooser model and associated Seafood EMS Resources.

These outcomes are expected to generate the advantages for industry and agencies discussed in the needs section of this report, such as improved community relationships, increased security of resource access, increased social resilience and improved profitability.

Initially, the outcomes are likely to accrue in the regions where the pilot studies are undertaken, however, there is a focus in this project on using these pilot studies to demonstrate the utility of the approach throughout Queensland. Hence, it is anticipated that outcomes will ultimately also occur in areas outside of those chosen for the pilot studies (e.g. Gulf of Carpentaria inshore fin fishery or other areas where EMS is already taking off, for example Rockhampton, Mackay, Townsville, Bowen, Bundaberg and Hervey Bay)).

11. Conclusion

Overall FRDC project 2003/062 was a great success. Despite changes to staff, funding arrangements, the large scale of the project attempted and only one EMS officer being employed, the project objectives were exceeded. As a result of this project, groups of fishers up and down the Queensland coast have been motivated to develop their own EMSs outside of this pilot project. The project has produced a significant output – a template for large-scale, regional EMS development that can be utilized by other groups (the Moreton Bay EMS). The Moreton Bay EMS has achieved all of the original projected outcomes and has received recognition for its success through:

- Achieving two prestigious awards as part of the 2006 Queensland Primary Industries Awards – the Sustainable Primary Production Award and the overall Most Outstanding Contribution to Primary Industries Award;
- Being showcased as part of the 2006 World Environment Day; and
- A presentation to the Fisheries Department of the United Nations Food and Agriculture Organisation

12. References

Williams, K.A. 2006. *Environmental Management System for professional fisheries in Moreton Bay*. Prepared for the Moreton Bay Seafood Industry Association and the Queensland Seafood Industry Association. Brisbane, Australia.

13. Appendix 1: Intellectual Property

The intellectual property or valuable information arising from this research is the challenges encountered and critical success factors for EMS adoption listed in sections 7.2.3, 7.2.4, 7.4.1, 7.4.2, 7.5.1, and 7.5.2. In addition the Environmental Management System (EMS) developed for Moreton Bay professional fisheries is significant intellectual property as it is one of the first multi-fishery, multi-species, regional EMSs to be completed and will form a template for other regions.

14. Appendix 2: staff

Original Staff members and contributions

Name	Position	Qualifications	Time
Bob Pagan (UQ/UNEP)	Professor	PhD	1
CRC Scientist	Scientist	PhD	5
Darren Clelland (Ecofish)	CEO	B.Com	5
Daryl McPhee (UQ)	Lecturer	PhD	4
Denis Ballam (Seanet)	Extension Officer		4
DPI Project Officer (TBA)	Project Officer		100
Duncan Souter (QSIA)	CEO	B.Sc (Hons)	1
EPA Project Officer (TBA)	Project Officer		100
Frank Lee (MBSIA)	Fishing Industry Representative		4
Julie Daly (DPI)	Policy Manager		8
Lindsay Delzoppo (EPA)	Director		1
Michael Fennessy	Fisher		4
Michelle Warrington	Executive Officer		5
Neil Chitty	Fishing Industry Representative		4
Nick Heath Operations	Manager	B.Com.	20
Paul Williams	Fishing Industry Representative		4
Planner (Moreton Bay Partnerships)	Director		4
Regina Counihan (CRC Coastal)	Scientist	PhD	4
Rob Brock	Fishing Industry Leader		4
Russ Reichelt, or proxy (CRC)	CEO	PhD	1
Ted Loveday (SSA)	Managing Director	M. Env. Man.	1
Tor Hundloe (UQ)	Professor	PhD	1

Actual staff members and contributions

Name	Position	Qualifications	Time
Kellie Williams	Project Officer	BEnvSc (Hons)	100
Daryl McPhee (UQ)	Lecturer	PhD	10
Duncan Souter (QSIA)	CEO	B.Sc (Hons)	5
Ted Loveday (SSA)	Managing Director	M. Env. Man.	10
Frank Lee (MBSIA)	Fishing Industry Representative		4
Denis Ballam (Seanet)	Extension Officer		4
Rob Brock	Fishing Industry Leader		20
Michael Fennessy	beam trawl fisher		4
Dave Thomson	net fisher		4
Jim Finlay	net fisher		4
John Page	net fisher		4
Michael Wood	otter trawl fisher		4
Dave Sterling	otter trawl fisher and R&D provider		4
Glenn Tipman (EPA)	liaison officer		5
Michelle Warrington	Executive Officer		5
Neil Chitty	Fishing Industry Representative		4
Ryan Donnelly (Ecofish)	CEO		5
Nick Heath Operations	Manager	B.Com.	5
Paul Williams	Fishing Industry Representative		1
Russ Reichelt, or proxy (CRC)	CEO	PhD	1
Tor Hundloe (UQ)	Professor	PhD	1
Bob Pagan (UQ/UNEP)	Professor	PhD	1

15. Appendix 3: Environmental Management System for professional fisheries in Moreton Bay

Environmental Management System (EMS)
for professional fisheries in Moreton Bay

AN INDUSTRY INITIATIVE
"environmental sustainability - to ensure a better future for all"

FOREWORD

By developing this Environmental Management System (EMS), we the professional fishers of Moreton Bay are making a commitment to environmental sustainability that goes beyond legislative requirements.

We believe that our role is not just as providers of fresh seafood for the Australian public, but as custodians of the resource in which we all have a responsibility to care for. That is our marine environment.

As a result we have developed an EMS that aims to holistically manage this resource now and for future generations. By holistically, we mean managing our activities in a way that incorporates the many different factors which may (directly or indirectly) impact on our environmental performance. This involves managing the social, occupational health & safety, food safety, economic and public relations aspects associated with the running of our day-to-day activities.

This plan has been written to compliment (rather than replace) current State Government fisheries management and to align with principles set out in the Department of Environment and Heritage's (DEH) *Guidelines for the Ecologically Sustainable Management of Fisheries*.

Our vision is to use this EMS as a vehicle for change by collaborating with natural resource managers, community members and other interested parties to work together on key issues that may affect the health of our marine environment.

Importantly, this EMS plan provides us with a strategic direction for improving our own performance with regard to the environment in which we operate and on which we depend.

Whilst this EMS has been written by professional fishermen, we hope that this plan will be viewed by anyone who reads it as an opportunity to collaborate with fellow community members, working towards the common goal of long-term environmental sustainability of the Moreton Bay marine environment.

Signed,

Robert Brock

Chairman of the Moreton Bay Seafood Industry Association (MBSIA)

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INTRODUCTION

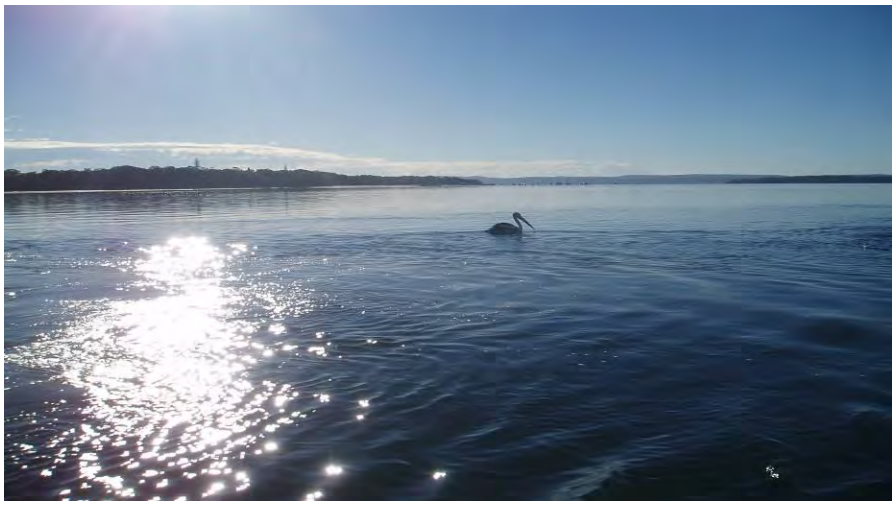
Over the past 10 - 15 years the professional fishers of Moreton Bay have faced increasing challenges on many levels - business-related, personally and socially. The fishers of Moreton Bay recognize that they have a responsibility to harvest seafood on behalf of the community in an environmentally sustainable manner (as current technology and techniques allow). To manage business and personal challenges as they arise, in addition to continually improving environmental performance, the fishers of Moreton Bay decided to develop an Environmental Management System (EMS).

We set out to develop a regional EMS for the whole of Moreton Bay. Fisheries that are currently included in the EMS are the otter and beam trawl, net and specimen shell collection commercial fisheries. The crab and line fisheries will be included in this EMS at a later date. With technical assistance from the University of Queensland and funding support from the Fisheries Research and Development Corporation (FRDC), Seafood Services Australia (SSA), the Queensland Seafood Industry Association (QSIA), the Natural Heritage Trust (NHT), the Queensland Environmental Protection Agency (EPA), CRC Reef and the Queensland Department of Primary Industries and Fisheries, we have developed an EMS which includes a vision, scope, risk assessment, policy, actions, code of industry best practice, implementation strategy, audit, review and reporting mechanisms.

This is the first time that fishers from a range of fisheries in Moreton bay have voluntarily collaborated in an effort to make a formal commitment to environment sustainability.

The EMS has been developed in accordance with guidelines set out by Seafood Services Australia (the *Green Chooser*), the Australian Standard ISO 14001:1996 *Environmental Management Systems*, the United Nations Food and Agriculture Organisation (FAO) *Code of Conduct for Responsible Fishing* and the Australian Seafood Industry Council (ASIC) *Code of Conduct for a Responsible Seafood Industry*.

We plan to use this EMS as a vehicle to proactively manage our local industry in a manner that goes beyond legislative requirements to ensure a more secure future for professional fishing and, more importantly, the marine environment on which our livelihood depends.



A Moreton Bay Seafood Industry Association (MBSIA) Initiative

The Moreton Bay Seafood EMS is an initiative of the Moreton Bay Seafood Industry Association (MBSIA), in conjunction with the Queensland Seafood Industry Association (QSIA) (see appendix A for Terms of Reference and appendix B for list of funding bodies). With the QSIA's help, MBSIA was established in 2001 to assist with management of regional issues affecting fishers in Moreton Bay. It is an incorporated association that has nearly 50 members, a chair, vice-chair, board and Chief Executive Officer. Representatives of each fishery and area of Moreton Bay form the MBSIA board. It is through the board that goals and objectives for the region are established and management issues dealt with. The MBSIA board has regular contact with the QSIA and Department of Primary Industries and Fisheries (DPI&F) representatives to ensure consistency in fisheries management across the State.

How will the EMS work?

Our EMS includes a Code of Industry Best Practice for fishers who are members of the MBSIA. All fishers must sign onto this Code in order to be a member of MBSIA. In addition to this, we have developed an Action Plan to address issues which may affect the health and future of the Moreton Bay marine ecosystem and our fishing businesses. In order to be effective, this Action Plan will be dynamic and therefore has mechanisms built into it that require ongoing review and modification.

A significant part of our written commitment to our EMS is the provisions of accurate information about the Moreton Bay region, the animals, plants and people which it supports and the factors which may impact upon its health.

There are some issues raised in this document that may not obviously come to mind as issues that have a major impact on the health of the marine environment. As professional

fishers of Moreton Bay we have a unique perspective of issues affecting the Bay because we are literally on the water most days of the year. Between us we have many years of local experience and can sense approaching threats to the marine environment well before they are detected by government agencies.

In addition to environmental factors, we will be evaluating, for example, social factors that influence our business. There is evidence in scientific literature that indicates that social issues, if not addressed, may negatively impact on the way in which the resource is managed, and ultimately the health of the ecosystems on which we all depend (Brussard et al. 1998; Jentoft 2000a).

Vision and policy commitment

Our joint vision as fishers from various professional fishing sectors within Moreton Bay is to harvest seafood on behalf of the regional community, now and for future generations, in a manner that allows us to:

- maintain a healthy marine environment;
- have credibility, support, awareness and recognition from the community;
- have security in our investments; and
- work in an environment where fisheries managers take into account all factors (including social) that may influence the sustainability of fisheries.

We want to achieve this vision within the next 5-10 years through actions that are ongoing. In this way our plan for achieving this vision will continue to be responsive to change well beyond the stated timeframe.

In order to achieve this vision we are committed to the following policy.

We will:

- ensure that our own actions have minimal impact on water quality;
- strive to achieve world‘s best practice in bycatch reduction;
- contribute to research in innovative gear technology design;
- contribute to stock monitoring and related research (e.g. provision of data through logbooks and water quality sampling);
- aim to address community concerns regarding the environmental impacts of our activities;
- strive to build positive relationships between our industry and other resource users so that we can work together in protecting our marine environment;
- work with Government agencies to ensure that the professional fisheries of Moreton Bay remain viable industries in the long term;
- champion the critical concept of factoring social issues into fisheries management (as we believe this may be the key to ensuring the future of our industry);

- proactively work to demystify our industry and promote the environmental achievements of Moreton Bay fishers; and
- work where appropriate with industry peak bodies.

Scope – who does the EMS apply to?

This EMS is inclusive of all professional fishers who have signed onto to the MBSIA EMS Code of Industry Best Practice and Action Plan and who hold a primary fishing vessel license endorsed with one of the following fishery symbols:

Otter trawl – M1 or M2

Beam trawl – T5

Net fisheries – N1 (East Coast No. 1, off-shore net fishery), N6 (Bait No. 1)

In time the EMS will extend to the following fisheries:

Specimen shell collection fishery – F

Crab fishery – C1 or C2 (to be included at a later date)

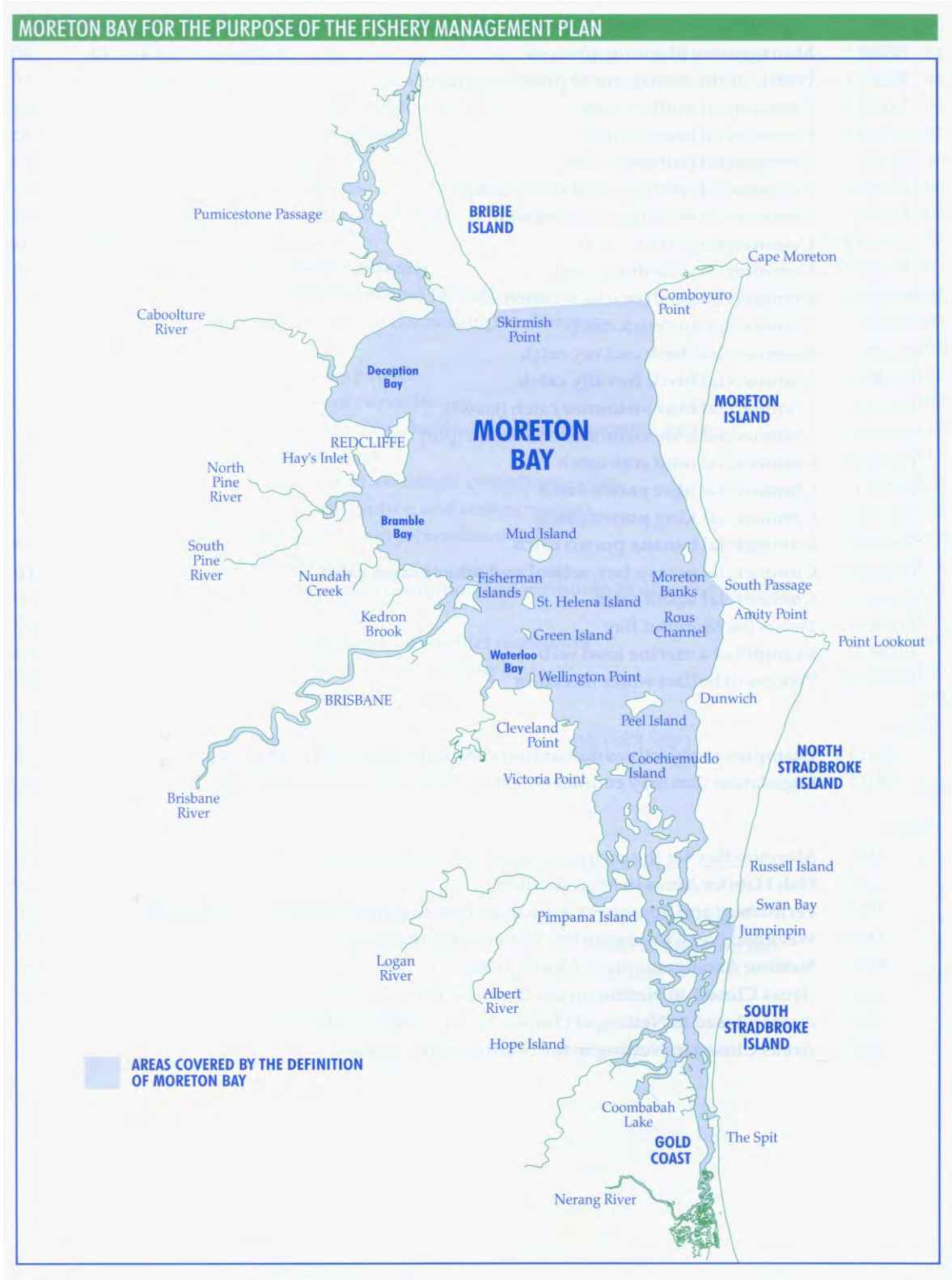
Line fishery – L1, L6 or L7 (to be included at a later date)

(Maps illustrating the boundaries for each of the fishing zones denoted by each of these license types are included in Appendix B)

As this EMS covers a range of fisheries within Moreton Bay, each fishery will be dealt with separately within this document.

Where is Moreton Bay?

According to the *Queensland Fisheries Regulation 1995*, the boundary of Moreton Bay is defined by a line from Skirmish Point on Bribie Island to Comboyuro Point on Moreton Island, then along the western foreshores of Moreton, North and South Stradbroke Islands and the Spit to the Gold Coast Seaway Bridge, then generally north along the mainland foreshores to Toorbul Point at the bottom of Pumicestone Passage. The area includes tidal waters of rivers and creeks flowing into the waters described such as the Brisbane and Nerang rivers. The area also includes Pumicestone Passage (Map 1 shows the defined area).



Map 1 Moreton Bay (please note that professional fishing is not permitted in the entire area depicted in this map. Rather it illustrates the boundaries of the Moreton Bay area) - from Discussion Paper No. 6, Queensland Fisheries Management Authority.

BACKGROUND ON MORETON BAY

Moreton Bay is considered unique in that it features some of the most productive fishing areas in Queensland. It has many special features, including habitat for a large range of vulnerable and commercially important marine species and large tracts of salt marsh, mangrove and seagrass communities (QFMA 1997). Thus it is important that the users of Moreton Bay put in place management plans now to protect these resources for the future. Developing an EMS is one way of ensuring the future of these resources.

Despite the level of productivity, the Bay‘s resources are under increasing pressure owing to its close proximity to the urban hot spots of Brisbane and south-east Queensland in general. These factors raise a number of issues for the health of Moreton Bay ecosystems, These include loss of fisheries habitat, urban and rural runoff, dredging and spoil deposition, freshwater flow reduction, mosquito and midge control, sewage effluent (more than 11 sewage treatment plants discharge into the Bay) and increased competition for resource access between users (QFMA 1997).

Moreton Bay is one of Queensland‘s most important coastal resources. In addition to its natural attributes, the Bay contributes significantly to the economy of the region and the State through a wide range of commercial and recreational uses. These include shipping, extractive industries, professional and recreational fishing, and boating. A host of directly and indirectly related economic activities in the manufacturing, retailing, transport, tourism and service industry sectors depend on the various uses of the Bay.

The Bay also provides a playground for about 1.7 million people (ABS 2005). Certain cultural and spiritual practices of Aboriginal communities residing in the region revolve around Moreton Bay.

In regard to professional and recreational fishing activities, Moreton Bay, with its extensive foreshores and tributaries, is vital to the productivity of fisheries resources inside and outside the Bay (that is the offshore commercial and recreational fisheries). More than 80% of crustacean and fin fish species spend some part of their life cycle in estuarine areas such as those found in Moreton Bay (QFMA 1997).

The population surrounding Moreton Bay accounts for over 50% of Queensland‘s total population. Brisbane and Moreton Statistical Divisions had the highest population growth in Australia during 2003-04, according to regional population figures released in March 2005 by the Australian Bureau of Statistics (ABS). Population pressures account for increased demands for recreational fishing, fresh seafood, and habitat destruction to allow for urban development, port development, increased levels of pollution and expansion of the Brisbane airport. The high probability of growing population pressures, coupled with the fact that Moreton Bay constitutes only 3% of the total Queensland coastline, explains why such concern exists for the sustainability of the resources within Moreton Bay.

Moreton Bay fisheries resources are utilized by many stakeholder groups. The three main groups are professional (including wild harvest and aquaculture), recreational and Aboriginal fishers. Other groups with significant interest in fish resources include seafood marketers, processors and retailers, charter operators, environmental interest groups, government agencies and divers. In fact, almost every resident of the Moreton Bay region has some sort of interest in Moreton Bay fisheries resources, even if it is only to enjoy consuming seafood that has been caught and sold commercially. We felt that in order to develop this EMS plan, we had to have a holistic view of Moreton Bay, including an understanding of the various user groups, flora and fauna that make up these ecosystems. Below is a summary of information the University of Queensland has compiled on Moreton Bay.

Professional sector

Fishing is a vital feature of Moreton Bay‘s economy and way of life. Moreton Bay‘s professional fisheries are a significant contributor to the Queensland economy, generating approximately $33.2 million gross value of production (GVP) annually, which is 10.6% of Queensland‘s total GVP for professional fishing (Fenton 2001a). In Moreton Bay approximately 1070 people are directly employed in the professional fishing sector. In addition, a significant workforce is employed indirectly in fishery-related industries (processing and marketing) and industries servicing the fishing fleet (manufacturing, slipways, chandlers and fuel suppliers). In total it is estimated that professional fisheries generate approximately 3082 jobs within the Moreton Bay catchment (multipliers established by Bishop (1998)). In value, Queensland‘s professional fisheries rank third among Australia‘s fisheries, and eighth among all Queensland‘s primary producers (DPI website). Moreton Bay produces more seafood than any other region or town along the Queensland coast – accounting for approximately 12% of the State‘s total catch (Williams 2002) (see Figure 1).

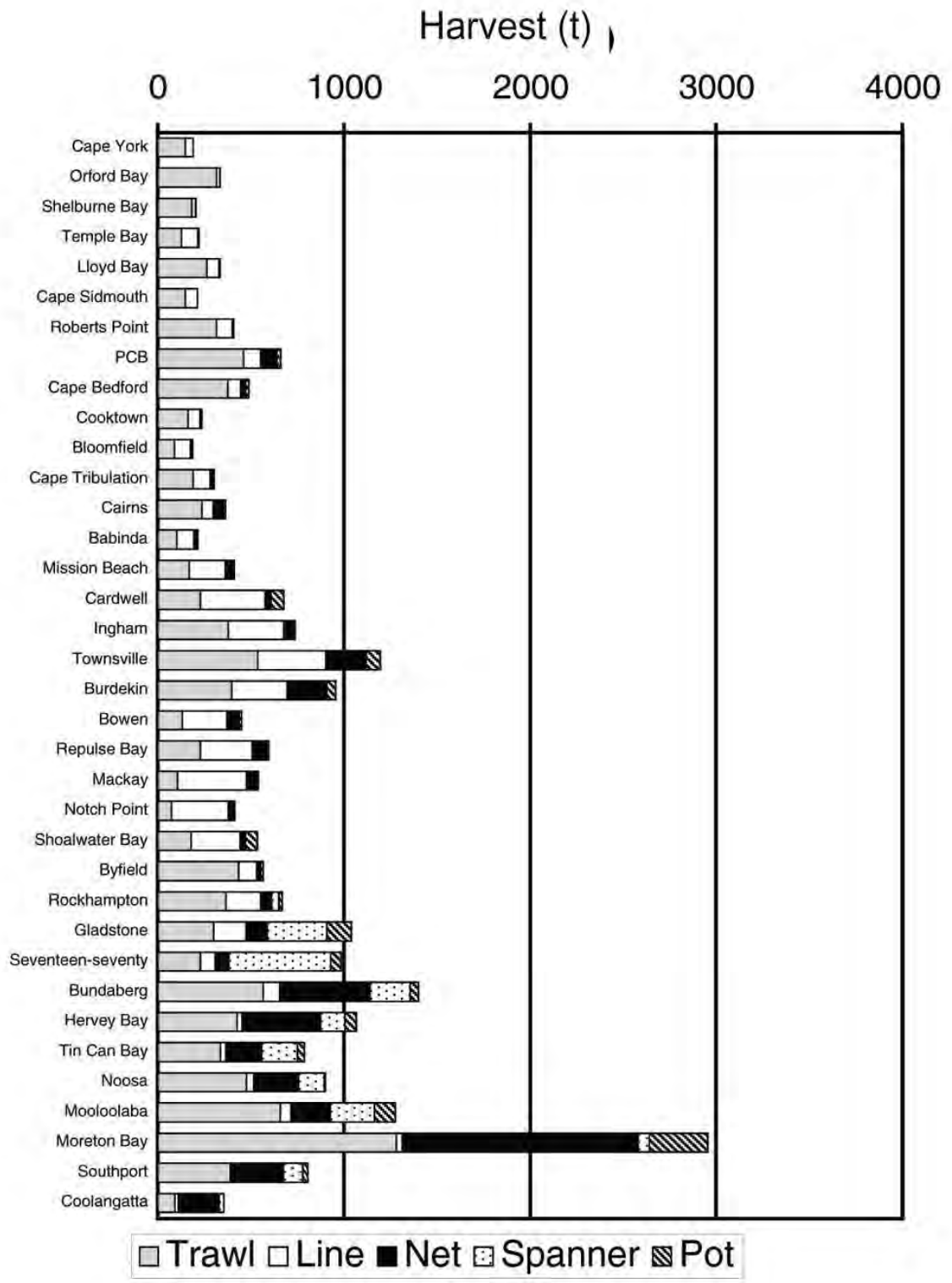


Figure 1 – Total harvest per fishery and Queensland region/town (from Williams 2002)

Queensland has almost 20% of Australia‘s commercial fishing fleet, with approximately 16% of Queensland‘s licensed primary fishing boats (the primary fishing boat is the main boat in the fleet) operating in Moreton Bay (Chrisweb DPI&F). These figures do not include fisheries managed by the Commonwealth rather than the State (such as the tuna fishery) or those that do not rely on boats (such as the beach worm fishery and specimen shell collection fishery).

Professional fisheries in Moreton Bay consist of the inshore and ocean beach net, otter and beam trawl, crab, line and specimen shell collection fisheries. Trawling (51%) is the primary fishing activity within Moreton Bay (or the Brisbane Town Resource Cluster), followed by netting (39%) and crabbing (33%) (Fenton 2001a). However, the net fishery currently has the highest GVP (33.2%) and catch per year (tonnes), closely followed by otter trawl (30.3% GVP). Overall approximately 2432 tonnes of seafood is retained for sale by professional fishers of Moreton Bay every year (Chrisweb, DPI&F).

About 360 primary fishing boats (which represent trawl, net and crab) are licensed to operate in the Moreton Bay region (DPI&F Freedom of Information 2005) with an estimated market value of more than $50 million in related capital equipment (QFMA 1997). Not all of these boats work exclusively within the Bay itself and only a proportion of these boats are currently operational. This includes approximately 75 otter trawlers, 130 net fishing boats, 57 beam trawlers and 100 crab endorsements, with many of these boats operating to some degree within the line fishery (please note these are estimates from information supplied by DPI&F through the *Queensland Freedom of Information Act 1992* and may not be entirely accurate). Anecdotal evidence suggests that many of these vessels do not operate regularly (within Moreton Bay). The number of boats operating at any one time during the year can vary considerably, depending on the season and the type of fishery.

Of the 230 or so non-trawl boats, many hold multiple endorsements that allow operation in more than one fishery. The multi-species operation of about two-thirds of this fleet enables a diverse range of seafood to be harvested throughout the year (QFMA 1997).

Moreton Bay otter trawlers represent about 18% of the State‘s otter trawl fleet. The Bay also has about 10% of the primary boat endorsements for net fishing, 14% of the beam trawl fleet and about 10% of the crab primary boats (QFMA 1997).

Research quantifying the amount of seafood exported and markets targeted for Moreton Bay seafood is limited. A scientific paper by Fenton 2001a states that most species caught in Moreton Bay are sold as seafood locally (within Brisbane) (42.8%) or interstate (5.5%), with 37.4% being exported. A small proportion of the total catch is sold locally as bait. The major catches or species covered in this EMS (prawn, mullet, crab and other fin fish) are generally not exported from Moreton Bay. Rather, they are sold locally or interstate. Further research is required to quantify which fisheries contribute to Fenton‘s export estimates and which key international markets Moreton Bay seafood is sold to.

Increased pressure on fisheries resources from a variety of user groups and the surge of [often] cheap imported seafood in the local market is making it increasingly difficult for professional fishing operations to remain viable. To add to this, negative community perceptions about professional fishing has resulted in widespread closures to commercial fishing in productive fishing areas.

To date, approximately 70% of Queensland's fishing grounds have been closed to commercial fishing, most of which has occurred over the past 5 years (pers. Comm. 2005). If this was the agriculture industry, this would equate to nearly 105.2 million hectares of farmland or $AUD3.9 billion (before processing, wholesaling or retailing) (Queensland Farmers Federation 2005).

Lack of security of resource access, combined with economic pressures has lead to a significant decline in the numbers of professional operators in the Bay over the past two decades. With the expected continuing rate of growth of other uses in the Bay, the participation rate of professional fishing is most likely to continue to decline, even without further restriction on the commercial sector under the *Fisheries Act 1994* (QFMA 1997).

In mid-2006 the Queensland Department of Primary Industries and Fisheries (DPI&F), introduced changes to licensing and fee arrangements for professional fishing that have provided fishers with fishing rights for the first time.

How are the professional fisheries of Moreton Bay managed?

Moreton Bay's fisheries are currently managed through statutory measures that are administered by the Queensland Department of Primary Industries and Fisheries (DPI&F). These regulatory management mechanisms include the implementation of both input and output controls.

The input controls are designed to:

- control effort through limited-entry arrangements (no new licenses can be issued, only transferred);
- control effort through gear and boat size limitations;
- control effort through license transfer arrangements, where effort units are cut back each time a license is transferred;
- achieve social objectives through weekend and seasonal closures;
- protect nursery habitat areas through permanent closures; and
- protect juvenile fish and other species through size limits.

There are also output controls designed to:

- control catches through catch or bag limits (known as total allowable catch or TAC).

These management elements are reflected in particular divisions of the *Fisheries Regulation 1995.*

Listed bellow are some closures that apply to commercial and/or recreational fishers in Moreton Bay:

- There are closures to all forms of fishing (including recreational) in Swan Bay (southern end of North Stradbroke Island) and Coombabah Lake;
- There are closures to all forms of professional fishing in Pumicestone Passage near Bribie Island;
- There are closures to the use of certain recreational apparatus. For example, spear fishing, including the use of spear guns is precluded from southern Moreton Bay including the Broadwater and Pumicestone Passage.

The Queensland DPI&F are required to meet the Australian Department of Environment and Heritage's (DEH) *Guidelines for the Ecologically Sustainable Management of Fisheries*. Under the *Environmental Protection and Biodiversity Conservation Act 1999* all State fisheries agencies are required to submit Ecological Assessments of each export fishery that they manage. An Ecological Assessment has been undertaken for Moreton Bay Beche-de-mer and this has been approved by DEH for export.

Under the *Queensland Marine Parks Act 1982* and the *Marine Parks (Moreton Bay) Zoning Plan 1997* the Environmental Protection Agency (EPA) manages access to the Moreton Bay Marine Park. While this legislation was not developed to manage fisheries, it controls commercial fishing access to Moreton Bay.

Legal Register

The following legislation is relevant to the seafood industry in general in Moreton Bay.

LEGISLATION	**RELEVANCE**
Queensland Fisheries Act 1994	Defines fisheries management framework, penalties and some specific rules.
Queensland Fisheries Regulation 1995 (amendments – 2003, 2004)	Provides specific information on how penalties are to be administered and what specific activities are allowed by law.
Fisheries (Coral Reef Fin Fish) Management Plan 2003	Provides specific information on management of the coral reef fin fish fishery.
Fisheries (East Coast Trawl) Management Plan 1999	Provides specific information on management of the east coast trawl fishery.
Fisheries (Freshwater) Management Plan 1999	Provides specific information on management of the freshwater fishery.
Fisheries (Gulf of Carpentaria Inshore Fin Fish)	Provides specific information on the management of the Gulf of Carpentaria inshore fin fish fishery.

Management Plan 1999	
Fisheries (Spanner Crab) Management Plan 1999	Provides specific information on the management of the spanner crab fishery.
Queensland Integrated Planning Act 1997	Broadly manages the effects of development on the environment.
Queensland Marine Parks Act 1982	This Act describes what a marine park is and they are to be legally established. It also describes the authority under which a zoning plan may be established for an existing marine park and describes the broad system under which penalties may be issued.
Queensland Marine Parks Regulation 1990	Provides instruction on establishment of marine parks and zoning plans, as well as rules for use of marine parks, including applications for use and fees payable.
Queensland Marine Parks (Moreton Bay) Zoning Plan 1997	To provide for the ecologically sustainable use of the Moreton Bay Marine Park and to protect its natural, recreational, cultural heritage and amenity values.
Queensland Transport Operations (Marine Pollution) Act 1995	An Act to protect Queensland‘s marine and coastal environment by minimizing deliberate and negligent discharges of ship-sourced pollutants into coastal waters, and for related purposes.
Queensland Transport Operations (Marine Pollution) Regulation 1995	Provides rules regarding discharges from ships and what to do in the case of an illegal or emergency discharge, also how to wash ships appropriately. It prescribes penalties and how they are to be administered.
Queensland Transport Operations (Marine Safety) Act 1994	Regulates the maritime industry to ensure marine safety, sets out government policy on marine operational issues
Queensland Transport Operations (Marine Safety) Regulation 1995	Provides specific information on how penalties are to be administered and what specific activities are permitted by law for the maritime industry
Queensland Transport Operations (Marine Safety – commercial fishing ships miscellaneous equipment) Standard 1998	Provides specific rules and guidelines for marine safety for commercial fishing vessels
Queensland Food Act 1981	An Act to consolidate and amend the law relating to the handling and sale of food, to make provision for securing the safety and suitability of and fixing standards for food and other purposes.
Queensland Food Hygiene Regulation 1989	Provides specific information on licenses and registration as it relates to food hygiene and how penalties are to be administered and what specific activities are allowed by law.
Queensland Food Standards Regulation 1994	Provides specific instruction on food handling.

Australian Environmental Protection and Biodiversity Conservation Act 1999	An Act relating to the protection of the environment and the conservation of biodiversity, and for related purposes.

Recreational sector

A number of Australian studies have shown that recreational fishing accounts for a substantial proportion of the total annual catch of some fish and aquatic invertebrate species, and the sheer number of people involved in recreational fishing is forcing management agencies to divert an increasing proportion of their attention and resources from commercial to recreational fisheries issues (Henry and Lyle 2003). Recreational fishing effort across the country has generally increased substantially in amount and effectiveness in recent years with inevitable declines in catch rates, particularly near major population centres (Henry and Lyle 2003).

At the time this EMS was developed specific data on recreational fishing catch and effort in Moreton Bay was not available. Therefore Queensland data from Henry and Lyle 2003 is referenced here.

The recently published National Recreational and Indigenous Fishing Survey (the Survey) states that recreational fishing effort in Queensland is the second highest in Australia.

This equates to 4.6 million recreational fisher days or 25.4 million fisher hours annually (these figures taken from May 2000 – April 2001). Approximately 20.6% of the Queensland population aged over five years – around 765,000 people – went recreational fishing in Queensland during the past 12 months (RFISH newsletter 4, 2005) (Figure 10). Patterns in interstate fishing effort indicate that Queensland is a net importer of fishing effort. In other words people travel from other states to fish in Queensland. The Survey also states that most recreational fishing occurs in coastal or estuarine waters. Line fishing is the most common fishing method.

Accurate estimates of recreational catch in the Survey are recorded as number of individual marine animals caught, rather than by weight or volume. This makes it difficult to infer overall trends for comparison with the commercial sector. According to the Survey, Queensland fishers harvested (and retained) approximately 11.8 million fin fish from April 2000 to May 2001. This accounts for nearly 20 per cent of finfish caught recreationally across Australia. The majority of finfish caught recreationally in Queensland are whiting, followed by bream, mullet and tailor. In the same year, approximately 5.5 million prawns were caught, 16.7 million yabbies, 585,500 mud crabs and 140,242 blue swimmer crabs. In addition to this 35,900 sharks and rays were caught.

According to average weights for given species multiplied by numbers caught, catch weights were estimated in the National Recreational and Indigenous Fishing Survey.

The recreational finfish harvest by weight was greatest in Queensland compared to any other state in Australia, at over 8,100 tonnes (during 2000 – 2001).

Non-finfish catch in Queensland was 800 tonnes. Figure 2 displays the overall catch from 2000 – 2001 for recreational and 2003 commercial fishers for selected finfish species. Finfish species that were common to both recreational and commercial catches were selected to provide an accurate comparison of common catches. This figure shows that recreational (5539.534 tonnes) and commercial net fishing (3859.87 tonnes) catches were closer in weight than 2003 commercial line fishing catch with (1052.4 tonnes).

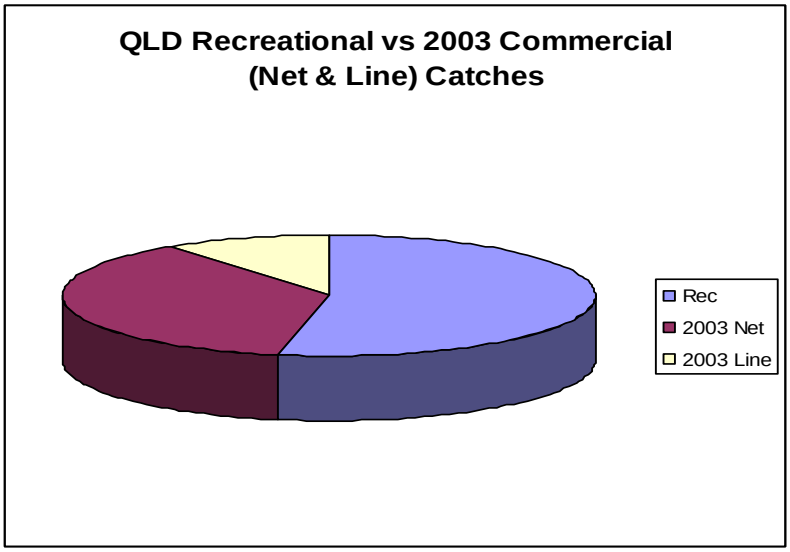


Figure 2 – Queensland recreational vs. 2003 commercial net and line catches for selected finfish species by weight (tonnes). Figures not indicative of total catch. Recreational figures taken from Henry and Lyle 2003. Commercial figures taken from Chrisweb logbook data.

2003 and 2005 logbook data have been used to indicate and help extrapolate into 2007 the changes in the commercial fishing industry and how they relate to the only available recreational data from the National Recreational and Indigenous Fishing Survey 2001. 2005 logbook data from Chrisweb in Figure 3 indicate a decline in commercial catches with 2005 commercial net catches at 2607.09 tonnes, 2005 commercial line catches at 262.5 tonnes and recreational catches from 2000- 2001 survey data at 5539.534 tonnes. Some data was not available for some species.

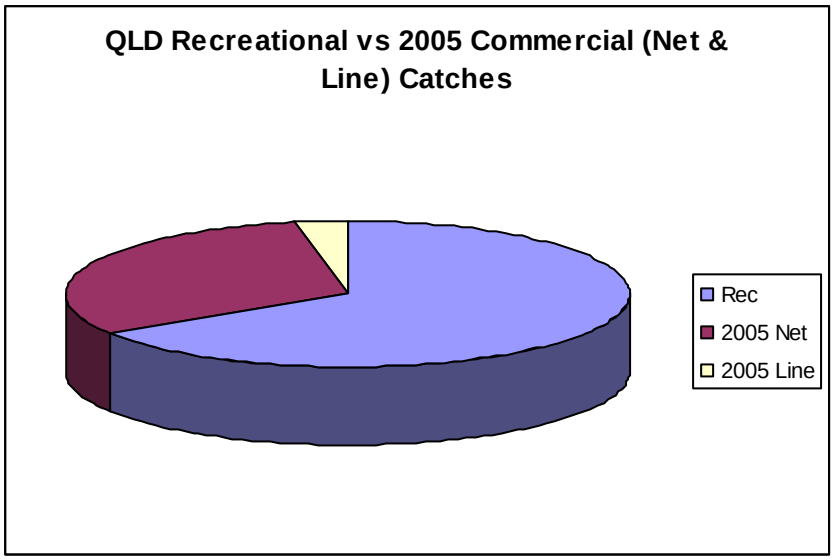


Figure 3 – Queensland recreational vs. 2005 commercial net and line catches for selected finfish species by weight (tonnes). Figures not indicative of total catch. All recreational figures are taken from Henry and Lyle 2003. All commercial figures are taken from Chrisweb logbook data.

The major finfish species caught by recreational and commercial fishers are mullet, bream, whiting, garfish and tailor. Figures 4 to 13 display the recreational and commercial catches for these species during 2000 – 2001 for recreational catches and 2003 and 2005 for commercial line and net catches. 2003 and 2005 commercial catch information has been used to illustrate the changing nature of these fisheries in Queensland over the last few years.

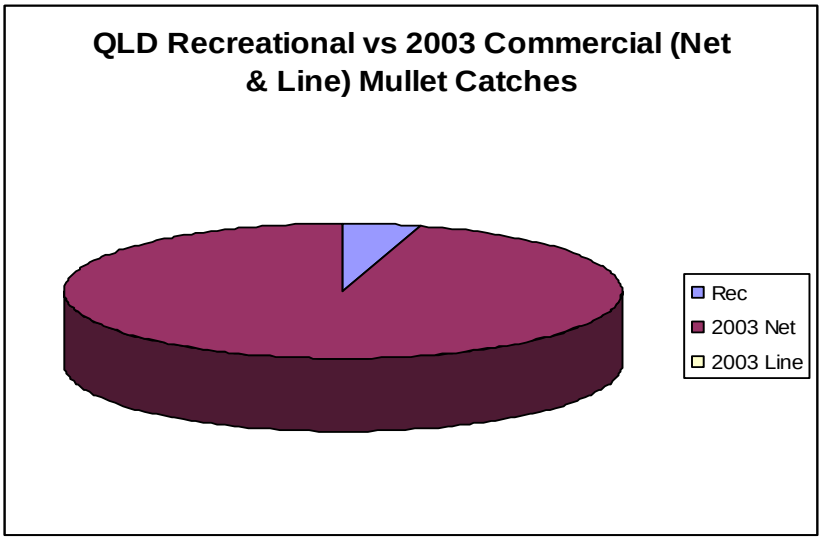


Figure 4 – Queensland recreational versus commercial mullet catch by weight (tonnes).

Figures 4 and 5 indicate that commercial fishers caught far more mullet in 2003 (2076.5 tonnes) and 2005 (1579.3 tonnes) than recreational fishers (94.456 tonnes) during 2000 –

2001. However Figures 6 and 7 indicates that recreational fishers caught far more bream (561.011 tonnes) than commercial fishers in 2003 (164 tonnes) and 2005 (211.7 tonnes).

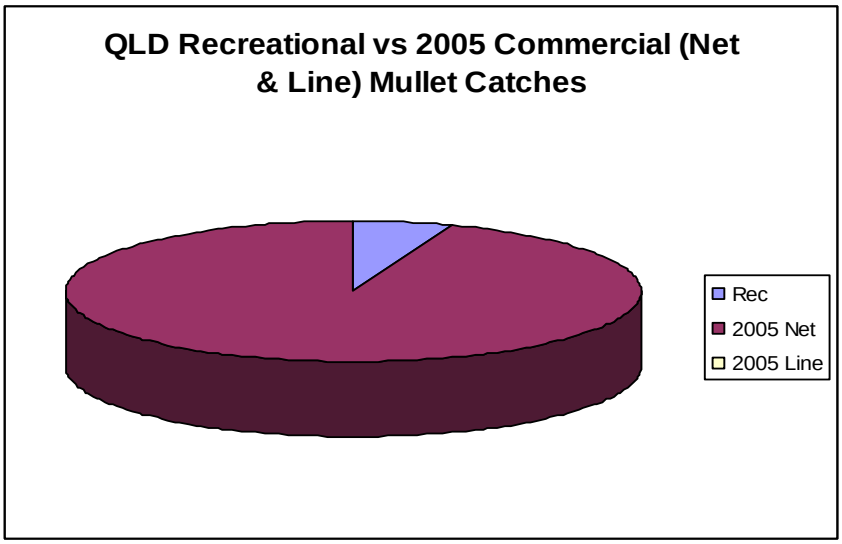


Figure 5 – Queensland recreational vs 2005 commercial mullet catch by weight (tonnes).

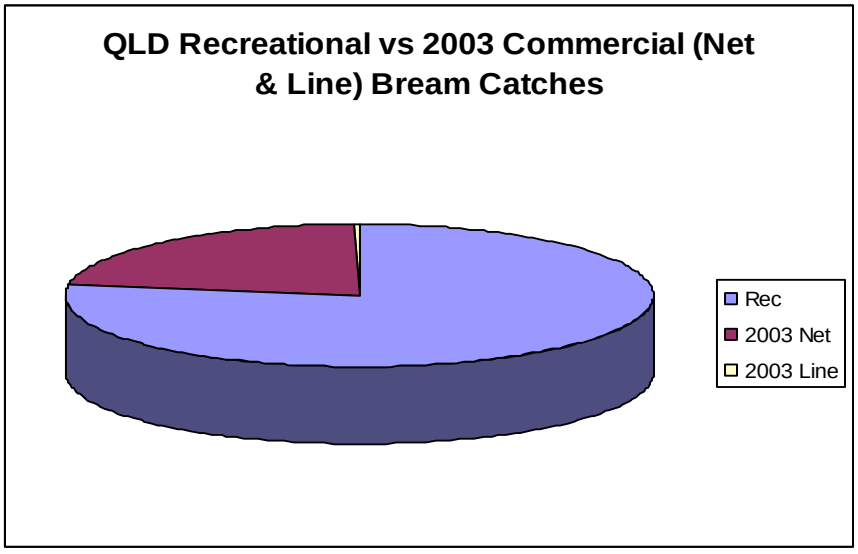


Figure 6 – Queensland recreational vs 2003 commercial bream catch by weight (tonnes).

Three times the amount of bream was caught by recreational fishers compared to commercial fishers, and one and a half times the amount of whiting was caught by recreational fishers compared to commercial fishers.

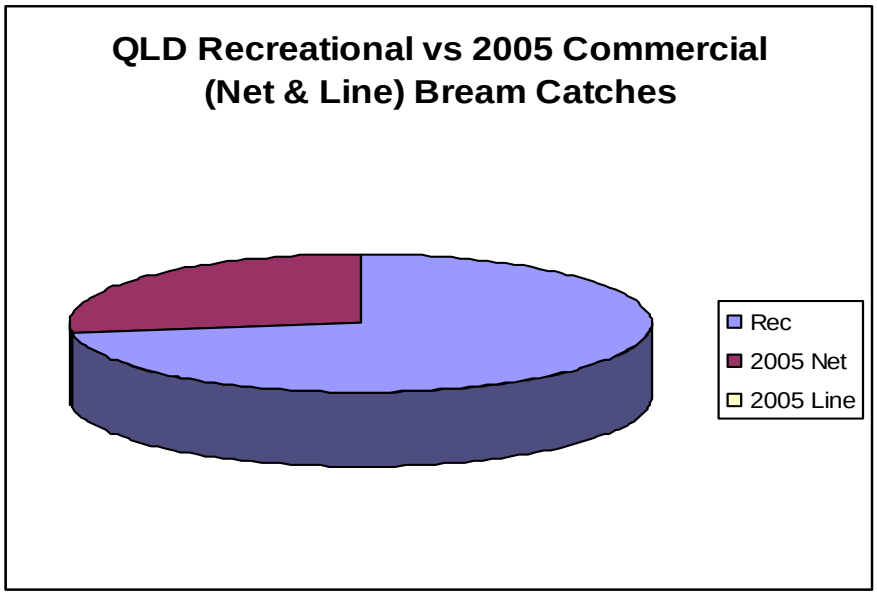


Figure 7 – Queensland recreational vs 2005 commercial bream catch by weight (tonnes).

Figures 8 and 9 also indicates that recreational fishers caught far more whiting (444.534 tonnes) than commercial fishers (315.1 tonnes) in 2003 and (343.4 tonnes) in 2005.

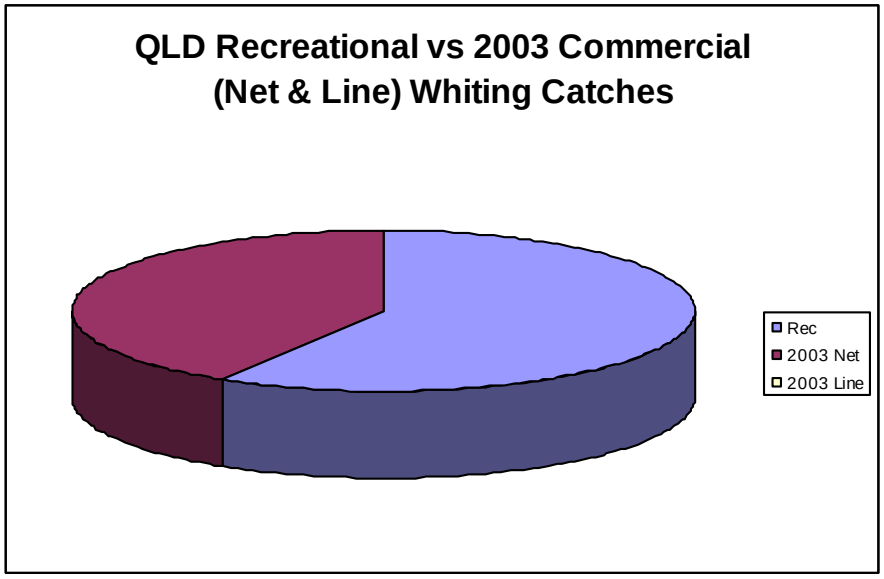


Figure 8 – Queensland recreational vs 2003 commercial whiting catch by weight (tonnes).

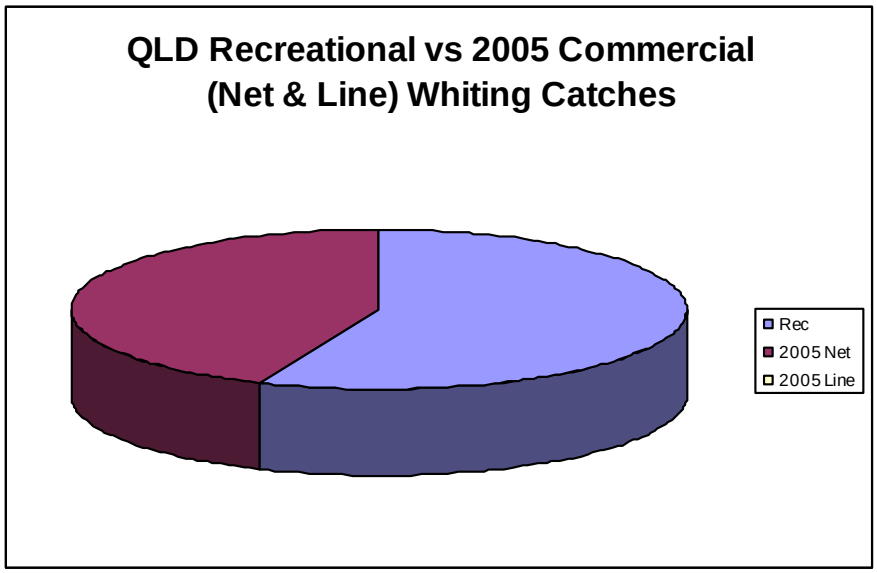


Figure 9 – Queensland recreational vs 2005 commercial whiting catch by weight (tonnes).

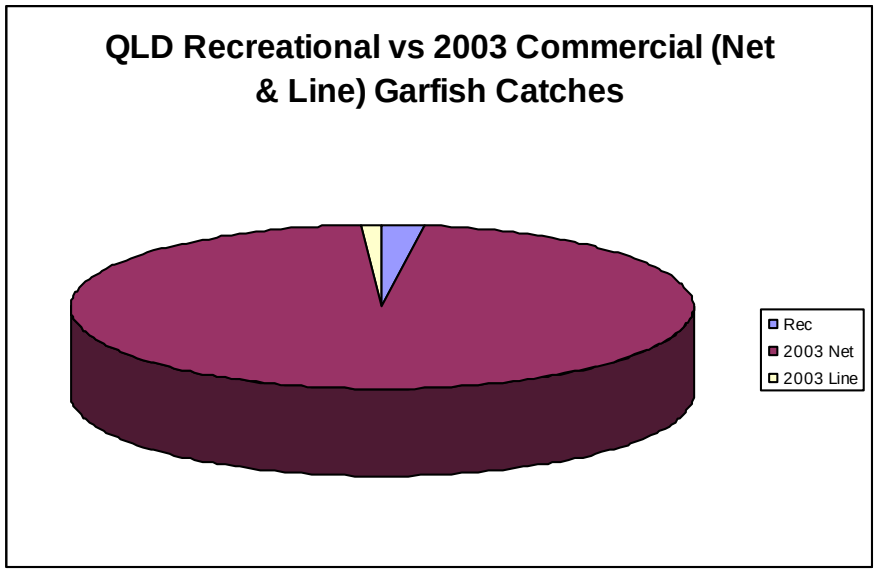


Figure 10 – Queensland recreational vs 2003 commercial garfish catch by weight (tonnes).

Figures 10 and 11 indicate that 2003 commercial net (218.7 tonnes), line (2.6 tonnes) and 2005 commercial net (163.9) and line (1 tonnes) garfish catches exceed recreational catches in 2000 – 2001 (5.242 tonnes).

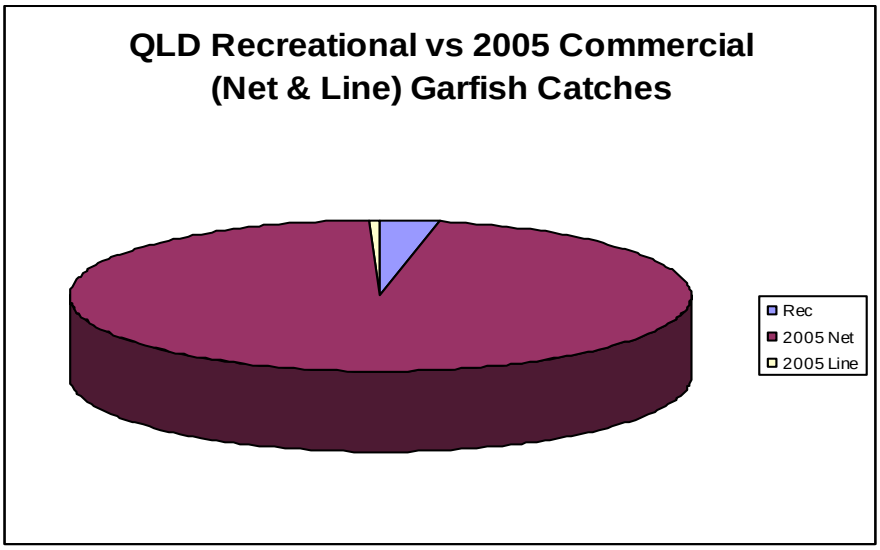


Figure 11 – Queensland recreational vs 2005 commercial garfish catch by weight (tonnes).

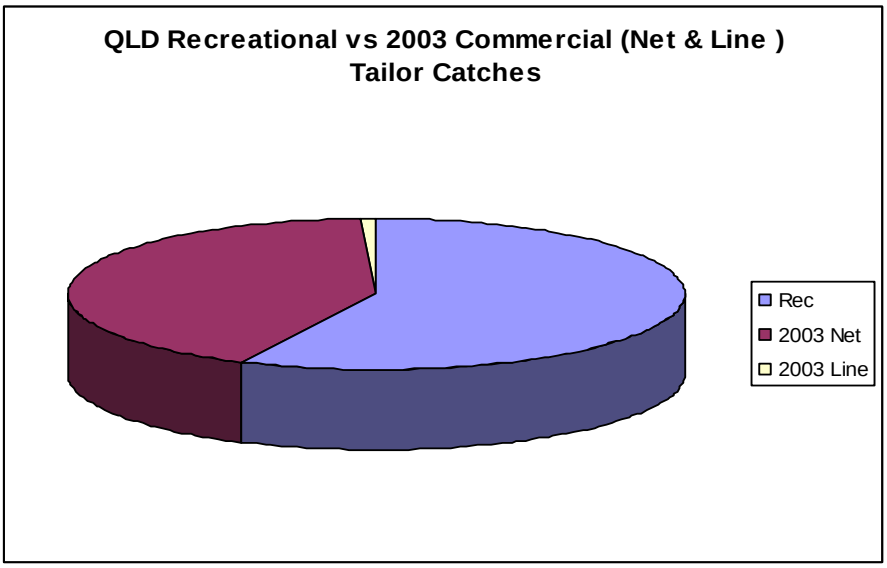


Figure 12 – Queensland recreational vs 2003 commercial tailor catches by weight (tonnes).

Figures 12 and 13 indicate that 2000 – 2001 recreational catch (162.767 tonnes) exceeds both 2003 and 2005 commercial net (119.9 and 127.3 tonnes) and line (2.4 and .8 tonnes) tailor catches.

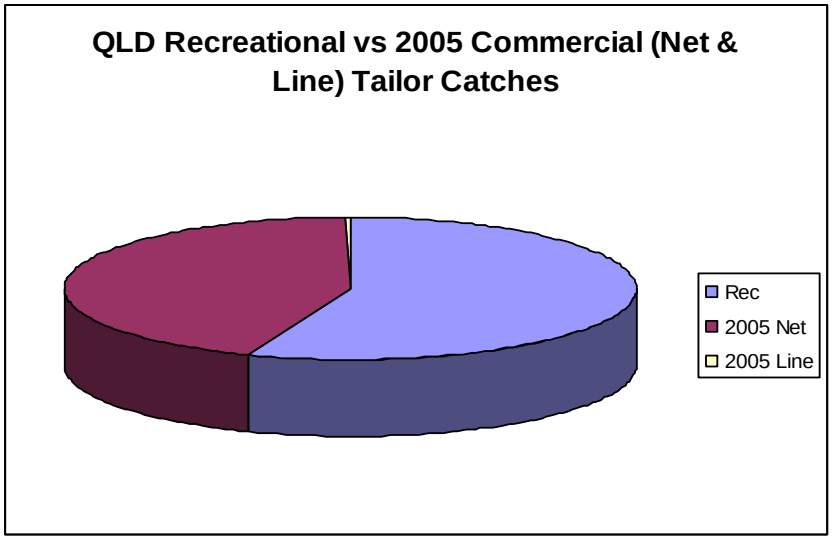


Figure 13 – Queensland recreational vs 2005 commercial tailor catches by weight (tonnes).

Finfish were by far the most popular category of seafood targeted by recreational fishers (8100 tonnes) and the most efficiently fished. The second most popular species targeted was mud crabs (585.502 tonnes), followed by prawns (54.618 tonnes) and blue swimmer crabs (46.7 tonnes).

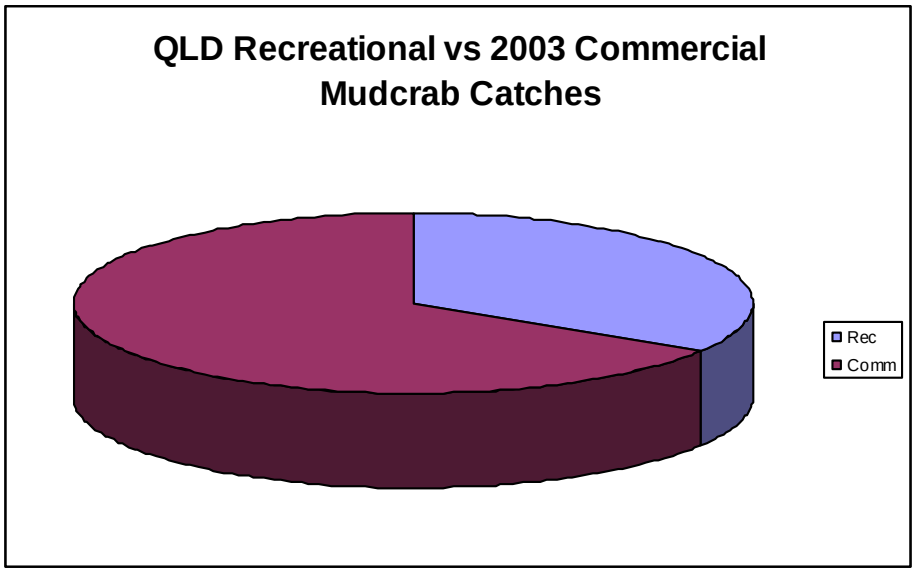


Figure 14 – Queensland recreational vs 2003 commercial mudcrab catch by weight (tonnes).

Figures 14 and 15 indicate 2000 – 2001 Queensland recreational mudcrab catch (585.502 tonnes) makes up approximately less than half of the 2003 and 2005 commercial mudcrab catch (1148.3 and 936.1 tonnes).

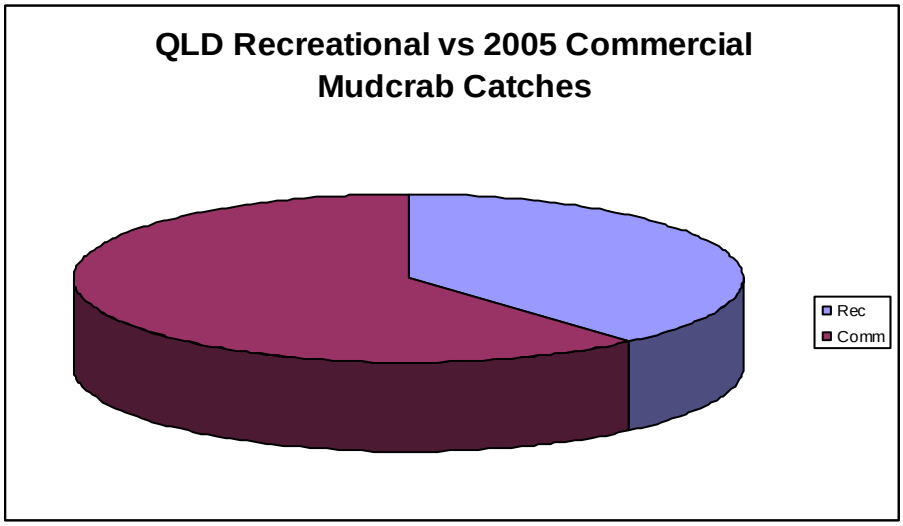


Figure 15 – Queensland recreational vs 2005 commercial mudcrab catch by weight (tonnes).

Expenditure on recreational fishing and associated recreational activities in Queensland is valued at $319.57 million each year (Henry and Lyle 2003). This expenditure is important to coastal communities (Williams 2002). The expenditure related specifically to Moreton Bay is difficult to calculate as the Survey did not publish how many recreational fishers reside in Moreton Bay. However based on the rates of decline in numbers of recreational fishers published by RFISH (see Figure 16), the expenditure on recreational fishing and associated recreational activities in Moreton bay can be estimated as $220 million. Logbook information indicates a clear decline in the numbers of professional operators in the Bay and recreational fishing similarly appears to have decreased despite population growth.

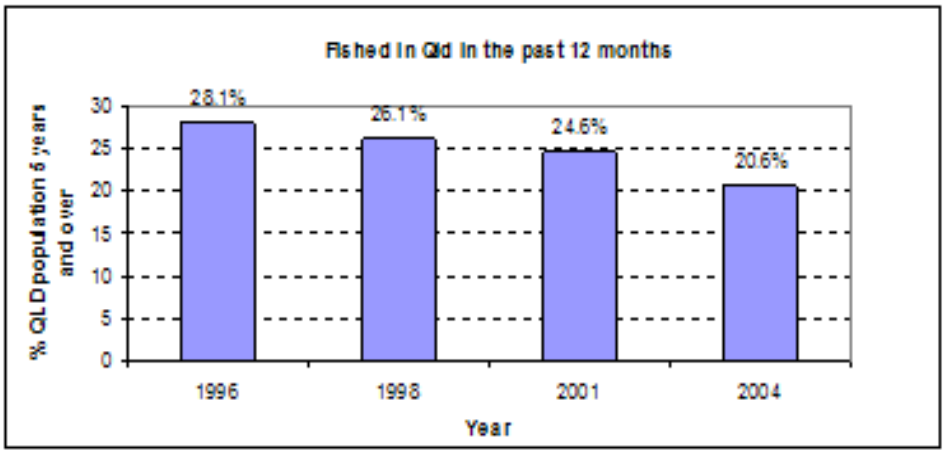


Figure 16 – taken from RFISH newsletter Issue 4, September 2005. The graph illustrates the percentage of Queensland residents who recreationally fish over a period of eight years.

The Queensland recreational community is estimated to harvest 8787 tonnes of finfish, crabs and prawns each year (Henry and Lyle 2003). These fish are valued at around $50.7 million based on equivalent values of gross value of production for commercially caught species during the period 2000 - 2001. Of this, the most recent available statistics (Chrisweb DPI&F 1997) indicate that 1,575,487 fish are caught, 673,722 harvested and 90,176 are released each year in the Moreton Bay region (the Moreton Statistical Division Balance).

Research into Queensland recreational fishing is conducted by the Recreational Fishing Information Coordination Committee for Queensland, under a program called RFISH. The following statistics are from the 1998 report. Approximately 135, 200 saltwater anglers (23% of the State‘s saltwater anglers) indicated they fish in locations adjacent to the Brisbane Statistical Division or Moreton Bay, 72% of these anglers fishing from boats as opposed to from the shore.

As with the commercial catches, varying degrees of inter-annual variability in recreational catches can be expected for many of Queensland‘s fish stocks as catches are often dependent on levels of recruitment or favourable environmental conditions. Although not comparable with the GVP for the commercial fisheries, the expenditure information collected as part of the RFISH program will provide information on the importance of recreational fishing expenditure on a number of key fishing-related items.

Regulations relating to recreational fishing in Queensland are limited compared to other states. Licenses are not required for amateur fishing in Queensland tidal waters. For many finfish species there are limits on the size of fish that can be legally taken. There are minimum size limits and also some maximum size limits. Take and possession limits also apply. This limits the number of fish that one person can legally take and keep. In Queensland there are a number of areas closed to taking some fish, all fish, or the use of

certain fishing apparatus. For more information refer to the *Fisheries Regulation 1995* or management plans. Fishers are allowed to take and possess no more than 10L of prawns recreationally. Also a recreational fisher must not possess prawns if more than 10 prawns have had their heads or any other part removed, unless the removal was to process the prawns for immediate consumption. Possession of female mud and blue swimmer crabs is prohibited and size limits apply to the male crabs taken. To add to this it is prohibited to possess egg bearing female Moreton Bay bugs (and other sea bugs) and spanner crabs.

There are a range of limits on recreational fishing gear for tidal waters. The taking of fish for sale other than by licensed fishers is prohibited in Queensland.

The following activities are illegal throughout Queensland:

- jagging or foul hooking fish;
- using explosives, poisons or electrical devices to take fish;
- interfering with authorized aquaculture activities;
- taking oysters from any oyster ground. However a person may consume oysters on the spot where taken in any public oyster reserve or on unlicensed oyster grounds;
- obstructing lawful netting operations, damaging or interfering with fishing apparatus, or removing fish from apparatus without lawful authority;
- possession or carriage of prohibited apparatus in closed waters unless the apparatus is dismantled, stowed and secured;
- collection of coral without lawful authority;
- interfering with marine life in a Fish Habitat Area (Note: line fishing is allowed in `certain areas of marine parks, and there is no specific prohibition on fishing in a Fish Habitat Area. Collecting yabbies with a hand pump only or worms captured by hand is also allowed in Fish Habitat Areas); and
- removing, damaging or interfering with markers or signs erected under the authority of fisheries legislation.

Indigenous sector

Indigenous fishers access coastal, estuarine and riverine fisheries resources throughout the State, especially in northern Queensland and Torres Strait. The importance of this fishing to remote communities has not been quantified but is believed to be substantial in some areas (Williams 2002). Four major coastal Aboriginal communities reside within the Moreton Bay region. These are Quandamooka, Gubi, Gubi Gubi and Ngarangwal (QFMA 1997).

Fisheries habitats

The commercial fishing activities covered in this EMS Plan is all marine harvest or wild-catch fisheries. This means that each of these fisheries involves catching fish in saltwater (in an estuarine, bay or ocean area), as opposed to freshwater or farming fish through

aquaculture processes. Marine harvest fisheries and the habitats that support targeted species are subject to a range of factors that may impact on the health of these ecosystems. These factors may be natural or human-related and may have varying degrees of impact on local ecosystems.

The fisheries habitats in Moreton Bay consist of:

- *marine plants* - mangroves, saltmarsh seagrasses and algae;
- *physical structures* - coral and rocky reefs, sandbanks, channels and tidal flats; and
- *hydrodynamic systems* - shallow sheltered estuaries and deeper oceanic waters of the continental shelf and slope.

Both vegetated and non-vegetated habitats are necessary for production of important fish, prawn and crab species, supporting major fisheries. Human modification of vegetated habitats may cause significant declines in fisheries productivity while the disturbance of non-vegetated habitats should also be viewed with some caution.

Moreton Bay‘s fisheries habitats are affected by natural environmental factors such as extreme weather conditions, changes to coastal currents, flood-mediated changes to river bed, banks and bars, natural decline, succession and recovery cycles of seagrasses. Over a long period of time factors such as the enhanced greenhouse effect and El Nino will also affect the water temperature and salinity.

Estuaries and inshore marine habitats are under pressure from human activity near urban and industrial centres and agriculture activities. Offshore marine habitats are generally less susceptible to the impacts of mainland activity (Williams 2002). Sewage disposal has caused significant localized decline in water quality in some catchments and inshore waters. Nuisance algae (e.g. Lyngbya) have bloomed over large areas of Moreton Bay in summer months over recent years and may be associated with low fish catches (Williams 2002). Reclamation of tidal land for port, industry and residential development has led to removal of saltmarshes, claypans, mangroves, seagrass and shallow non-vegetated areas. In the past there have been problems associated with spoil disposal from dredging which has cause localized sedimentation of foreshores and loss of marine plants.

In Queensland it is estimated that 75% of commercially-landed seafood is dependent on estuarine habitats. Similarly, a high proportion of species targeted by the recreational fishing sector and indigenous fishers is also dependent on estuarine and freshwater habitats during part or all of their life cycles.

Waste water generated by (2.4 million QLD) people is treated by sewage treatment plants in the coastal zone of Moreton bay. Local governments are spending money to improve sewage systems. Despite this, sewage discharges have led to nutrient enrichment and subsequent ecosystem changes (Zeller 199`8).

Management of fisheries habitats is critical in order to sustain existing and future fisheries productivity, and to enhance recreational, commercial and traditional fishing opportunities (Sheppard 1997). Fish habitats are currently managed through regulatory arrangements under the provisions of the *Fisheries Act* 1994, such as declaration and management of Fish Habitat Areas, protection of marine plants, restoration of fisheries habitat etc.

Fisheries Habitat Areas

Many Fisheries Habitat Areas have been declared within Moreton Bay to preserve the state of those areas. Fishing and crabbing may take place in these areas; however the destruction or disturbance of plant life, sedentary animals or the banks is prohibited. Fisheries Habitat Areas can be declared under a Management Plan. Existing Fisheries Habitat areas within Moreton Bay include: Coomera, Pimpama, Myora, Hay‘s Inlet, Kippa-ring, Deception Bay, Jumpinpin/Broadwater, Pumicestone Passage, Moreton Banks, Peel Island, Myora Extension, Coombabah and Bribie Island.

The Moreton Bay Marine Park

The Moreton Bay Marine Park is overseen by the Environmental Protection Agency‘s Coastal Management Branch, under the *Queensland Marine Parks Act 1982*. It is managed through the *Marine Parks (Moreton Bay) Zoning Plan 1997.* The purpose of this Plan is not to manage fisheries (which are managed under the *Fisheries Act 1994*), but to provide for the ecologically sustainable use of Moreton Bay Marine Park and to protect its natural, recreational, cultural heritage and amenity values. The Park is divided into general use, habitat, conservation, buffer and protection zones. All forms of commercial and recreational fishing are prohibited in all protection zones except for the Peel Island protection zone where commercial tunnel netting by one professional operator targeting black trevally is permitted as a non-conforming activity. Within the Flinders Reef Zone trolling for pelagic fish is allowed, and commercial aquarium fish collection by several professional operators is permitted as an existing non-conforming use.

Ramsar sites in Moreton Bay

Ramsar is the name given to the international Convention on Wetlands of International Importance. Australia was the first nation to become a Contracting Party to the Convention.

The Ramsar Convention‘s broad aims are to halt the worldwide loss of wetlands and to conserve, through wise use and management, those that remain.

Australia has 42 Ramsar sites. Ramsar sites are chosen on the basis of their ecological, botanical, zoological, limnological, or hydrological characteristics of international significance.

Moreton Bay was listed under the Ramsar Convention in 1993 as a Ramsar site, based on its extensive intertidal areas of seagrass, mangroves and saltmarsh, which offer valuable habitat to a large range of flora and fauna.

Other conservation-related rules

Whales, porpoises, dugong, turtles, dolphins and Grey nurse sharks are all protected under the Nature Conservation Act. In Queensland mangroves and all other marine plants are completely protected under the *Fisheries Act 1994*. The protection extends to seagrassess, saltcouch and those plants such as Melaleuca growing adjacent to tidal lands. Any disturbance (such as trimming, mowing or removal) of marine plants requires an approval from the QDPI&F.

MORETON BAY NET FISHERY

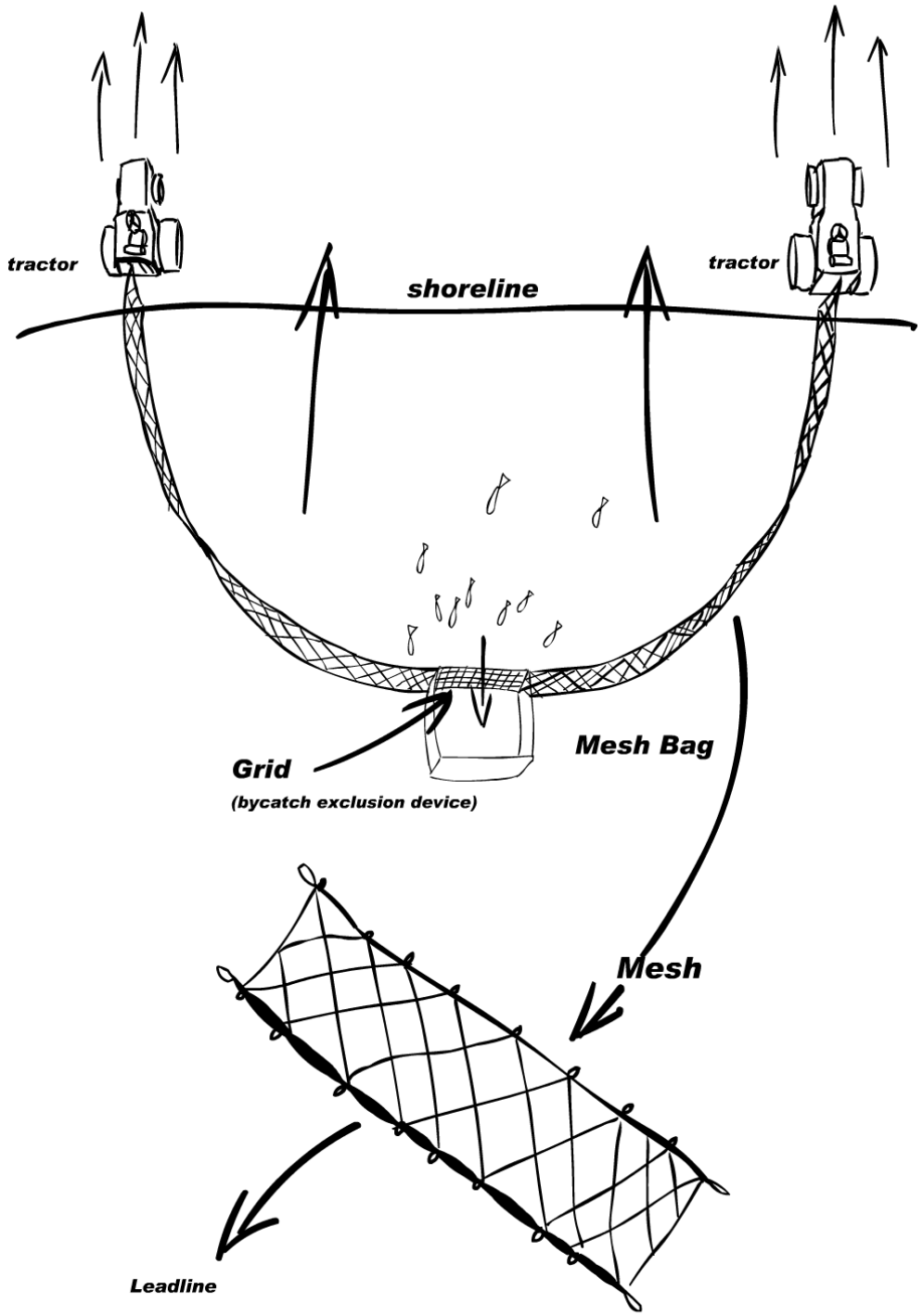
Description of the Fishery

Netting (39%) is the second most common professional fishing activity undertaken in Moreton Bay (second to trawling 51%) (Fenton 2001a). The net fishery currently has the highest GVP ($4.8 million) (33.2%) and catch per year (tonnes), closely followed by otter trawl (30.3% GVP). Overall approximately 1309 tonnes of seafood is retained by professional net fishers for sale within Moreton Bay every year (ChrisWeb, DPI&F, 2003 logbook data). About 122 commercial net endorsement holders reside in areas adjacent to Moreton Bay (ChrisWeb, DPI&F) and of these, less than 90 nominate netting as their principal fishing activity (QFMA 1997).

Net fishing involves catching fish in nets that are operated by hand, as opposed to using a vessel to tow the nets (as in trawling). Professional net fishers use a variety of types of nets to target different species of fish, in addition to different techniques for catching fish. The design of nets used varies depending on the species targeted and the type of area fished. Netting includes techniques such as tunnel netting, haul or seine netting, ring netting and gill netting, as well as many other techniques. Overall each technique is based on similar fishing principles. In Moreton Bay, all netting techniques are designed to target and catch specific species of fish of legal size. This is achieved through careful selection of net —baviness" and mesh size. The following is a description, including diagrams for examples of many net fishing techniques:

Haul nets

Haul or seine nets are used to haul fish on to a beach or shoreline. Very small mesh is used so that nothing gets meshed. After fish are spotted, the net is placed or —shot" around the fish in a semi-circle and hauled back to the shore, making sure that the lead line is not raised, which would allow fish to escape. As the net is pulled in (by fishers walking in the water), the fish are drawn to the middle or —bunt" of the net where, in shallow waters, non-target fish can be released unharmed. This way the fish are always submersed in the water, even during release. The species targeted of legal size are placed in ice slurry to be chilled before sale.

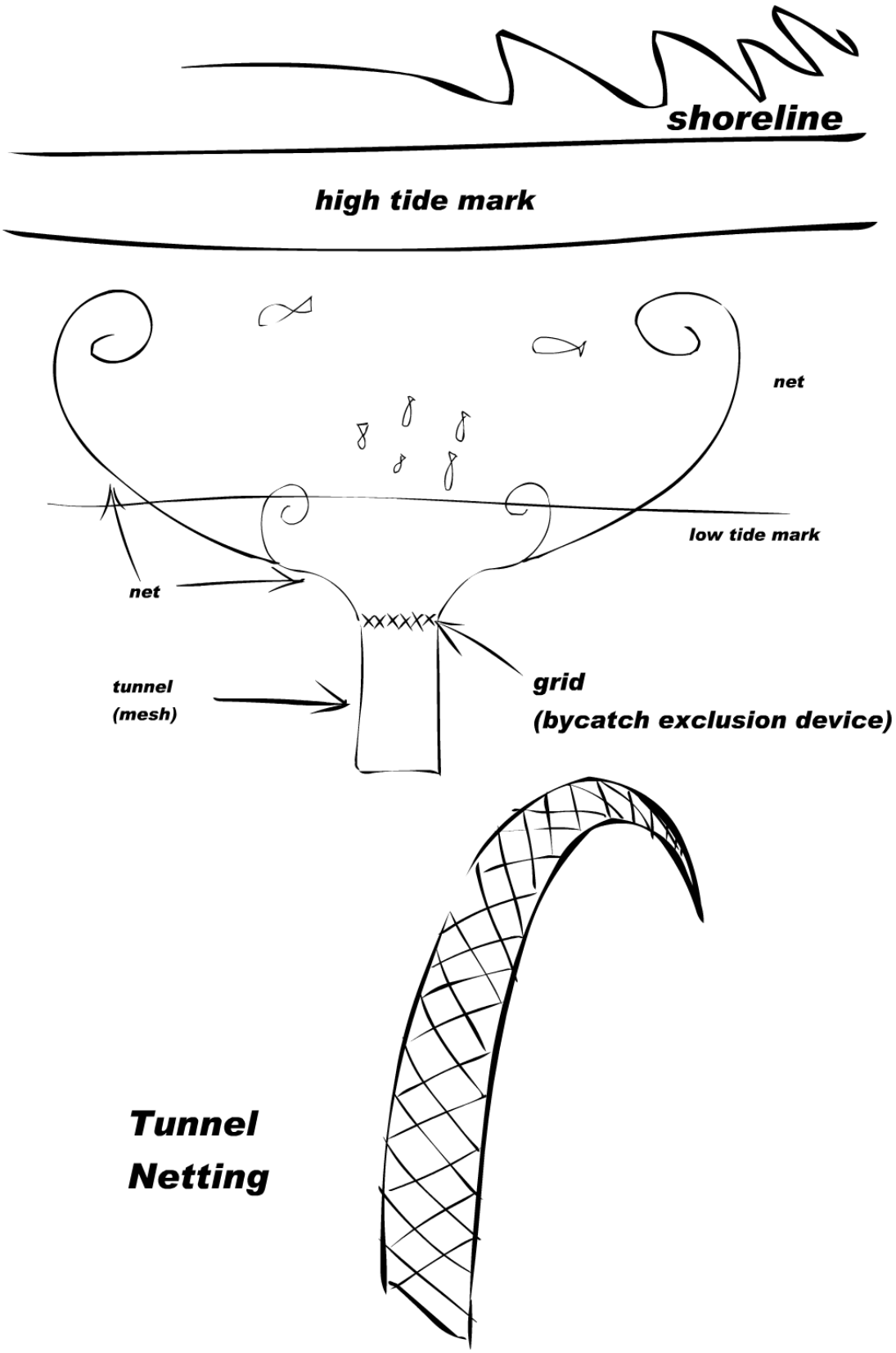


Haul Netting

Tunnel netting

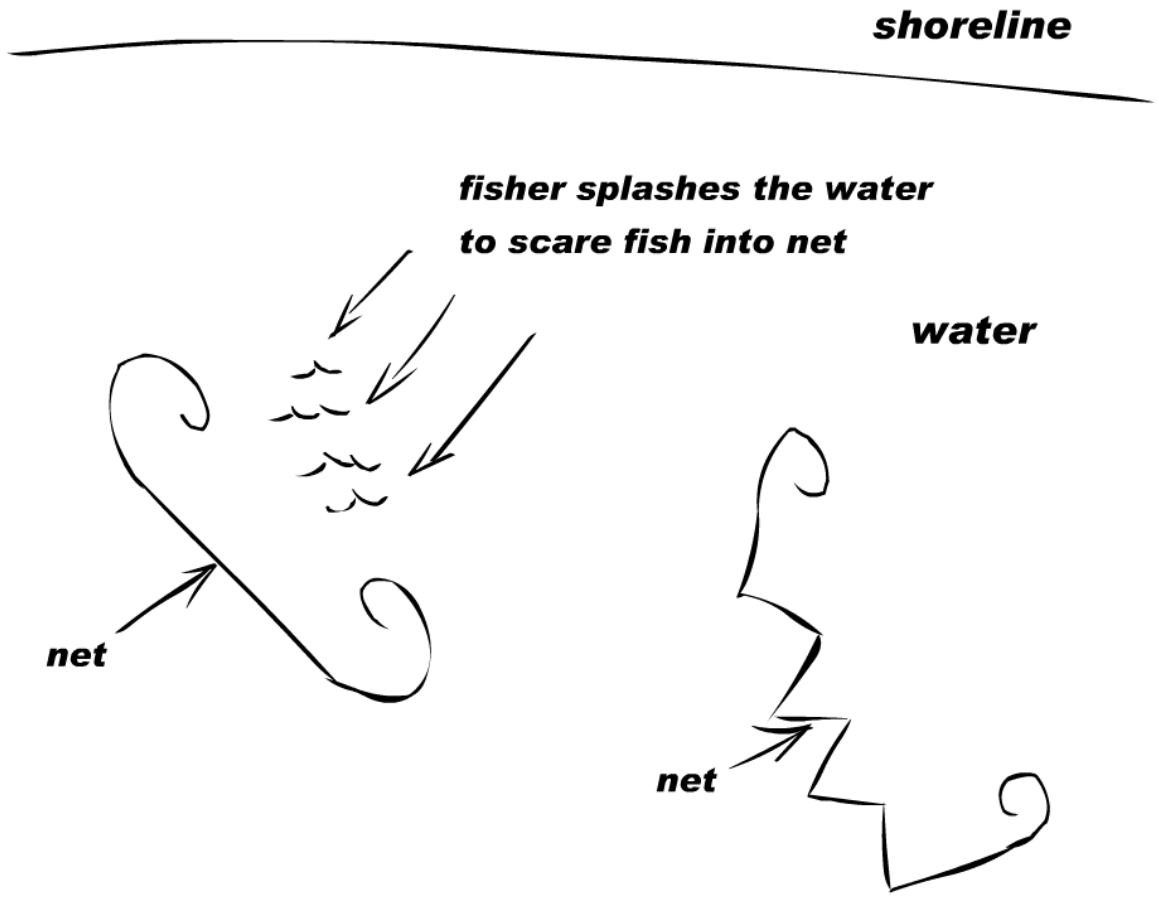
Picture of tunnel netting operation in Moreton Bay

Tunnel netting is undertaken close to the shore whereby operators set the net on stakes from the shallow waters to deeper waters. In this way, as the tide falls, fish swim towards the deeper water where there is a narrow tunnel of net where the fish get trapped. As the tide goes out, the fishers slowly haul the arms of the net (either side of the tunnel) into dinghies until the tunnel is reached. This is accomplished by walking alongside the dinghies in the water, as the tide goes out. All fish remain in water while being released or if target species, placed in an ice slurry on a dinghy.


shoreline
high tide mark
net
low tide mark
net
tunnel
(mesh)
grid
(bycatch exclusion device)
Tunnel
Netting

Mesh or gill nets – in general

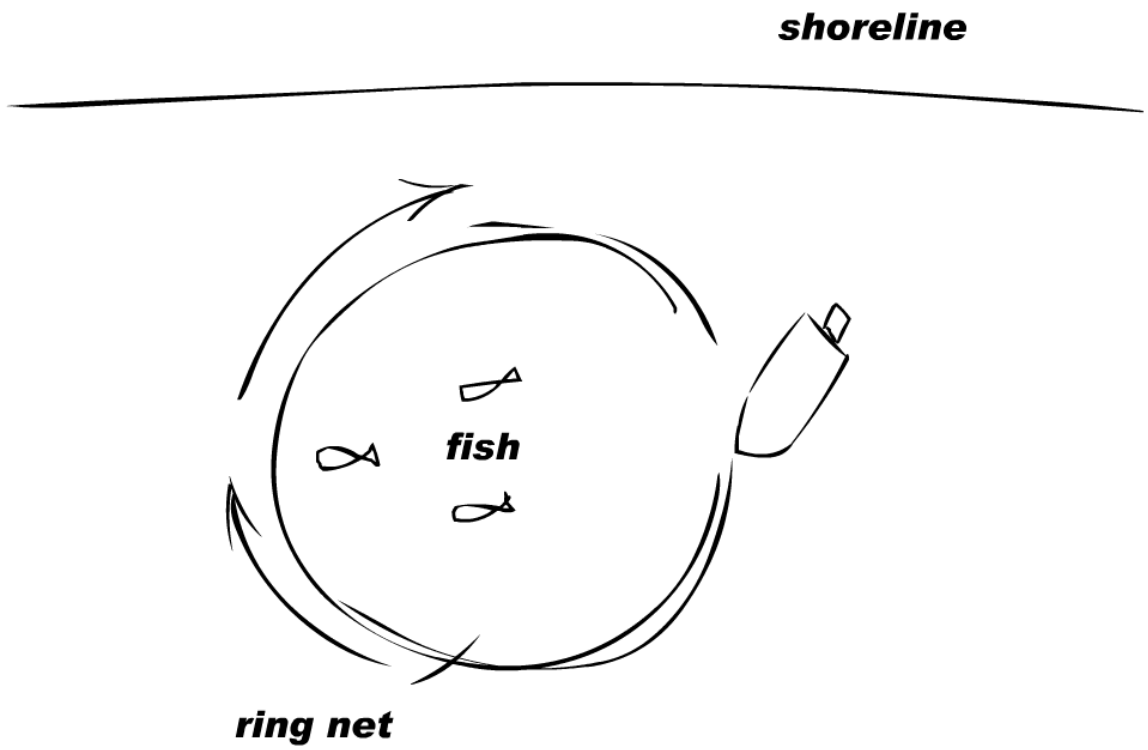
Mesh or gill nets may be set in a straight line, curved, zigzagged or in a circle across the water. When the net is set, the operator proceeds to ~~–b~~elt off" or splash the water on the inside of the net, thus frightening the fish into the net where they become trapped. Depending on the species being targeted, the heaviest possible nets are used for gill netting to ensure that non-target species _bounce-off' the net, rather than being meshed or tangled in the net. In addition, specific mesh sizes are selected to target species of legal size, thus preventing under-size fish from being meshed in the net.



Mesh or gill - netting

Ring netting

Ring netting is a type of gill netting that generally involves one or more operators weighting a net at one end then shooting the net from the stern of the boat in a complete circle. The ends of the net are then joined. In some cases the operator may splash in the middle of the net to scare the fish into the net. The net is then untied and hauled onto the boat to sort the product. This technique is used for bait fishing as well as garfish, mullet and tailor.



Ring Netting

Full descriptions of nets, in terms of legal length and mesh sizes and areas of use, are found in Schedule 13 of the *Fisheries Regulation 1995*.

The main species targeted by net fishers include:

- Mullet;
- Whiting;
- Bream;
- Flathead;

- Shark;
- Tailor;
- John dory;
- Garfish;
- Butter fish
- Black Trevally; and
- Bonito.

Trends in catch and effort

The following graphs indicate that over the past 17 years the number of net boats operating within Moreton Bay has decreased by approximately 24.1 per cent (Figure 20).

Over the past 17 years the number of primary vessels used for netting within Moreton Bay has decreased by approximately 24.1 per cent (Figure 22).

To add to this, in 1984 the number of primary boats with an N1 (general netting symbol) were frozen for the whole east coast of Queensland. However there is no cap on the number of primary fishing vessel with an N1 that can work in Moreton Bay at this time. The majority of net fishers who operate in Moreton Bay live adjacent to the Bay, however other fishers who live elsewhere along the Queensland east coast hold an N1 or N6 (bait net symbol) can come and net within the Bay should they wish to. Primary boat symbols for the ocean beach fishery are capped in the various zones in Moreton Bay. The relevant ocean beach symbols are K2, K3, K4 and K5.

The overall effort or average number of days fished per boat has stayed constant over this time, with no significant increases reported (Figure 21). The average amount of catch per boat per day has remained relatively constant between 200 – 250 kg/boat/day (Figure 21). In addition the total annual catch levels for the whole net fishery have remained relatively constant between 1000-2000 tonnes per year (Figure 17). The primary species caught are mullet, followed by bream, and whiting (Figure 18). The reported annual catch rates for these species have remained constant over the past 17 years (Figures 18 and 19). There have been slow increases in the amount caught of all three species despite the decrease in boats operating and the steady effort rates.

Overall the data contained in the graphs below indicates that there are fewer net fishers fishing than there were in the late 80's and the fishers remaining are not fishing harder or longer. Catch rates are still similar to those of the late 80's and this indicates that fish stocks are likely not decreasing due to commercial fishing and fishers tend to be fishing smarter, not harder.

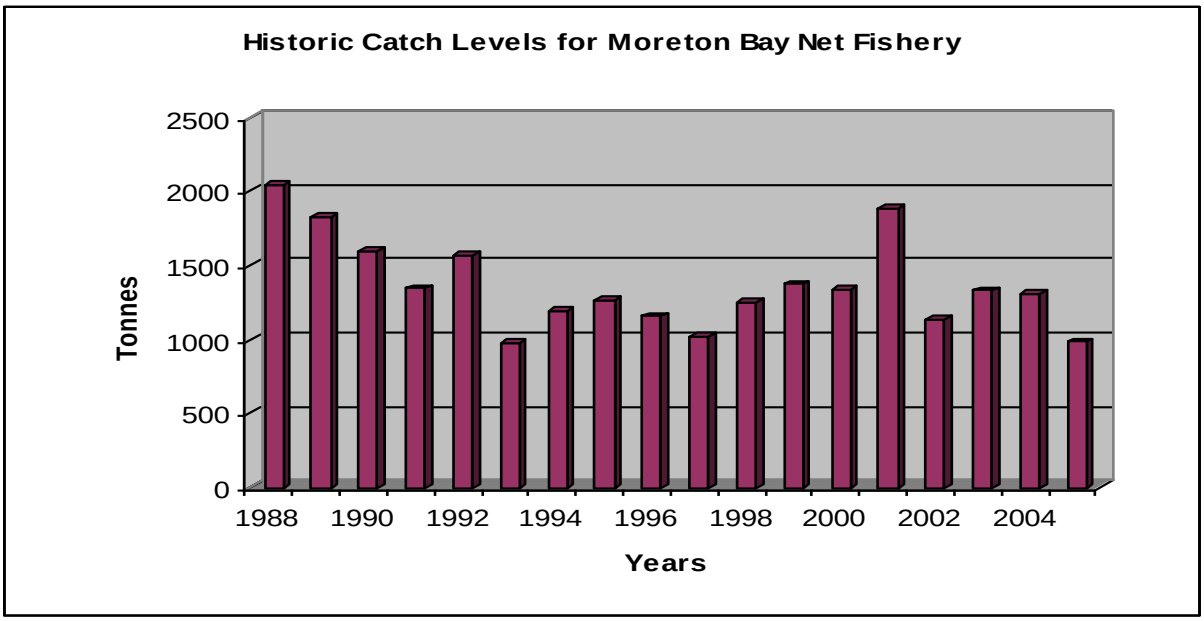


Figure 17 – Catch levels displayed over time for Moreton Bay inshore net fishery (compiled from DPI&F Chrisweb data).

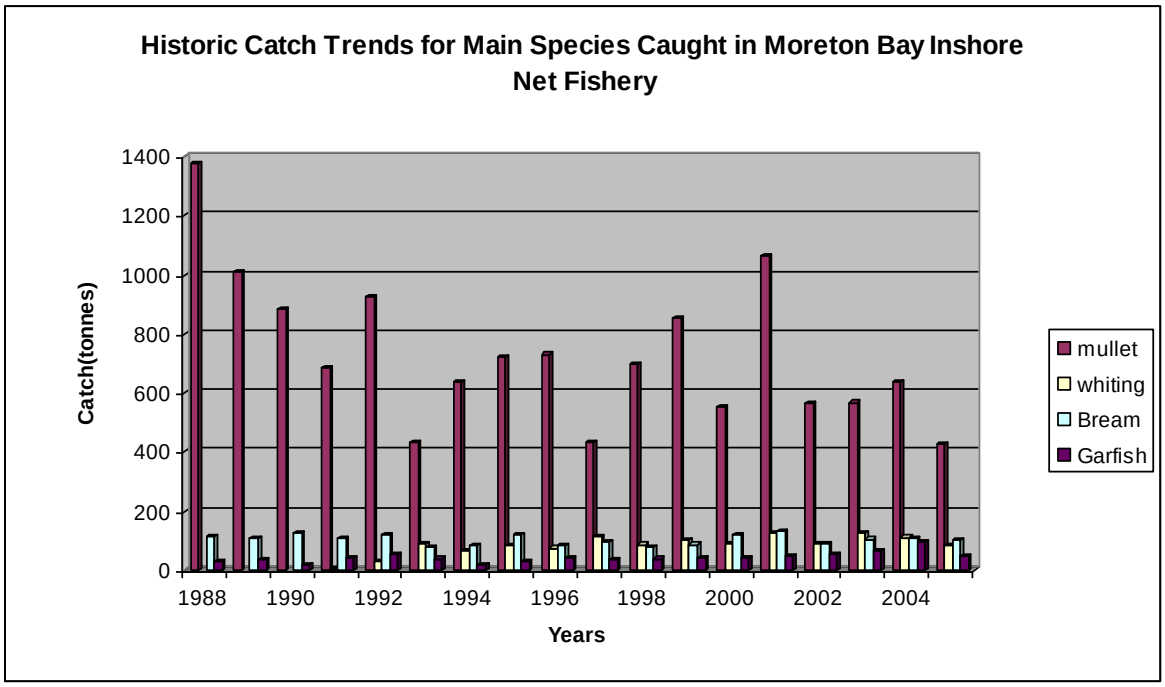


Figure 18 – catch levels displayed over time for top four species caught in Moreton Bay inshore net fishery (compiled from DPI&F Chrisweb data)

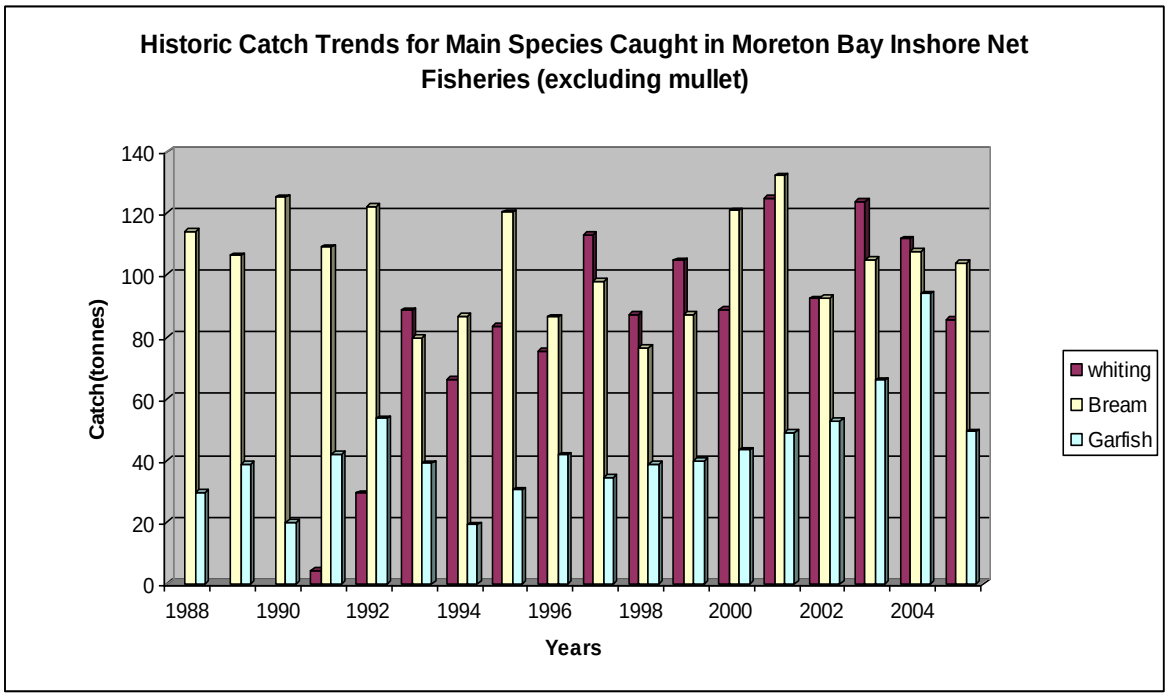


Figure 19 – catch levels displayed over time for main species caught in Moreton Bay inshore fishery (excluding mullet)

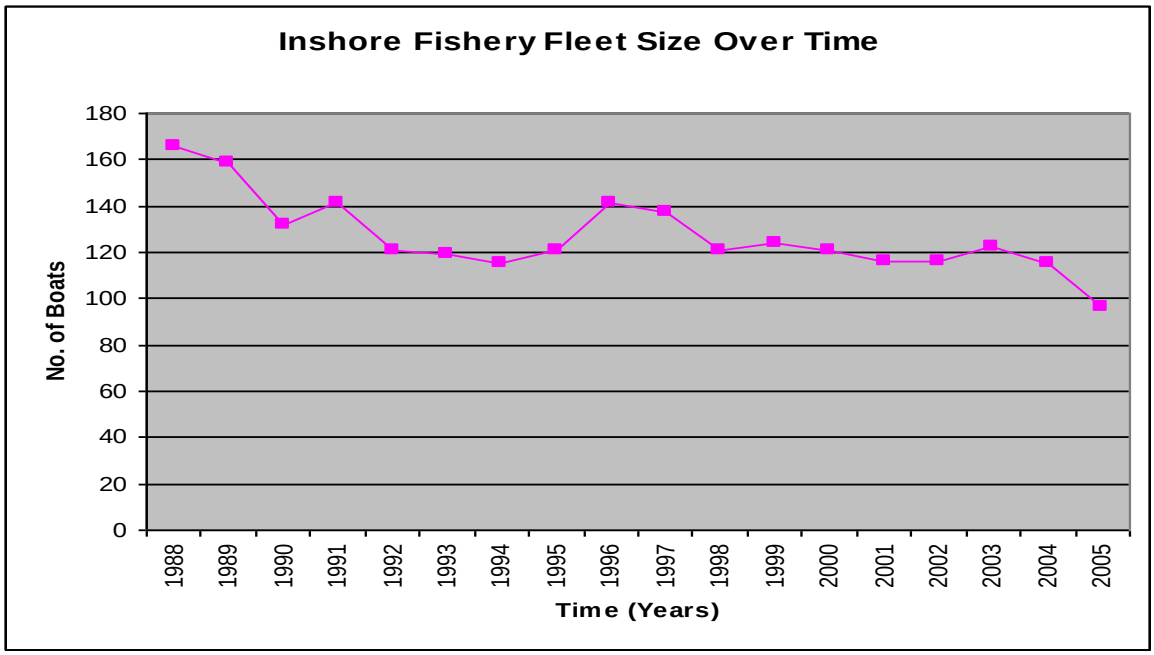


Figure 20 – Number of boats operating over time within the Moreton Bay inshore net fishery (compiled from DPI&F ChrisWeb data).

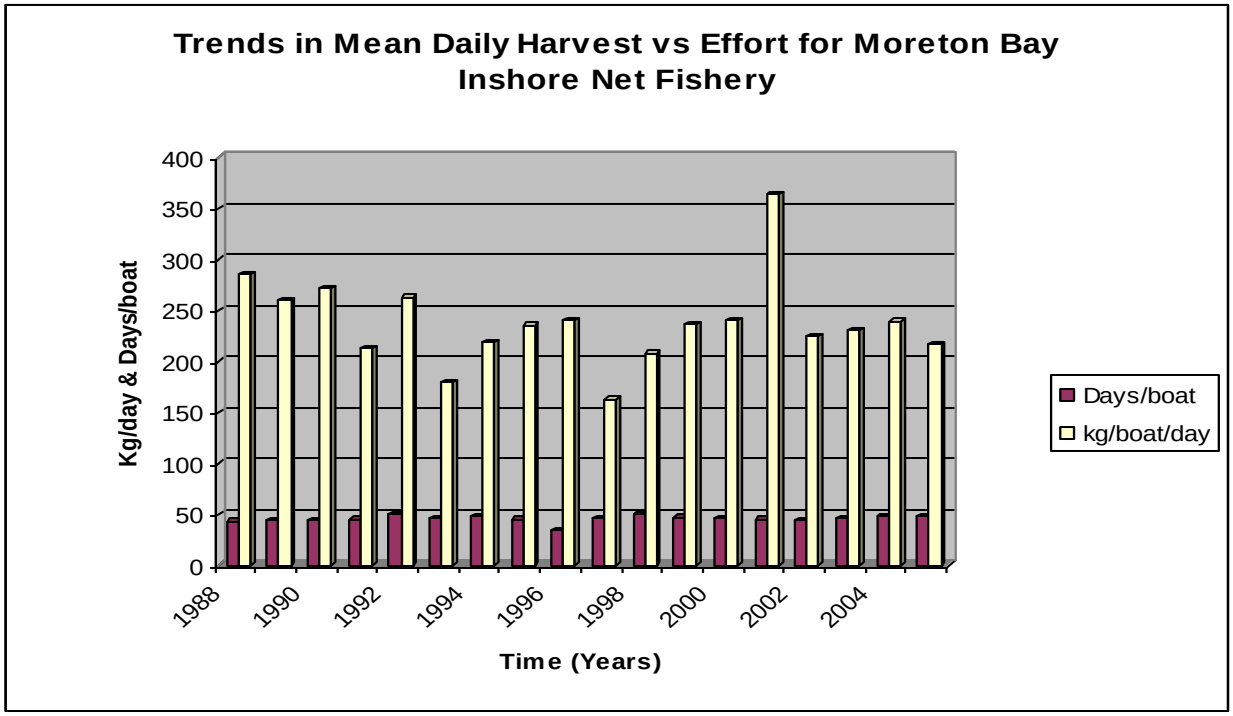


Figure 21 – mean daily harvest (Kg) for inshore net fishery vs effort or mean days fished over time (compiled from DPI&F ChrisWeb data).

Contribution to research

Professional fishers in Moreton Bay volunteer their time, knowledge and experience to assist with research projects on a regular basis.

Examples of research fishers are currently contributing to include:

- Research with Professor Col Limpus on toxicity levels in turtles living in the western side of Moreton Bay;
- Research with James Cook University monitoring the interaction between close proximity boats and turtles on the western side of the Bay;
- PhD at the University of Queensland on sharks in the Bay;
- University of Queensland honours project on sting rays of Moreton of bay, including reproduction, variety of species, habitat, migrations, spawning and feeding grounds;
- Research on Bamboo and wobbegong sharks in Moreton Bay with the University of Queensland;
- Research on Eagle rays in Moreton Bay with the University of Queensland;

- Contributing to a shark seminar at Dunwich research centre on Stradbroke Island early 2005;
- assisting ENTOX national research centre with studies on toxicity levels within different fish species Moreton Bay; and
- Getting fish, turtles etc out of the impoundment for the expansion for the port of Brisbane and releasing them into the wild after tagging etc.

The environment likely to be affected by the fishery

Professional net fishing mainly occurs in inshore bay or ocean beach areas, generally in shallow water. These areas comprise mainly of:

- sheltered muddy shores and estuaries subject to low wave energy (supporting mangrove, saltmarsh/claypan, seagrass and shallow water algal bed communities);
- high energy rocky and sandy shores; and
- shallow-water banks and bars.

The large sand islands of Fraser, Moreton, Bribie, North and South Stradbroke Islands provide protection for the inner foreshores of Moreton Bay as they dissipate the energy of ocean swells and act as a wave break (see Map 1). This allows fine sediments deposited by coastal streams to accumulate and settle.

Extensive mud flats occur in the lee of islands close to the southern Queensland coast (e.g. Fraser and Bribie Island). These intertidal flats provide a warm, nutrient-rich and well-lilt substrate suitable for the establishment and growth of algae and some seagrasses (e.g. Zostera). Over time mangroves, saltmarsh and other plants may also grow along these flats.

Seagrass beds provide important nursery habitat for species that are targeted by other professional fisheries (e.g. otter trawl). Seagrass leaves provide physical cover for young prawns as they grow, minimizing predation by fishes and providing an environment for the growth of smaller animals which form part of the prawn diet (Zeller 1998). For example, juvenile tiger endeavour and other prawns inhabit seagrass beds. Seagrass is also the main dietary requirement for large marine mammals such as dugongs.

Individual fish species have particular habitat requirements which may change throughout stages of growth and development in the animal‘s life cycle. Many fish and other animals spend all or part of their life within estuaries. An estuary is a semi-enclosed body of water which has a free connection with the open sea and within which seawater mixes with fresh water. Estuaries are usually located in the section of a river where the fresh river water and sea water mix – near the river mouth. Many juvenile species reside in estuaries where they grow rapidly before moving into the open sea as adults. Flathead, sea mullet, tailor, marine prawns and mud crabs all spend significant parts of their life in estuaries (Zeller 1998). Estuaries are commonly utilized as spawning habitats by estuarine fish such as bream.

Relatively flat sandy intertidal areas may form broad expanses over which many species of fish feed or shelter form more open waters (e.g. dusky flathead, sand whiting).

The inshore areas where professional net fishing takes place support fish that live in mid-water (pelagic) habitats and near-bottom (demersal) habitats. Each species have different dietary requirements and predators that in turn feed on them. All of the various species in the food chain make up the local ecosystem. Thus if a population of one species of plant or animal is decreased, this will affect all of the species in the ecosystem in the long term. Pelagic fish species such as tailor range over considerable distances between nursery, grow-out and spawning areas. These fish are high order predators of pelagic food chains and feed on small baitfish. Demersal fish species feed on animals or plant material on the sea bottom. These species may have restricted home ranges, remaining in a localized area throughout much of their lives (e.g. dart or whiting) or may move extensively during spawning (e.g. bream, mullet and luderick). Most fish targeted by professional net fishers require, either directly or indirectly, one or more plant types (Zeller 1998).

Whilst there has been much research into the characteristics and life-cycles of most commercially-caught species and their preferred habitat (e.g. list references here), there is little research quantifying potential impacts of inshore netting on seagrasses, other plant species and benthic animals. More research is also required to quantify impacts of inshore netting on target and non-target catch.

Current/proposed management arrangements for the fishery

The professional net fishery in Moreton Bay is managed by the Queensland Fisheries Service (QFS) which is part of the Queensland State Department of Primary Industries and Fisheries (DPI&F) through the use of the:

- *Queensland Fisheries Act 1994;*
- *Queensland Integrated Planning Act 1997;*
- *Queensland Fisheries Regulation 1995 (amendments – 2003, 2004);*
- *Marine Parks Act 1982;*
- *Marine Parks Regulation 1990;* and
- *Marine Parks (Moreton Bay) Zoning Plan 1997.*

No fisheries management plan for the inshore net fisheries of Queensland exists.

Under these statutory provisions, the following applies:

Weekend closures apply to all forms of netting in Moreton Bay from 6pm each Friday to 6 pm each Sunday.

- all nets must be appropriately marked;

- net length and mesh size restrictions apply to various nets in specific sites;
- the use of tunnel nets is confined to certain areas within Moreton Bay; and
- all commercial netting is prohibited within the areas of the Broadwater and the Nerang River, the Gold Coast Seaway, Coombah Creek, Oyster Lake and Saltwater Creek, Coomera River, Dunwich, Manly Boat Harbour, Wynnum and Manly, the Brisbane River, Kedron Brook to Pine River, the South and North Pine Rivers and in the vicinity of the Sandgate Pier.

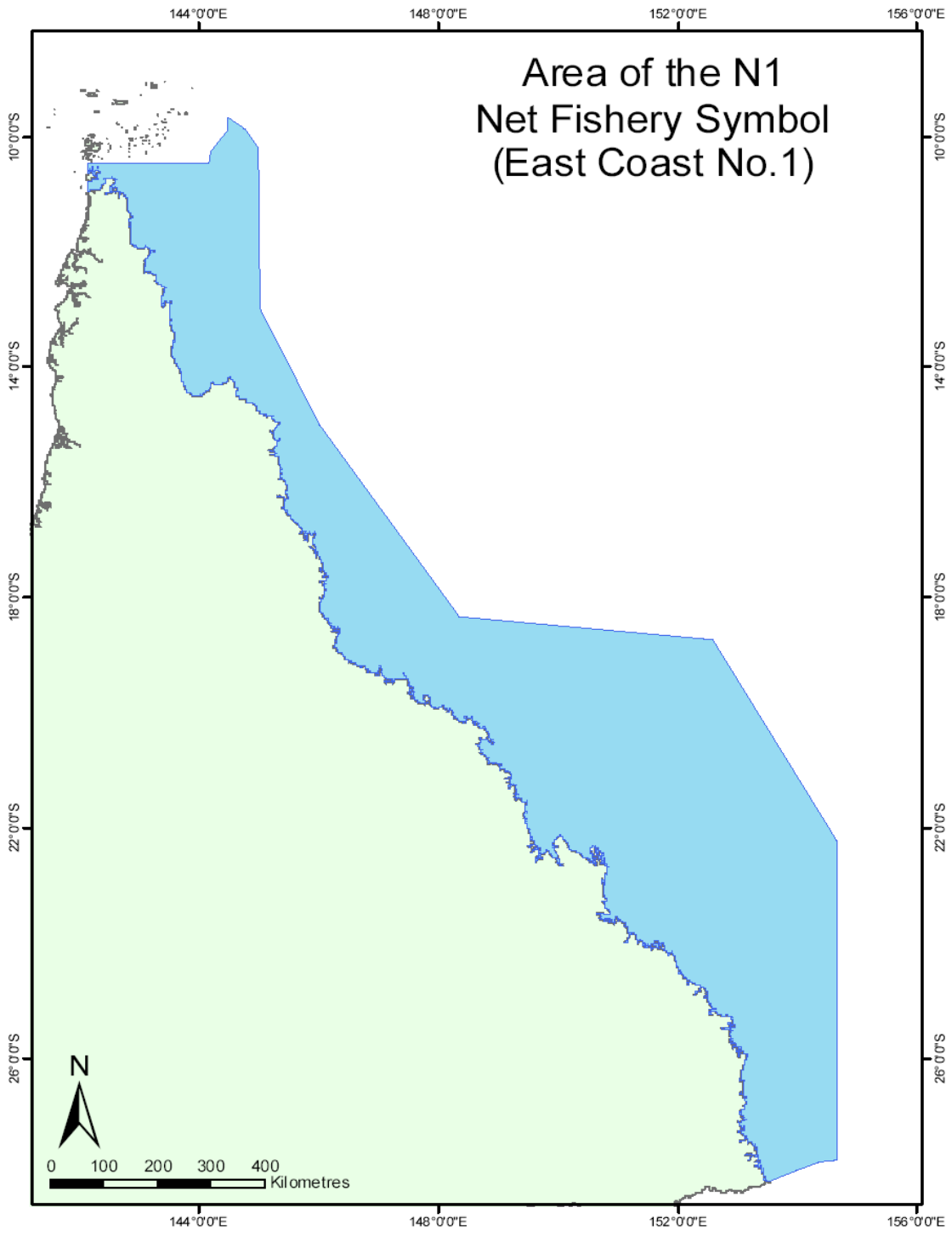


Figure 22 – Map taken from DPI&F website (current as of 3 January 2006). This map represents the approximate area where fishing operations are permitted under the fishery symbol. Please refer to the relevant fisheries legislation (e.g. Regulation or Management Plan) for the exact boundaries of an area.

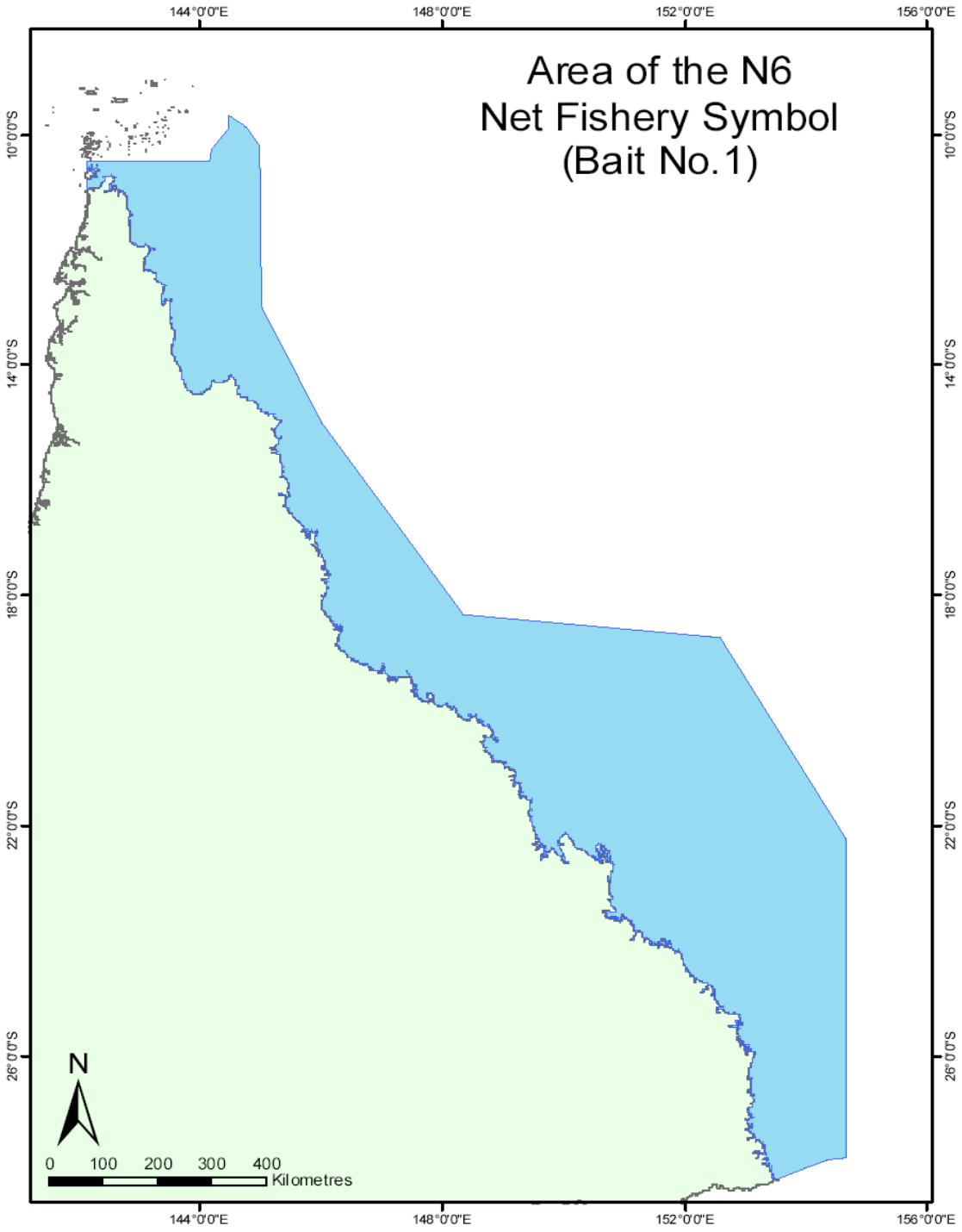


Figure 23 – Map taken from DPI&F website (current as of 3 January 2006). This map represents the approximate area where fishing operations are permitted under the fishery symbol. Please refer to the relevant fisheries legislation (e.g. Regulation or Management Plan) for the exact boundaries of an area.

Risk assessment of the fishery

The most significant element of an Environmental Management System (EMS) is the completion of a thorough risk assessment. In this case we used a risk assessment tool that follows the *ISO 14001* standards for EMS development. Using this tool (located on the Seafood Services Australia (SSA) website) we evaluated risks to our businesses that may occur pre-fishing, during fishing and post-fishing within the following categories - environmental, food safety, occupational health and safety, economic, public relations and social risks.

Photo of Moreton Bay net fishers (L–R John Page, Dave Thomson and Jim Finlay) at work on risk assessment

We identified hazards and risks associated with each activity that is undertaken during professional net operations and ranked risks using the tables below. The risk assessment involved evaluating internal risks associated with our activities, as well as external risks that we cannot control but may impact on our livelihood. The risk ranking tables assisted us to evaluate the likelihood of a particular threat or risk occurring and the consequence if it did occur (i.e. worst case scenario).

NB - It must be noted that in many cases there is insufficient scientific information on the potential impact of an activity. This made it difficult to accurately rank the risk. Thus while practical actions have been developed to mitigate risks, in many instances this initial risk assessment will mainly be useful in identifying knowledge gaps. Once these knowledge gaps are filled, it will then be possible to more accurately assess the impact of activities on the environment or other factors. In turn this will make it possible to develop more specific actions to address high risk activities.

The full risk report undertaken is attached at the end of the net section. Those activities that were assigned a risk ranking of 15 of higher are considered high risks and corrective actions have been developed to address each of these risks. These actions form our Action Plan below. Those activities that were assigned a risk ranking of 14 or lower are considered low or moderate risks and a Code of Best Industry Practice has been developed to ensure that each of these risks are minimized.

The following are tables that were used to conduct the risk assessment.

Table 1: LIKELIHOOD LEVELS OF AN IMPACT

Likelihood	Score	Definition
Likely	**6**	It is expected to occur
Occasional	**5**	May occur
Possible	**4**	Some evidence to suggest this may possibly occur
Unlikely	**3**	Uncommon, but has been known to occur
Rare	**2**	May occur in exceptional circumstances
Remote	**1**	Never heard of, but not impossible

Table 2: CONSEQUENCE LEVELS OF IMPACT

Consequence	Score	Definition
Negligible	**0**	Very insignificant impacts. Unlikely to be measurable.
Minor	**1**	Possibly detectable but minimal impact on structure/function.
Moderate	**2**	Maximum acceptable level of impact – recovery measured in months or years.
Severe	**3**	This level will result in wider and longer term impacts – recovery measured in years.
Major	**4**	Very serious impacts with relatively long time frame likely to be needed to restore to an acceptable level – recovery measured in years to decades.
Catastrophic	**5**	Widespread and permanent/irreversible damage or loss will occur – unlikely to ever be fixed.

To calculate the risk ranking for each of the identified risks, the number chosen from table 1 is multiplied by the number chosen from table 2. These numbers will fit into one of the categories shown in the table below.

Table 3: RISK RANKING CATEGORY

Score		Category
0	**=**	**Negligible risk**
1 – 6	**=**	**Low risk**
8 – 12	**=**	**Moderate risk**
15 – 18	**=**	**High risk**
20 - 30	**=**	**Extreme risk**

For table 2, the fishers involved made a set of rules to make it easier and more consistent. In table 2, all cases were considered worst-case scenarios, so long as fishers can remember at least one instance of it ever occurring to anybody.

The consequences were ranked as follows:

NEGLIGIBLE - less than a day to recover;
MINOR – a day to a week to recover ;
MODERATE – a few months to recover;
SEVERE – years to recover;
MAJOR – years to decades to recover;
CATASTROPHIC – either the person/business will never recover (e.g. somebody may die, a risk where you may lose your business (financial/economic) or a risk where the public perception would be so bad that a whole fishery may be threatened).

Net fishery Action Plan

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
SECTION 1 Environmental								
1. Actions relating to internal risks								
	1.1 Fishing	1.1.1 Catching fish in nets	Interaction between nets and non-target catch	To aim for minimal interaction with non-target species	To instigate or at least investigate studies into effective BRDs for nets	MBSIA working group	June 2007	Progress to be reported on at monthly MBSIA meetings
					To commence discussion with DPI&F about altering legislation so that it is not illegal for fishers to use turtle exclusion devices within tunnel nets	MBSIA working group	June 2007	Progressed reviewed at monthly MBSIA meetings
					All fishers must complete the DPI&F protected species course (if they have not already done so). A weekend training day will be organized for all fishers who have	All fishers who have not completed the protected species course	June 2007	Progress to be reviewed by board at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
					not already completed the course.			
5	1.1 Fishing	1.1.2 Bringing in nets and sorting catch	Injury to and mortality rates of bycatch	To ensure that all non-target species are released uninjured and alive	Where sorting trays are used, each tray must have a shoot or hole whereby non-target fish are returned to the ocean as quickly as possible (to reduce mortality rate of bycatch)	All net fishers who use sorting trays	June 2007	Members to discuss progress at MBSIA monthly meetings
					Where sorting trays are not used, techniques must be devised to suit individual operations, ensuring that catch (both target and non-target) remains in water before being sorted, to ensure that lag time between being out of water and release is minimised	All net fishers who do not use sorting trays	June 2007	Members to discuss progress at MBSIA monthly meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
					Review current scientific studies on interactions between birds (e.g. pelicans) and catch, and devise ways to minimize this interaction	MBSIA working group	June 2007	Members to discuss progress at MBSIA monthly meetings
	1.1 Fishing	1.1.3 Use of boats on water	Water, air and noise pollution from outboard motors	To minimize water, air and noise pollution from outboard motors	Operators are encouraged to fit outboard motors that produce minimal emissions	All fishers	June 2007	Progress to be discussed at monthly MBSIA meetings
2. Actions relating to external risks								
20	1.2 External	1.2.1 Urban pollution (physical debris)	Smothering of seagrass and chemical breakdown of debris. Injury or death of marine animals.	Minimize disposal of physical debris in ocean	Have an active role in broader catchment management of Moreton Bay's waterways, through having representation on the EPA Board and the Brisbane Waterways group	MBSIA board	Represent atives must have made contact with these groups by May 2006	Members to discuss progress at MBSIA monthly meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
30	1.2 External	1.2.2 Urban pollution (chemicals, sewage and other waste)	Drastically reduced water quality which negatively impacts on flora and fauna	Minimize input of nutrients and chemicals to the marine ecosystem	Have an active role in broader catchment management of Moreton Bay's waterways, through having representation on the EPA Board and the Brisbane Waterways group	MBSIA board	Representatives must have made contact with these groups by March 2006	To be reviewed in 12 months
					Publicly support and contribute to conservation groups attempting to prevent land-based pollution.	MBISA board	December 2007	Progress to be reviewed at monthly MBSIA meetings
					Conduct a desk-top study collating existing research quantifying impacts on water quality in Moreton Bay.	MBSIA working group to source funding for project	December 2007	To be reviewed at every second monthly MBSIA meeting

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
					Where information gaps are identified, instigate targeted research studies with relevant researchers and source funding.	MBSIA working group to source funding for project	Decembe r 2008	To be reviewed at MBSIA monthly meetings
					Have a permanent representative of the MBSIA on the SEQ NRM group to raise these issues and ensure that they are addressed through this group	MBSIA elected representat ive	Person to apply for members hip of SEQ NRM group by May 2006	To be reviewed at monthly MBSIA meetings
30	1.2 External	1.2.3 Development of housing estates and commercial/ind ustrial enterprises	Destruction of mangroves and other important marine habitats, in addition to changes in tidal flows	Preserve flora critical to the health of the Moreton Bay marine ecosystem	Investigate whether an EIA has been undertaken with regard to mosquito spraying of mangroves near residential areas	MBSIA working group	Decembe r 2006	To be reviewed at monthly MBSIA meetings
					Actively contribute to the Moreton Bay Waterways and Catchments Partnership (by having a delegate to represent)	MBSIA elected representat ive	Person to be elected by May 2006	To be reviewed at monthly MBSIA meetings
12	1.2 External	1.2.4 Expanding the	The dumping of dredged	To protect marine plants	To remain involved with the Port of	MBSIA working	Working group to	To be reviewed at

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
		port, the airport and dredging of rivers and other areas	material close to shore causes smothering of seagrass beds and other plants, degradation of water quality and alters tidal flows.	and ensure water quality	Brisbane Corporation	group	meet by June 2006	monthly MBSIA meetings
15	1.2 External	1.2.5 Dumping of ballast water from foreign vessels	Introduction of exotic pests which impact negatively on marine ecosystems	To have nil release of ballast water in Moreton Bay	To notify the Brisbane Port Corporation that the MBSIA wish to actively contribute to resolution of this and similar issues and would like to be updated on any developments in this area	Volunteer MBSIA team elected at Moreton Bay Fisher's meeting to talk to Port Corporation	Working group to meet by June 2006	To be reviewed at monthly MBSIA meetings
SECTION 2 Occupational Health and Safety								
1. Actions relating to external risks								
15	2.1 External	2.1.1 Recreational boating	Collision	To avoid all collisions between professional	To contact the peak recreational fishing and boating organizations about developing some	MBSIA board	June 2007	To be reviewed every two months at

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
				fishing vessels and other vessels in the Bay	sort of education/awareness program about boating rules and interactions.			monthly MBSIA meetings
SECTION 3 Food Safety								
1. Actions relating to internal risks								
15	3.1 Fishing	3.1.1 Bringing in the nets and sorting product	The ice slurry that target species are placed into may melt on a very hot day, if there is insufficient ice or if the sorting process takes longer than usual – this can potential lead to product contamination	Have nil product contamination at all times	All fishers must have completed the food safety course and thus have a completed food safety plan relating to their individual operation	All fishers	June 2007	To be reviewed at monthly MBSIA meetings
SECTION 4 Public Relations								
1. Actions relating to internal risks								
15	4.1 Pre-fishing	4.1.1 Loading fuel	Some fuel may potentially be spilled	To ensure that fuel spillage does not occur,	All fishers to follow code of conduct in relation to loading fuel	All fishers	June 2007	To be reviewed at monthly

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			resulting in water pollution, potentially fire, personal injury to crew and likely increased public negativity towards the commercial fishing industry as a whole	that in the event of a spillage, that cleanup is swift and thorough and that media coverage of such an event is managed appropriately.	and cleanup of any spillage. In the event a spillage does occur follow procedure as set out in fuel spillage instruction form.			MBSIA meetings
20	4.1 Fishing	4.1.2 Interaction between nets and non-target species	Negative media may result from interaction of nets with non-target species, even if there are measures in places to minimize it. This sort of media is catastrophic for the industry	To take all precautions necessary to avoid interaction with non-target species and to regularly publish positive news articles relating to new measures and achievements	To organize some group training with regard to dealing with the media and communicating positive news stories. Also with how to deal with negative media as it arises.	MBSIA board	First group receive training by June 2006, second group trained by June 2007	To be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			in terms of securing resource access and therefore a secure future	with regard to eliminating bycatch				
					Demonstrate through a verifiable process that fishers are committed to environmental sustainability – investigate the options for third party certification (or other forms of certification) e.g. ecolabelling.	MBSIA board	Decembe r 2007	To be reviewed at monthly MBSIA meetings
					Scope out an appropriate marketing strategy to promote the EMS and seafood caught by Moreton Bay fishermen operating under an EMS	MBSIA executive	Decembe r 2007	To be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
					Support research into options for fishers with regard to labeling/certification	MBSIA board	June 2007	To be reviewed at monthly MBSIA meetings
20	4.1 Fishing	4.1.3 Sorting the product	If some members of the public are looking on while a commercial net fishing operator is sorting product, negative attitudes may be formed about the industry if they notice that undersize fish or other bycatch are being released	To minimize bycatch, education of the public about fishing practices, dispel myths and publish good news stories about the achievements of the industry with regard to minimizing bycatch, improving water quality and protecting important species	Design a public awareness program with regard to the professional net fishing industry and combine efforts with other professional fisheries in the region to organize promotional activities at a regional level. Develop a communication strategy based on research into key stakeholder groups – e.g. education packages for schools. (refer to SSA engagement of stakeholders study)	MBSIA board	June 2007	To be reviewed at monthly MBSIA meetings
2. Actions that relate to external risks								
30	4.2 External	4.2.1	Anecdotal	To improve	To approach	MBSIA	Decembe	To be

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
		Recreational fishing	evidence indicates that some recreational fishers have a negative view of the professional fishing industry due to lack of information about the industry and competition for resource access	recreational fishers' awareness of commercial fishing activities and initiatives	recreational fishing magazines and tide guides about putting factual articles in their publications	board	r 2006	reviewed at monthly MBSIA meetings
SECTION 5 Economic								
1. Actions that relate to external risks								
20	5.1 External	5.1.1 Re-zoning of Moreton Bay Marine Park	Reduced access to productive fishing grounds resulting in loss of income and potential loss of	To maintain access to productive fishing grounds, while implementing sustainable fishing practices.	To actively participate in and contribute to planning and consultative processes associated with re-zoning of the Moreton Bay Marine Park and to work with recreational fishing	MBSIA board representatives	Already underway and continuing through the process.	To be reviewed at monthly MBSIA meetings.

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			business.		groups in ensuring equitable access for all.			
15	5.1 External	5.1.2 Recreational fishing	Competition between recreational and professional fishers which may result in loss of access to fishing grounds	To build positive relationships between the recreational and professional fishing sectors and to work together on issues that are common	To contact the peak recreational fishing body and discuss what might be a common issue to work towards and to develop a project to work on together.	MBSIA board	June 2007	To be reviewed at monthly MBSIA meetings
18	5.1 External	5.1.3 Selling product	Fluctuating and poor prices, difficulty in finding a market or buyer, which leads to financial loss and insecurity	To have some financial security within the seafood industry	Contact the Brisbane City Council about their recent investigation about whether to establish a fish board where people can bid for product	MBSIA board	June 2007	To be reviewed at every third monthly MBSIA meeting
30	5.1 External	5.1.4 Selling product	Competition with cheaper imported product	To rebuild Australian consumer interest in purchasing	To formally support a project investigating ecolabelling	MBSIA board	Decembe r 2007	To be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
				local and fresh produce. To promote the local seafood products and to encourage consumer awareness about product quality and harvesting techniques	Scope out an appropriate marketing strategy to promote the EMS and seafood caught by Moreton Bay fishermen operating under an EMS	MBSIA executive	Decembe r 2007	To be reviewed at monthly MBSIA meetings
					to instigate a promotional campaign for locally caught seafood	MBSIA board	Decembe r 2006	To be reviewed at monthly MBSIA meetings
SECTION 6 Social								
30	6.1 Post-fishing	6.1.1 Selling the product	There is significant social impact on families when prices are poor. It puts strain on family life, relationships and ability to	To have financial security for families	Diversifying the family business into other areas to provide security during times of economic instability	All fishers	Ongoing	To be discussed every 6 months at MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			provide for children.					
30	6.2 Internal	6.2.1 Fishing	The significant amount of fishing hours required to make a living (including maintenance, bookwork and other business activities) results in less time spent with family and partners, sometimes resulting in family breakdown and often depression and health issues	To operate a business where it is possible to have a balance between work and personal life	To utilize communication technologies such as mobile phones and email while at sea to have regular contact with family and partners.	All fishers	June 2007	To be reviewed at monthly MBSIA meetings
30	6.3 Fisheries management issues	6.3.1 Fishing and participation in fisheries management	Competition for resource access, closure of fishing grounds can lead to	To work in a political environment where fishers can have some security and	To issue formal invitations to fisheries managers to have regular boat and ramp visits	MBSIA board	December 2006	To be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			industry insecurity, depression, strain on relationships and even suicide – this is a very significant problem	sense of ownership and participation in fisheries management decisions				

Code of Industry Best Practice

(Industry Standard for Moreton Bay net fishers)

Pre-fishing

1. Operators will re-fuel according to procedures set out on signs at the fuel depot and will take due care in order to prevent potential spillages;
2. if not re-fueling at a depot, operator must follow procedure as set out by the Queensland Transport Department;
3. in the event that fuel spillage does occur, operators will follow fuel depot procedures for clean-up and pollution prevention;
4. if you do not know what the re-fuelling procedures are at a particular depot, ask;
5. crew must follow relevant legislation pertaining to lifting heavy weights onto a marine vessel;
6. use common sense and be alert at all times when working on or around boat ramps;
7. each operator must have completed a food safety course and have their own food safety plan to ensure that the handling process is transparent and traceable;
8. nets must be checked that they are stacked carefully prior to fishing to avoid tangling;

Fishing

9. All net operators will use specific mesh sizes to target specific species in order to avoid catching non-target species;
10. the use of innovative gear modifications (such as bycatch reduction devices or BRDs) to reduce the amount of bycatch is encouraged;
11. if a large marine animal is spotted the nets will not be thrown out at that time within that specific area;
12. fishers will take exceptional care when fishing within ―know‖ turtle or dugong areas (identified based on experience and knowledge) and if large marine animals (e.g. dugong) are spotted, the nets will not be shot until the area is clear;
13. operators to keep adequate watch during the fishing session so that if a protected species is spotted it can be safely released according to procedure for handling (as set out in protected species course) – in most cases this will involve lifting the net so that the animal may swim out;
14. inexperienced fishers to be trained or coached by experienced fishers so that the code of industry best practice may be understood and applied in all situations;
15. during retrieval of nets, all non-target species are to be released alive before the net is brought on board the boat or to shore;
16. during tunnel netting, small amounts of fish will be sorted at a time to minimize time out of water;
17. each sorting tray must have a shoot or hole whereby non-target fish are returned to the ocean as quickly as possible (to reduce mortality rate of bycatch);

18. fishers will retain an amount of product that can reasonably be stored at the correct temperature to ensure food safety and product quality;
19. while fishing, if large physical debris (urban pollution) is observed, authorities to be notified (e.g. a rusting fridge);
20. while fishing, if visual evidence of chemical pollution is observed, authorities to be notified (e.g. dead or unhealthy fish floating in water, or oil/chemical slicks noticed on water surface);
21. if unusual, toxic or possible pest algae (including Lyngbya or –Fireweed" or some species of *Caulerpa*) is observed while fishing, authorities to be notified – or jotted in log book;
22. by possessing a professional fishers license, it is expected that the operator be trained in navigation, listen to correct radio channels, keep adequate watch at all times, obey speed limits and have lights on vessel operating at night in order to avoid collisions with other boats or objects;
23. fishers to avoid fishing in bad weather conditions;
24. crew must wear appropriate clothing that is fitted close to the body to avoid being tangled in fishing gear;
25. crew to have up-to-date knowledge on identification and handling of venomous marine animals;
26. when hauling nets and retrieving catch, crew to use appropriate care when handling fish to avoid stings etc – as per regulation for handling fish after catching;
27. fishers must follow procedure as per legislation with regard to marking out tunnel net stakes (e.g. marking stakes with lights at night) to avoid interaction with other vessels/users;
28. while fishing any waste (including personal or other) must be collected and disposed of at an appropriate on-land waste facility; and

Post-fishing

29. Biodegradable cleaning products (as approved by supplier) are to be used in accordance with the seafood safety course.

Review mechanisms

In addition to regular monitoring and documentation of progress against actions at MBSIA meetings, a period of review is required after the deadlines, to ensure that actions have been carried out.

As many of the actions are scheduled to be completed by June 2007, it is envisaged that a comprehensive review will commence in July 2007. This review will involve a series of workshops or meetings, where the MBSIA board will evaluate the progress of actions and the uptake and implementation of the EMS in general.

Each working group elected to work on certain actions will be required to report back to the board on their achievements and progress. Discussion will centre on key themes such as:

- What have been the key challenges to implementing the action?
- How have these challenges been resolved?
- What are the future directions, actions or projects leading from the completion of the original action?
- What support do fishers or teams require in order to achieve these actions?

For actions that involve modifications to fishing operations or gear (and that apply to all fishers in the sector), an appropriate method to ensure changes have been implemented needs to be established. This method will be decided on by the net fishing representative, in consultation with other net fishing members and the MBSIA board. This may be through, for example, boat inspections by the MBSIA or signed agreements stating compliance with the EMS.

The Code of Conduct should also be reviewed by the net representative and net members to ensure that it is relevant and up-to-date.

The findings of the review will be compiled into a report, which will be used by the board to set new actions, targets, deadlines and monitoring.

A similar review will be undertaken again in July 2008 to report of progress against actions (review of actions will be annual). This review will be more comprehensive than the July 2007 review. A full risk assessment should be undertaken, to ensure that actions are relevant and up-to-date. This will be undertaken through workshops with all members who have net fishing endorsements. In addition, the 2008 review will include updating the background information in the EMS, including updating statistics on catch and effort, number of vessels, species caught and external impacts on the environment (e.g. pollution). The key output of the 2008 review will be fully updated EMS documentation.

Following the 2008 review, a summary version of the revised EMS will be printed for fishers as a quick reference document, including vision, policy, actions and code of conduct.

Review Form

(to be filled out by fishers at the July 2007 and July 2008 reviews)

Action	By whom	Deadline	Achieved? (yes/ no)	Challenges	How were challenges resolved?	Support required to carry out actions	New action, deadline, by whom and monitoring

Net fishery Risk Report and Corrective Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
SECTION 1 Environmental Risks						
1.1 Pre-fishing	1.1.1 Load fuel	Fuel spillage	Pollution	- Crew training and operational manuals are provided by the Queensland Transport Department. - In addition, fueling generally occurs on land. - Fuel depot spillage procedures followed at the re-fueling point - Fuel tank hooked up to engine (no transfers of fuel on board) - Tank must be removed from boat before fueling.	2	Code
1.1 Pre-fishing	1.1.2 Load stores and ice onto boat	Chemical spillage	Pollution	- Crew training and operational manuals are provided by the Queensland Transport Department. - In addition, fueling generally occurs on land. - Fuel depot spillage procedures followed at the re-fueling point - Fuel tank hooked up to engine (no transfers of fuel on board) - Tank must be removed from	2	code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
				boat before fueling.		
1.2 Fishing	1.2.1 Catching fish in nets	Interaction between nets and non-targeted catch	Potential harm to animal	- fishers use specific mesh sizes and ply strength that target specific species of fish and exclude the majority of non-target catch - all fishers must do a master fisherman‘s course and these matters are covered in this course. - some fishers voluntarily undertake threatened species courses, while new entrants must complete the course.	5	Action
1.2 Fishing	1.2.2 As the nets are brought in, fish are sorted (those that are of legal size are picked out and placed in an ice slurry, while other fish are released live.	There is a potential for catching non-target animals	Non-targeted animals (bycatch) may be injured	- generally there is not much bycatch in net fishing operations as specific mesh sizes are used to target specific species and exclusion grids are used - product usually remains submerged in water (in nets) until being scooped onto the sorting tray, in small groups of fish (i.e. not all at once) - careful handling of any fish caught - often the sorting trays used have shoots or wholes in the side whereby any non-targeted	5	Code and Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
				fish are scooped straight back out of the shoot into the ocean and the targeted species are scooped into the ice slurry (using this type of sorting tray drastically reduced the time spent out of water for bycatch and therefore the mortality rate)		
1.2 Fishing	1.2.3 Any activity while fishing	Waste (personal and other) may not be disposed of in an appropriate manner	Pollution that can potentially injure animals, reduce water quality and impact on marine plants such as seagrass	Most fishers keep rubbish on board vessel and dispose of at an appropriate on-land facility	4	code
1.2 Fishing	1.2.4 Any time when operating vessels	Fumes will escape from outboard motor	pollution of air and water as well as contribute to noise pollution	No current controls	8	action
1.3 Post-fishing	1.3.1 Clean-up at home or at wholesalers depot (ice box, bins, back of truck)	Cleaning agents may be spilt	Spilt cleaning agents may end up in ground water or may be filtered into drains and ultimately end up in the ocean, which will reduce water quality.	- biodegradable cleaning agents approved by the supplier are used	0	Code
1.4 External risks	1.4.1 Urban pollution (physical debris)	Smothering of seagrass, and chemical	Detrimental impacts on marine flora	No current controls in place	20	Action and code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
		breakdown of debris. In addition marine animals may become trapped by large debris or choke on plastic bags, or be poisoned by cumulative effects of cigarette butts on water quality				
1.4 External risks	1.4.2 Urban pollution (chemicals)	Drastically reduced water quality	Direct absorption of chemicals by marine animals through their skin. In addition mangroves and seagrass beds (which form a nursery for many juvenile marine fauna) may be killed.	No current controls in place	30	Action and code
1.4 External risks	1.4.3 Development of housing estates and commercial/industrial enterprises	Destruction of mangroves and other important marine habitats, in addition to changes in tidal flows	Mangroves and seagrass beds may be killed (which are important breeding grounds for many juvenile marine species).	Planning and development controls regarding destruction of marine plants (fisheries legislation provides for protection of marine plants and declaration of key fish habitats as Fish Habitat Areas and restoration of fish habitats).	30	Action
1.4 External risks	1.4.4 Land-based	Chemicals in	Degradation of	No controls	15	Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
	farming	waterways	marine flora and fauna due to decreased water quality			
1.4 External risks	1.4.5 Recreational fishing	Over-fishing of fish stocks (there is no limit on the number of recreational fishers in Queensland). In addition use of fishing techniques that are not sustainable.	Reduction or potential elimination of breeding stocks. Pulse fishing (high density of fishers operating in the one spot) may significantly deplete fish stocks. In the long term this will impact on the amount of fresh fish available to be supplied by commercial fishers to the Australian market (e.g. through fish and chip shops).	No control	30	Action
1.4 External risks	1.4.6 Ports and shipping	Expanding the port and dredging of rivers and other areas.	The dumping of dredged sand/silt/mud close to shore causes smothering of seagrass beds and other plants, degradation of water	No controls	12	Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
			quality and alters tidal flows			
1.4 External risks	1.4.7 Ports and shipping	Dumping of ballast water from foreign vessels	Introduction of exotic pests, which will result in downstream effects on marine ecosystems.	No controls…	15	Action
1.4 External risks	1.4.8 Dumping of sewage (treated or otherwise) into waterways	Increased nutrient content in water (especially nitrogen and phosphorus)	- Decreased water quality - many pest species (including flora and fauna) thrive on increase nutrient loads, e.g. fireweed or lyngbya. This weed takes over seagrass beds and smothers them. Thus it kills off important breeding grounds and juvenile nurseries.	No controls	30	Action and code
SECTION 2 Occupational health and safety (OH&S) risks						
2.1 Pre-fishing	2.1.1 Load fuel	Fuel spillage	Fire, leading to personal injury	- Crew training and operational manuals are provided by the Queensland Transport Department. - In addition, fueling generally	2	Code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
				occurs on land. - Fuel depot spillage procedures followed at the re-fueling point - Fuel tank hooked up to engine (no transfers of fuel on board) - Tank must be removed from boat before fueling		
2.1 Pre-fishing	2.1.2 Load stores and ice onto boat	Chemical spillage	Personal injury due to fire or breathing in fumes	Take care not to lift heavy weights and to make sure that all chemicals are appropriately stored and packaged.	6	Code
2.1 Pre-fishing	2.1.3 Load stores and ice onto boat	Lifting heavy weights	Personal injury	Follow relevant legislation pertaining to lifting of heavy weights onto a marine vessel	8	Code
2.1 Pre-fishing	2.1.4 Push boat down ramp (if not already in water)	A crew member may slip over on the boat ramp	Personal injury	Use common sense and be alert around boat ramps	5	Code
2.1 Pre-fishing, fishing and post-fishing	2.1.5 Travel to and from fishing grounds	Collision with other boats, the dock or with submerged objects	Personal injury	-Crew trained in navigation. - listen to correct radio channels - keep adequate watch at all times - obey speed limits where relevant - have lights on vessel at night -Crew possesses appropriate certificates.	15	Code
2.2 Fishing	2.2.1 Putting nets out	Net entangled with operator	Personal injury and damage to clothing etc	Wear appropriate clothing - don‘t go out in bad weather	10	Code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
2.2 Fishing	2.2.2 Bringing in nets	Fishers may come into contract with venomous marine animals	Personal injury (mainly stings, some can be fatal)	- Fishers use appropriate level of care while handling nets - fishers are aware of which species are venomous - fishers are aware of what treatments are required for various types of stings or other injuries - fishers may use protective gloves or clothing, depending on the area being fished and the individual operator.	10	Code
2.3 Post-fishing	2.3.1 Unloading product at boat ramp	A crew member may fall off boat onto boat ramp	Personal injury	Use common sense and be alert around boat ramps	5	Code
2.3 Post-fishing	2.3.2 Unloading product at wholesaler depot or wharf	Lifting heavy weights.	Personal injury (ie. Straining back, dropping box on foot or slipping over on boat ramp)	- use common sense - in addition, crew need to take care not too lift boxes that are too heavy	6	Code
2.3 Post-fishing	2.3.3 Pulling boat up ramp (if required)	Crew member may slip on boat ramp	Personal injury		5	Code
2.3 External risks	2.3.4 Recreational boating	Collision	Personal injury	Communication between boats	15	Code – might need to put action here as this is a high risk ranking

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
SECTION 3 Food Safety risks						
3.1 Pre-fishing	3.1.1 Load fuel	Fuel spillage	Contamination of product	- Crew training and operational manuals are provided by the Queensland Transport Department. - In addition, fueling generally occurs on land. - Fuel depot spillage procedures followed at the re-fueling point - Fuel tank hooked up to engine (no transfers of fuel on board) - Tank must be removed from boat before fueling.	2	Code
3.1 Pre-fishing	3.1.2 Load stores and ice onto boat	Unclean ice bins	Potential contamination of ice and product	- Carry out appropriate maintenance and cleaning before loading ice. - those fishers who have completed an accredited course for safe food handling w ill follow a safe food procedure specific to their particular operation.	3	Code
3.1 Fishing	3.1.3 Bringing in the nets	Catching non-target species	Lost fishing time, slower process, if a sunny day may reduce product quality as it is	Fishers use a variety of methods to reduce bycatch	15	Code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
			exposed to elements for longer			
3.1 Fishing	3.1.4 Placing fish in ice slurry	- There may be insufficient ice or the ice may melt on a very hot day - unclean sea water in ice slurry - too many fish are caught on one day	Product contamination or spoilage	- take sufficient ice - Check the ice at regular intervals on a hot day and go back to sure for more ice if necessary - make sure sea water looks –good" visually (or even smell it) before adding it to ice slurry - many fishers have undertaken seafood handling courses to make the handling process transparent and traceable - keep ice box approximately 2-3 degrees Celsius - buy ice from reputable suppliers - Don't throw the nets out too many times (don't do too many shots) in one day - regulate the amount of net shot	6	Code
SECTION 4 Public relations risks						
4.1 Pre-fishing	4.1.1 Loading fuel	Fuel spillage	The potential for fire, pollution, personal injury or other risk would result in	No controls in place to address PR/media if there is an accident	1	Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
			increased public negativity towards the commercial fishing industry			
4.2 Fishing	4.2.1 Catching fish in nets	Interaction between nets and non-target species	Negative media may result from any interaction of nets with non-target species, even if there are measures in place to minimize it. This sort of media is catastrophic for the industry in terms of securing resource access and therefore a secure future.	No current controls in place	20	Action and code
4.2 Fishing	4.2.2 As the nets are brought in, fish are sorted (those that are of legal size are picked out and placed in an ice slurry, while other fish are released live)	Catching undersize fish or other bycatch	If the general public are near an active commercial net fishing operation and notice large numbers of undersize fish or other bycatch being released, this may result in negative attitudes towards the industry.	No controls in place to address public relations risk	20	Action and code
4.3 External risks	4.3.1 Recreational	Recreational	Recreational fishing	No controls in place	30	Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
	fishing	fishers have a negative view of the commercial fishing industry due to ignorance and competition for resource access	lobby groups can be powerful and can help swing political decisions (which may not be favourable for commercial fishers). In addition, typically, any significant reduction in fish stocks or breeding stocks is considered by the public to be as a result of over-fishing by commercial enterprises.			
SECTION 5 Economic risks						
5.1 Fishing	5.1.1 Travel to and from fishing grounds	Collision with other boats, the dock or with submerged objects	Damage to fishing vessel, propeller or other gear	-Crew trained in navigation. - listen to correct radio channels - keep adequate watch at all times - obey speed limits where relevant - have lights on vessel at night -Crew possess appropriate certificates.	12	Code
5.1 Fishing	5.1.2 Putting the nets	Net may become	Loss of fishing time	Careful stacking and checking	2	Code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
	out	entangled within itself		nets prior to fishing		
5.1 Fishing	5.1.3 Catching fish in nets	Interaction between nets and large marine animals or other non-targeted catch	Net damage, loss of fishing time and loss of product	As above. Fishers will generally do everything in their power to avoid interaction with large marine animals due to respect for the environment and also due to these economic reasons.	5	Code
5.1 Fishing	5.1.4 Bringing in nets	The nets may get snagged on a submerged object while bringing them in.	Damage to nets and gear, Loss of product, Lost fishing time.	- depending on which species is being targeted, it is sometimes beneficial to fish in ~~"r~~ocky" areas - as a result there are no real control measures in this instance	5	Code
5.1 Fishing	5.1.5 As the nets are brought in, fish are sorted	Catching undersize fish or other bycatch	Lost fishing time, slower process, if a sunny day may reduce product quality as it is exposed to elements for longer	fishers use a variety of methods to minimize by-catch.	3	Code
5.1 Fishing	5.1.6 Placing fish in ice	- There may be insufficient ice or the ice may melt on a very hot day - unclean sea water in ice slurry	Product contamination or spoilage	Product must be handled as per the food safety plan	6	Code
5.1 Fishing	5.1.7 Placing fish in ice slurry	Potential for too many fish being	Product spoilage	- Don't throw the nets out too many times (don't do too many	5	Code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
		caught		shots) in one day - regulate the amount of net shot		
5.1 Fishing	5.1.8 As the nets are brought in, they are cleaned (usually by shaking them out) and placed onto the boat in an orderly fashion.	The net may not be folded appropriately	The net may get entangled within itself the next time it is thrown out, which results in lost fishing time	Appropriate care is taken to clean and fold the net properly	5	Code
5.2 External risks	5.2.1 Re-zoning of Moreton Bay Marine Park	Reduced access to productive fishing grounds	Reduced access to productive fishing grounds will result in loss of income which may put many fishermen out of business give current poor market price and fuel costs.	Attempts have been made to improve community perceptions of commercial fishing in the Bay through promotion of the EMS in brochures (available at seafood retailers & fish and chip shops) and in the media.	20	Action
5.2 External risks	5.2.2 Land-based farming	Chemicals in waterways	Degradation of marine flora and fauna due to decreased water quality.	Publicly support ‗green' groups attempting to prevent any sort of land-based pollution activities, this will help build relationships and make the community think that you care about the environment!!	15	Action
5.2 External risks	5.2.3 Recreational fishing	Conflict between recreational and professional fishers for resources	Commercial fisheries may be economically unviable as a result of competition – due to	Fishers or fishing associations will find an issue where recreational and commercial fishers have common ground	15	Action and code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
			loss of access to fishing grounds.	and use this to improve the relationship between the two groups. A better relationship may facilitate provision of accurate information on sustainable fishing practices for recreational fishers – e.g. through notices in tide books and recreational fishing publications.		
5.2 External risks	5.2.4 Selling the product	Fluctuating and poor prices, Difficulty in finding a market or buyer	- Financial loss, not being able to meet overheads of the business or pay staff. - large margin between retail prices and fishers income	- establish a ~~"f~~ish board" where people can bid for product - diversify catch targeted and also businesses -	18	Action
5.2 External risks	5.2.5 Selling the product	Competition with ~~"c~~heaper" imported product	Financial loss	No controls	30	Action
SECTION 6 Social risks						
	6.1 Selling the product	Fluctuating and poor prices, Difficulty in finding a market or buyer. Also competition with	There is also a significant social impact on families of fishers when prices are poor. It puts significant strain on	????? Diversifying the business into other areas to provide security during times of economic instability.	30	Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
		cheaper imported product.	family life, relationships and ability to provide for children. Poor or fluctuating prices is a regular occurrence for fishers – there is little financial security or stability in this industry as there is no guarantee of prices or markets. At the same time, a commercial fishing enterprise can be lucrative when prices are good.			
	6.2 Time or hours spent at sea	Less time spent with family and on relationships	- Family break-down - depression - health issues - potential loss of business	- utilizing communication technologies such as mobile phone and email while out at sea to have regular contact with loved ones	30	Action
	6.3 Pressure of business (i.e. to perform and provide for a family)	High expectations on self and others	- health issues - stress - possible break-down	???	30	Action
	6.4 Keeping up with maintenance, bookwork and other	No time for a social life or to have time for self-	As above	???	25	Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective action
	business activities	interests				
	6.5 Industry management – contribution to State fisheries regulation processes	Time away from family and business			25	Action
	6.6 Public perceptions of the fishing industry and management issues	Resource access competition and fishery shutdown	Conflict amongst professional fishers - depression - strain on relationships and families	No controls	30	Action

MORETON BAY TRAWL FISHERIES

Otter Trawl

Description of the Fishery

There are approximately 70 otter trawl vessels operating in Moreton Bay (DPI&F Freedom of Information records), catching approximately 457 tonnes of seafood per year, with an annual GVP of $4.3 million (ChrisWeb). Trawling accounts for approximately half of the commercial harvest and fishing effort as days fished from the Bay. In the Queensland context, Moreton Bay harvests about 10% of the annual prawn harvest. In addition it produces approximately 10% of the total harvest weight for trawling in Queensland (Williams. L, in prep, 2005).

Otter trawl operations are undertaken in a defined area of the northern and middle sections of Moreton Bay. This type of trawling involves a prescribed net attached to boards which, when towed behind the boat, spread apart thereby opening the net. The net has a weighted bottom rope that allows the net to sink to the seabed where the prawns are scooped up and herded to the back of the net (commonly called the cod end).
The major season for otter trawling in the Bay is from late September to late April. Catches mainly consist of tiger prawns (*Penaeus latisulcatus*), greasyback prawns (*Metapenaeus bennettae)*, king prawns *(Penaeus plebejus)*, endeavor prawns *(Metapenaeus endeavouri)* and banana prawns *(Penaeus merguienis)*. Some additional species are also permitted to be caught and sold. These include:

- blue swimmer crabs;
- sand crabs;
- squid;
- cuttle fish;
- Moreton Bay bugs;
- Balmain bugs; and
- Octopus.

Otter trawling is permitted in less than 40% of the Moreton Bay area (Williams, L.E. in prep. 2005). This is due to permanent area closures to protect fishery habitat such as seagrass meadows and nursery grounds for prawn and fish. It is difficult to estimate what proportion of the Bay area is actually trawled, as there are areas of Moreton Bay where trawling is permitted, but prawns do not occur or minimal otter trawling occurs, as the underwater topography makes it unsuitable for trawling.

Trends in catch and effort

The following graphs indicate that over the past 17 years the number of trawl vessels operating within Moreton Bay has decreased by approximately 36 per cent (Figure 26).

The average amount of catch per boat per day has fluctuated between 60 – 95 kg/boat/day (Figure 27). The overall effort or number of days fished per boat has increased over time from 60 to 90 days/year/boat.

The total annual catch levels for the whole otter trawl fishery have significantly decreased over time from over 1200 tonnes per year in the 1980's to approximately 450 tonnes in 2005 (Figure 24). This correlates with the decrease in the number of boats fishing in the Bay over time (decreased effort).

The primary species caught are Tiger, Banana and King prawns, as well as squid. The reported annual catch rates for these species have fluctuated over the past 17 years (Figure 25). Catches of Tiger prawns have increased, whilst the amount of King, Banana prawns and squid captured has decreased.

There are a number of external factors that influence catch rates (apart from fishing effort). Drought and rain affect fishers just as dramatically as it affects farmers on the land. Rainfall is directly related to variation in catches (QDPI&F 2004). For example, in 1991 higher rainfall occurred and this corresponds with higher catch rates in the figure below (when it is wet, there are more prawns). The year 1997 was also a "wet" year and this corresponds with an increase in catch rates for the same year, due to prawns breeding more in the wet periods. During the last few years Moreton Bay has experienced a bad drought period, which has resulted in decreased catch rates (as reflected in the figure below). In addition to changes in weather, the natural breeding cycles of various permitted species impact on catch rates.

NB: *all trends depicted in the following graphs are based on the most recent logbook data publicly available (2005) on the Chrisweb internet site.*

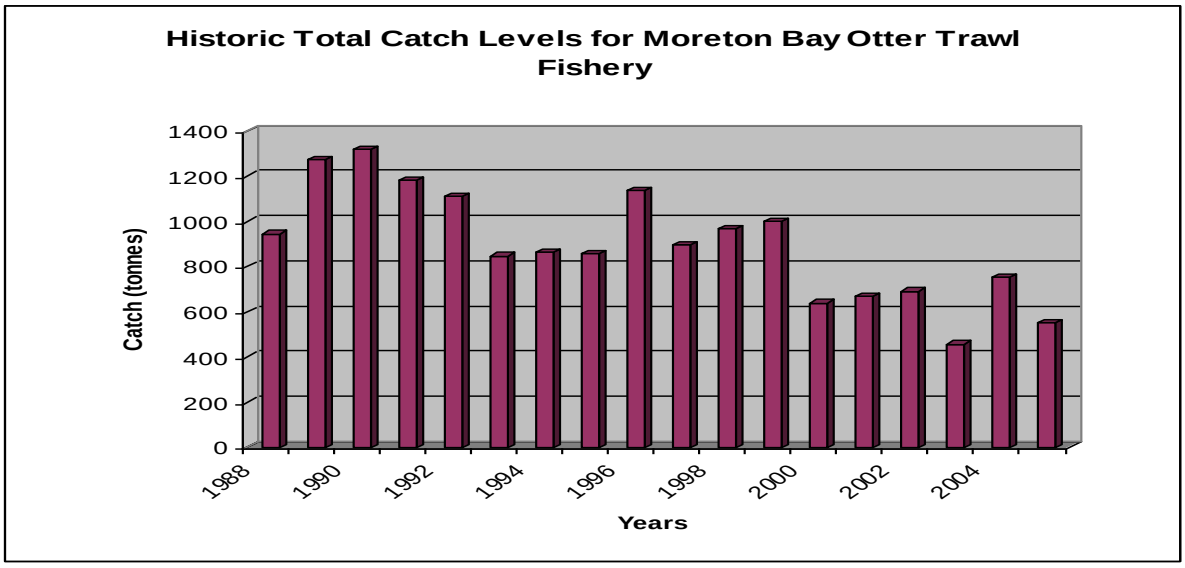


Figure 24 – Catch levels displayed over time for Moreton Bay otter trawl fishery (compiled from DPI&F Chris Web data)

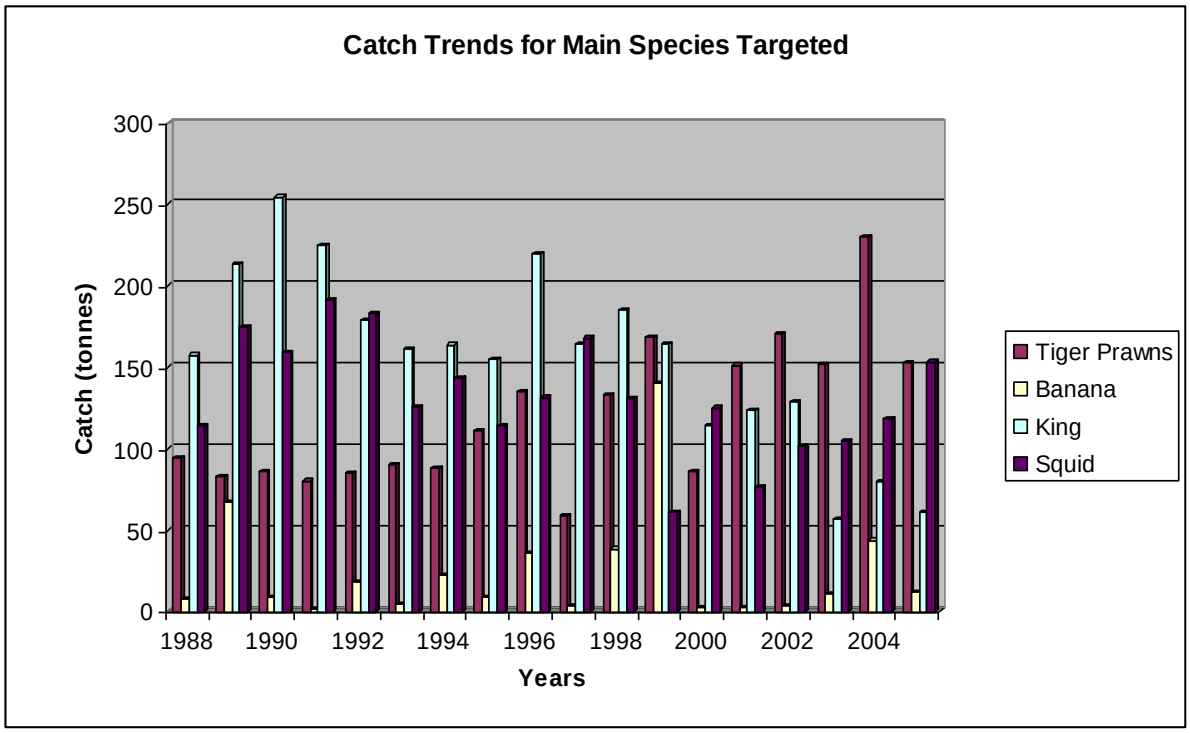


Figure 25 – Catch levels displayed over time for top four species caught in Moreton Bay otter trawl fishery (compiled from DPI&F Chris Web data)

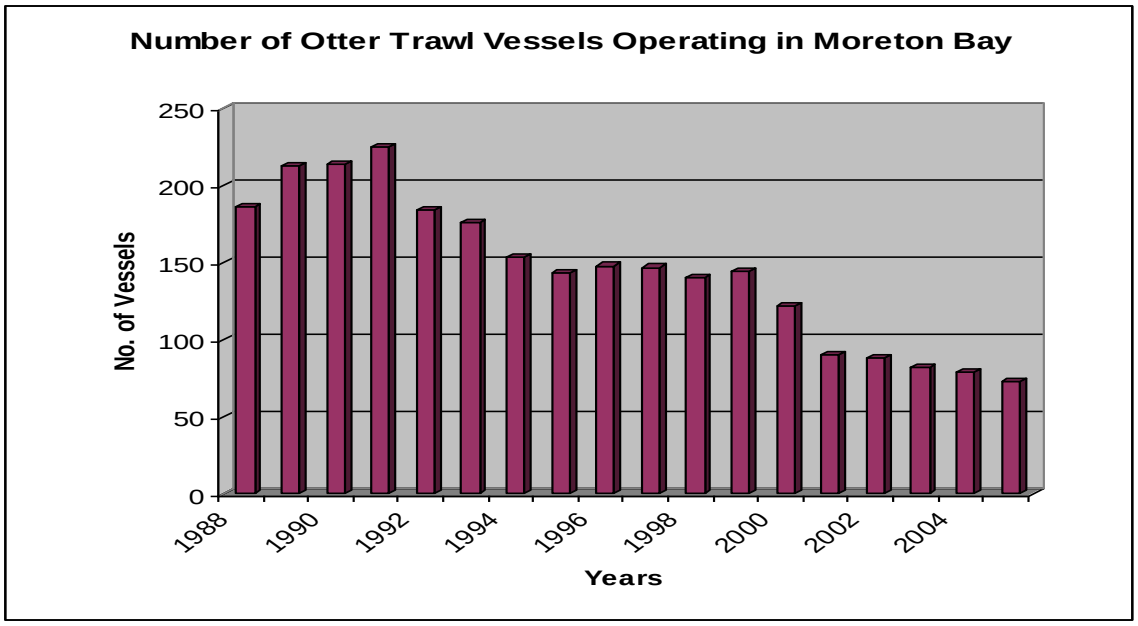


Figure 26 – Number of boats operating over time within the Moreton Bay otter trawl fishery (compiled by DPI&F Chris Web data)

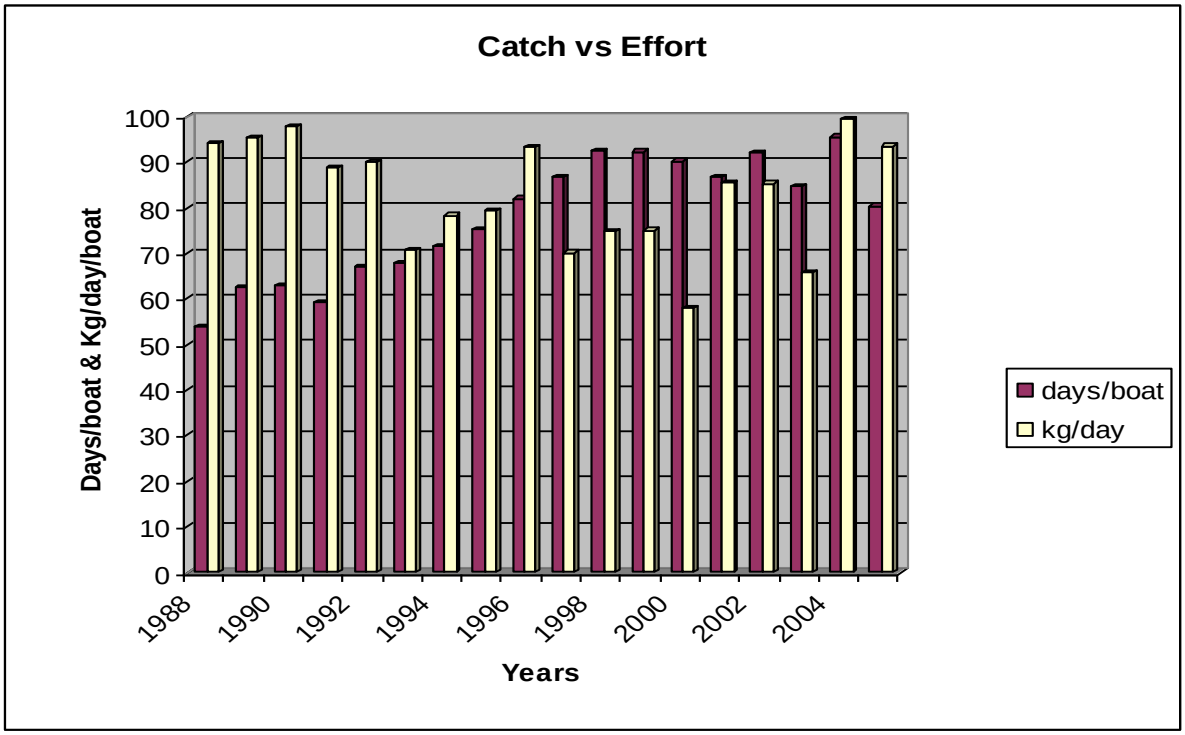


Figure 27 – Mean daily harvest (Kg) for otter trawl fishery vs effort or mean days fished over time (compiled from DPI&F Chris Web data)

Fishing Methods

All trawl vessels operating in Moreton Bay must be no longer than 14 meters. Special apparatus restrictions are set for the otter trawl fishery undertaken in Moreton Bay. The size of the mesh must be at least 38mm but no more than 60mm, and the size of the head rope and bottom rope for the net cannot measure more than 32.5 meters.

Under the *Fisheries Act 1994* a weekend closure to trawling (and all forms of netting) applies to Moreton Bay from 6 p.m. each Friday to 6 p.m. each Sunday.

The most common type of gear setup on Moreton Bay otter trawlers is a double rig or two nets (Figure 28). However some boats use different gear setups such as _tri-gear' or three nets (two large, with one small net for sampling) or _quad-gear' or four nets.

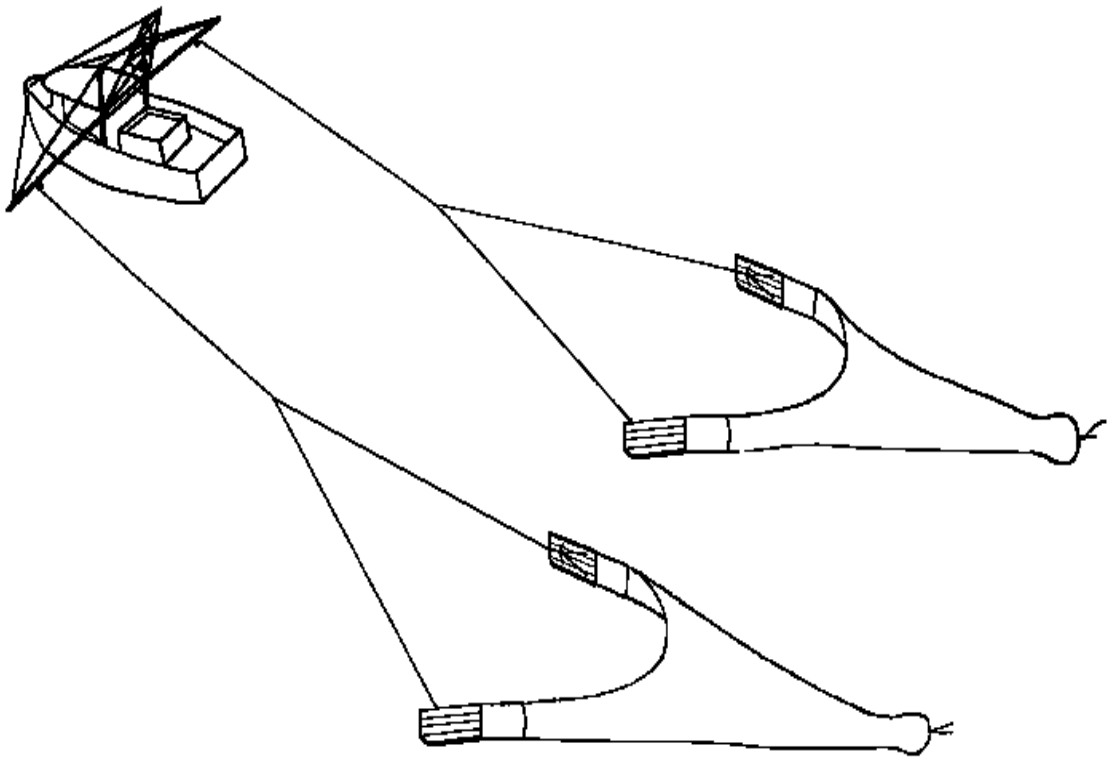


Figure 28– Diagram of a typical otter trawl ~~–~~double rig" (Sterling et al. 2005)

It is compulsory for all otter trawlers to have both a turtle exclusion device (TED) and bycatch reduction device (BRD) fitted to each net (Figure 29). These devices ensure that not only turtles, but most large non-target species never enter the cod-end of a net.

Anecdotal evidence suggests that some Moreton Bay otter trawl operators voluntarily attach TEDs of a larger size than the legally required dimensions. This ensures that all animals are released. In addition to this, some operators are voluntarily trialing and developing new, innovative BRDs.

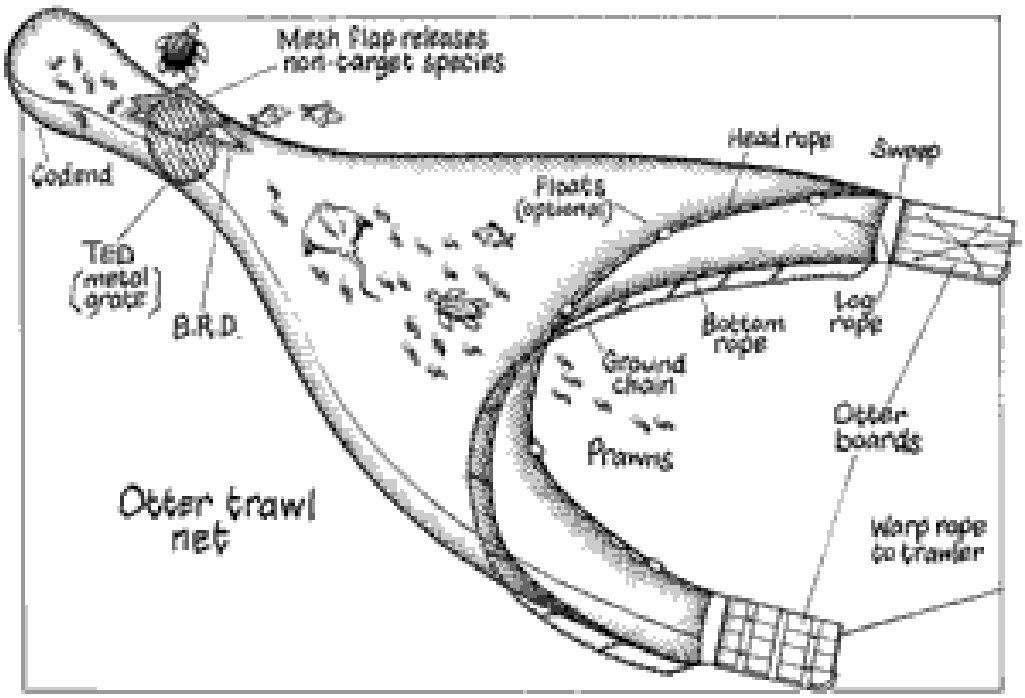


Figure 29 – Diagram of a typical otter trawl net showing the Turtle Exclusion Device (TED) and Bycatch Reduction Device (BRD) (QDPI&F website, 2008).

The environment likely to be affected by the fishery

Little published data is available on the nature and extent of seabed habitats fished by trawlers in Queensland. (Zeller 1998). Without a thorough knowledge of benthic assemblages in trawled areas, it is difficult to make definitive assessments of the impact of trawling in Moreton Bay. While studies have been conducted into the effects of trawling in the Great Barrier Reef Marine Park (Poiner et al. 1998, Pitcher et al 1997), the results do not necessarily have direct correlation with trawling in Moreton Bay. These two areas have vastly different sea bottom topography, structures and therefore benthic assemblages, flora and fauna.

Trawl grounds in inshore areas of southern Queensland have predominantly mud bottoms in estuaries and close to the mainland shore and are sandy in deeper waters and further offshore (Zeller 1998). Trawlers target species in specific areas on a seasonal basis where substrate is suitable. Closures may limit trawling at specific times or locations reducing the level of disturbance to benthic habitats in trawlable areas.

Trawling in Moreton Bay generally occurs in the muddy or sandy flats offshore, in the northern and middle areas of the Bay (WBM 2004a). Inshore seagrass beds are not affected by trawlers except during the banana prawn season when boats come in close to shore (Zeller 1998). The banana prawn season occurs over a limited period of time

(generally around March/April) as it is rainfall dependant. In addition, short shots are used to target banana prawns to minimize damage to both the product and the environment.

The surface layers of the banks and channels in northern Moreton Bay are highly mobile under the influence of the prevailing tidal flows and wave action. Despite this dynamic environment, the sandy substrate provides habitats for a range of benthic (bottom-dwelling) fauna such as worms and prawns (WBM Oceanics 2004a). Some of these fauna are in turn prey species of fish and are therefore important for environmental and commercial reasons.

WBM Oceanics Australia (2004a) completed a detailed investigation of benthic fauna communities in northern Moreton Bay which provided information on the nature of macrobenthic resources and the possible responses of fisheries to any impacts on macrobenthos. This study found that the majority of organisms occur in the top 30cm of sediment. Results indicate that rates of recolonisation by organisms from larval dispersal and active colonization from adjacent areas are very high. This can be attributed to the adaptation of faunal species to their highly mobile sand bank habitat.

This study also found that benthic faunal assemblages vary depending on the depth and location. A larger number of species and overall abundance were recorded as depths increased (WBM 2004a). This is consistent with a lower energy environment (less exposed to tidal currents, wave action and sediment transport) at greater depths.

This study indicated that extractive processes (e.g. sand extraction) would be unlikely to result in —detectable medium or long-term changes in the distribution or abundance of (economically important) species in Moreton Bay" (WBM 2004a). Based on these results (and given the current paucity of information on the benthic impacts of trawling in Moreton Bay), it is reasonable to assume that trawling (documented as disturbing substrates and benthic assemblages (Poiner et al 1998)) would not significantly impact on benthic assemblages in these areas, due to naturally high recruitment rates.

Research has been undertaken in a number of areas over the last few years, investigating trawl gear technologies that are more _benthic-friendly' than those currently used (e.g. Sterling 2005). Depending on the results of rigorous testing, commercial prototypes may be utilized to further minimize the impact of Moreton Bay trawlers on marine biodiversity.

Habitat required to support the fishery

Many species of prawns and fish use inter-tidal wetlands as feeding and nursery areas. Juvenile prawns and fishes migrate from these habitat areas to deeper waters to recruit. Prawn juveniles continue to use inshore marine and estuarine habitats until they reach adulthood when they move out of their nursery habitats into deeper, more marine waters (Zeller 1998). As a result, fisheries habitat critical to sustaining the species that support

the trawl fishery has been permanently closed to ensure that recruitment to neighboring trawl grounds continues.

Some of the most valuable nursery habitats for tiger and endeavour prawns in Queensland are the shallow coastal seagrass meadows. These meadows are also essential dugong and turtle feeding habitat. Some of the most important areas of juvenile prawn, fish and crab nursery habitat are in sheltered ports and harbours targeted for increased development.

Port developments and urban, industrial and agricultural land practices must be managed to ensure the sustainability of these valuable coastal marine ecosystems (QFMA 1996).

Current/proposed management arrangements for the fishery

The professional otter trawl fishery in Moreton Bay is managed by the Queensland Fisheries Service (QFS) which is part of the Queensland State Department of Primary Industries and Fisheries (DPI&F) through the use of the:

- *Queensland Fisheries Act 1994;*
- *Queensland Integrated Planning Act 1997;*
- *Queensland Fisheries Regulation 1995 (amendments – 2003, 2004);*
- *Marine Parks Act 1982;*
- *Marine Parks Regulation 1990;* and
- *Marine Parks (Moreton Bay) Zoning Plan 1997.*

Moreton Bay otter trawl activities are regulated through the *Fisheries (East Coast Trawl) Management Plan 1999.*

Under these statutory provisions stringent operating rules apply to both the otter and beam trawl fleets. In the otter trawl fleet, the boat size has been limited to 14 meters total length and trawl net size severely restricted. There are weekend closures when no trawling is permitted, as well as a series of areas closed to trawling, which protect both the estuarine habitats and the juveniles of all species. In addition, trawl fishers are not permitted to keep species such as whiting, and must meet the minimum standard size limits for permitted species targeted by professional fishers.

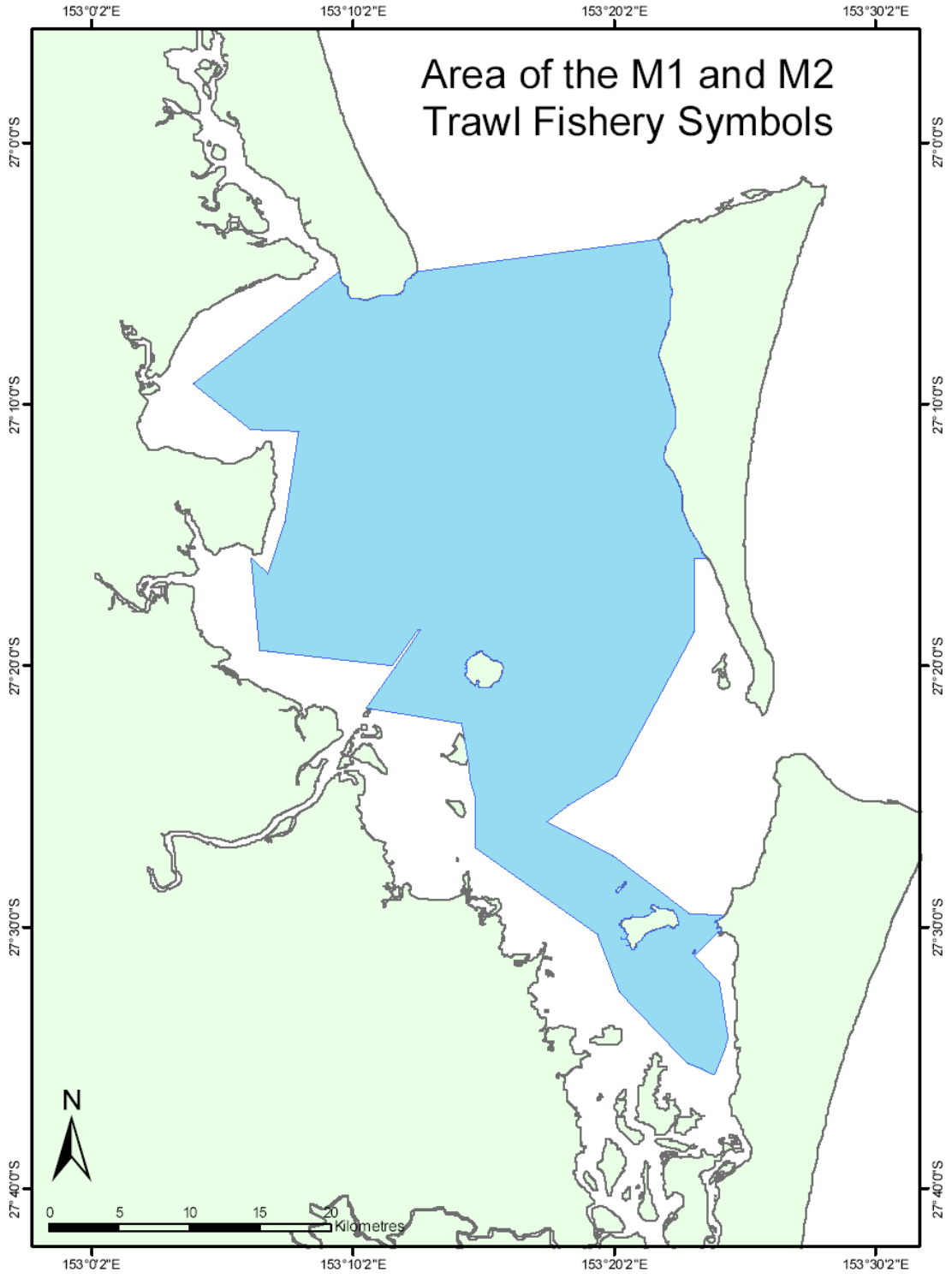


Figure 30 – Map taken from DPI&F website (current as of 3 January 2006). This map represents the approximate area where fishing operations are permitted under the fishery

symbol. Please refer to the relevant fisheries legislation (e.g. Regulation or Management Plan) for the exact boundaries of an area.

Risk assessment of the fishery

The most significant element of an Environmental Management System (EMS) is the completion of a thorough risk assessment. In this case we used a risk assessment tool that meets the *ISO 14001* standards for EMS development. Using this tool (located in Seafood Services Australia (SSA) website) we evaluated risks to our businesses that may occur pre-fishing, during fishing and post-fishing within the following categories - environmental, food safety, occupational health and safety, economic, public relations and social risks.

We identified hazards and risks associated with each activity that is undertaken during professional trawl operations and ranked risks using the tables below (provided by SSA). The risk assessment involved evaluating internal risks associated with our activities, as well as external risks that we cannot control but may influence our livelihood. The risk ranking tables assisted us to evaluate the likelihood of a particular threat or risk occurring and the consequence if it did occur (i.e. worst case scenario).

NB - It must be noted that in many cases there is insufficient scientific information on the potential impact of an activity. This made it difficult to accurately rank the risk. Thus while practical actions have been developed to mitigate risks, in many instances this initial risk assessment will mainly be useful in identifying knowledge gaps. Once these knowledge gaps are filled, it will then be possible to more accurately assess the impact of activities on the environment or other factors. In turn this will make it possible to develop more specific actions to address high risk activities.

The full risk report undertaken is attached at the end of the otter trawl section. Those activities that were assigned a risk ranking of 15 of higher are considered high risks and corrective actions have been developed to address each of these risks. These actions form out action plan below. Those activities that were assigned a risk ranking of 14 or lower are considered low or moderate risks and a code of best industry practice has been developed to ensure that each of these risks are minimized.

Table 1: LIKELIHOOD LEVELS OF AN IMPACT

Likelihood	Score	Definition
Likely	**6**	It is expected to occur
Occasional	**5**	May occur
Possible	**4**	Some evidence to suggest this may possibly occur
Unlikely	**3**	Uncommon, but has been known to occur
Rare	**2**	May occur in exceptional circumstances
Remote	**1**	Never heard of, but not impossible

Table 2: CONSEQUENCE LEVELS OF IMPACT

Consequence	Score	Definition
Negligible	**0**	Very insignificant impacts. Unlikely to be measurable.
Minor	**1**	Possibly detectable but minimal impact on structure/function.
Moderate	**2**	Maximum acceptable level of impact – recovery measured in months or years.
Severe	**3**	This level will result in wider and longer term impacts – recovery measured in years.
Major	**4**	Very serious impacts with relatively long time frame likely to be needed to restore to an acceptable level – recovery measured in years to decades.
Catastrophic	**5**	Widespread and permanent/irreversible damage or loss will occur – unlikely to ever be fixed.

To calculate the risk ranking for each of the identified risks, the number chosen from table 1 is multiplied by the number chosen from table 2. These numbers will fit into one of the categories shown in the table below.

Table 3: RISK RANKING CATEGORY

Score		Category
0	**=**	**Negligible risk**
1 – 6	**=**	**Low risk**
8 – 12	**=**	**Moderate risk**
15 – 18	**=**	**High risk**
20 - 30	**=**	**Extreme risk**

For table 2, the fishers involved made a set of rules to make it easier and more consistent. In table 2, all cases were considered worst-case scenarios, so long as fishers can remember at least one instance of it ever occurring to anybody.

The consequences were ranked as follows:

NEGLIGIBLE - less than a day to recover;
MINOR – a day to a week to recover;
MODERATE – a few months to recover;
SEVERE – years to recover;
MAJOR – years to decades to recover;

CATASTROPHIC – either the person/business will never recover (e.g. somebody may die, a risk where you may lose your business (financial/economic) or a risk where the public perception would be so bad that a whole fishery may be threatened).

Otter trawl fishery Action Plan

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
SECTION 1 Environmental								
1. Actions relating to internal risks								
1 - low	1.1 Fishing	1.1.1 Trawling	(a) capture - Non-target species may get caught in nets	Although the risk of catching (large) non-target species is considered low due to the use of Turtle Exclusion Devices (TEDs), the technology can be further improved and we embrace this, as we are aiming to minimize our impact on the environment. Our specific goal to address this issue is to minimize catch of non-target species.	To conduct a review of all research to date on BRDs and the improvement of these devices.	MBSIA working group	January 2008	Progress to be reviewed at monthly MBSIA meetings
					Based on the outcomes of action 1 (once any gaps in knowledge are identified), design experiments to further develop and improve Turtle Exclusion Devices (TEDs) and other types of BRDs.	MBSIA working group	June 2008	Progress to be reviewed at monthly MBSIA meetings
					All master fishers who have not completed the protected species course must complete one at a group session	All fishers who have not completed a protected species course	January 2008	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
5 - low	1.1 Fishing	1.1.1 Trawling	(b) Release - Capture of non-target species	Although the risk ranking is considered low for this activity, we want to ensure that we are aiming for world's best standards with regard to minimizing our impact on the environment. As a result, our specific goal for this activity is to minimise mortality of non-target species catch.	To trial the use of small hoppers on Moreton Bay otter trawlers (for definition of hoppers, see glossary)	MBSIA working group	January 2008	Progress to be reviewed at monthly MBSIA meetings
					All sorting trays must have shoots or holes built into the sides to ensure the speedy return of non-target species to the ocean (and these must be maintained) or other techniques that achieve the same goal must be implemented.	All fishers	June 2007	Progress to be reviewed at monthly MBSIA meetings
1 - low	1.1 Fishing	1.1.2 Trawling	Damage to benthic flora and/or fauna	Although the risk ranking for this hazard is considered low, we accept that it is important to further minimize ANY impacts. Our goal to address this risk is to minimize the impact of trawl gear on benthic communities.	To assess and evaluate current scientific information on the impacts of various ground-gear on benthic communities and to identify knowledge gaps.	MBSIA working group	January 2007	Progress to be reviewed at monthly MBSIA meetings
					Once knowledge gaps are identified, to commit to science-based initiatives on trawl gear to reduce damage to benthic communities.	MBSIA working group	June 2007	Progress to be reviewed at monthly MBSIA meetings
6 - low	1.1 Fishing	1.1.3 Generation of	The bilge water may	To aim for nil discharge of contaminated bilge	To trial the inclusion of simple bilge water filtering	MBSIA working	June 2007	Progress to be reviewed at

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
		bilge water and disposal of such water	contain oil and/or other contaminants and may not be disposed of appropriately.	water at any time	devices on board trawl vessels in Moreton Bay (this technique developed by John Olsen) or other techniques that achieve the same goal must be implemented	group		monthly MBSIA meetings
6 – low	1.1 Fishing	1.1.4 The overall operation's energy efficiency rate, water use and potential air pollution may not be optimal	These factors may be having a direct or indirect adverse affect on the environment	To minimize the ecological footprint of trawl operations (i.e. the indirect impacts on the environment)	To investigate the costs associated with contracting an environmental consultant to undertake a cleaner production assessment of Moreton Bay otter trawl vessels	MBSIA executive	June 2007	Progress to be reviewed at monthly MBSIA meetings
					To scope funding options to offset costs of undertaking a cleaner production assessment	MBSIA executive	June 2007	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
					To utilize the findings and recommendations of the cleaner production assessment to make recommendations that may apply to all Moreton Bay otter trawl vessels	MBSIA EMS committee	12 months after the clean production assessment has been completed	Progress to be reviewed at monthly MBSIA meetings
2. Actions relating to external risks								
30 - extreme	1.2 External	1.2.1 Urban pollution (physical debris)	Smothering of seagrass and chemical breakdown of debris. (e.g. food wrappings, cigarette butts, cars etc.)	Minimize disposal of physical debris by all resource users into the ocean and to assist with the removal of such debris from the ocean.	Have an active role in broader catchment management of Moreton Bay's waterways, through having representation on the EPA Board and the Brisbane Waterways group	MBSIA board	Already achieved and continuing	Ongoing review at monthly MBSIA meetings
					Have an active role in marine clean-up exercises	All fishers	Already achieved and continuing	Ongoing review at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
30 - extreme	1.2 External	1.2.2 Urban pollution (chemicals, sewage and other waste)	Drastically reduced water quality which negatively impacts on flora and fauna	Minimize input of chemicals by all resource users to the marine ecosystem	Have an active role in broader catchment management of Moreton Bay's waterways, through the action listed above and also by assisting where possible with research, such as water quality monitoring programs and water sampling.	All fishers	Already achieved and continuing	Ongoing review at monthly MBSIA meetings
					Publicly support and contribute to conservation groups attempting to prevent land-based pollution.	MBSIA board	June 2008	Progress to be reviewed at monthly MBSIA meetings
30 - extreme	1.2 External	1.2.3 Development of housing estates and commercial/ industrial enterprises	Destruction of mangroves and other important marine habitats, in addition to changes in tidal flows	To assist in preserving flora critical to the health of the Moreton Bay marine ecosystem	To have a Moreton Bay seafood industry representative on the EPA board and to contribute to the approvals process for developments.	MBSIA representative	June 2006	Progress to be reviewed at monthly MBSIA meetings
					Actively contribute to the Moreton Bay Waterways and Catchments Partnership (by having a delegate to represent)	MBSIA representative	Already achieved and continuing	Progress to be reviewed at monthly MBSIA meetings
18 - high	1.2 External	1.2.4 Recreational fishing	Potential over-fishing of fish stocks due to	To ensure the future of fish stocks in Moreton Bay by building a more	To approach local incorporated recreational fishing groups as we seek	Elected MBSIA represen	January 2008	Progress to be reviewed at monthly

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			less stringent input and output controls imposed on recreational anglers (compared to professional industry) by State Government.	positive and cooperative relationship with recreational anglers.	cooperation on local issues. E.g. addressing risks that affect both resource user groups and to commence cooperation on new initiatives that will be beneficial for all.	tatives		MBSIA meetings
				To ensure that accurate information on recreational catch and effort is available	To support research undertaken by DPI&F in relation to recreational catch and effort and to ensure public access to this information	MBSIA board	Decembe r 2006	Progress to be reviewed at monthly MBSIA meetings
25 - extrem e	1.2 External	1.2.5 Ports and shipping	Expanding the Brisbane port and the dredging of rivers and other areas.	To ensure that the relevant authorities are aware of the potential or real impacts of dredging and port expansion on marine flora and fauna in Moreton Bay and to ensure that this impact is minimized.	To provide input regularly on water quality issues through representation on the EPA board and on other relevant committees.	MBSIA board	May 2006	Progress to be reviewed at monthly MBSIA meetings
					Volunteering to assist with research into water quality issues and the effects of dredging and/or expansion of ports on marine ecosystems.	All fishers	Ongoing as research projects arise	Progress to be reviewed at monthly MBSIA meetings
					To record any obvious	All	Ongoing	Progress to be

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
					changes to flora and fauna as a result of dumped silt close to shores – for example smothering of seagrass beds or reduction in catches following such activity. These records to be collated and reported to the EPA and DPI&F.	fishers		reviewed at monthly MBSIA meetings
					To organize a meeting with the Brisbane Port Corporation to discuss issues.	Volunteers elected at Moreton Bay Fisher's meeting	By June 2006	Progress to be reviewed at monthly MBSIA meetings
	1.2 External	1.2.6 Expansion of the Brisbane airport	Loss of fishing grounds and wider impacts to the ecosystem	To minimize impacts of airport expansion on the environment, including fish stocks and water quality.	To organize a meeting with the Brisbane Airport Corporation to discuss issues.	Volunteers elected at Moreton Bay Fisher's meeting	By June 2006	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
25 - extreme	1.2 External	1.2.7 Dumping of sewage (treated or otherwise) into Moreton Bay waterways	Increased nutrient content in water column (particularly nitrogen and phosphorus)	To ensure that relevant authorities and the community are aware of the potential and real impacts of increased nutrient content or eutrophication on water quality – for example increases in algal blooms such as Lyngbya.	To record any obvious changes to flora or fauna near river mouths and in general – for example the presence of new or unusual algal blooms or increased presence of Lyngbya. These records to be collated and reported to the EPA and DPI&F.	All fishers	All fishers to be reporting from June 2006	Progress to be reviewed at monthly MBSIA meetings
					Support researchers who are attempting to map eutrophication (increased nutrients) in Moreton Bay.	All fishers	As projects arise	Progress to be reviewed at monthly MBSIA meetings
					To support conservation groups who are trying to raise awareness about water quality issues in the Bay.	MBSIA board	June 2008 and in the mean time, as they arise	Progress to be reviewed at monthly MBSIA meetings
					To have representation on the Waterways partnership group	MBSIA representatives	Already achieved and continuing	Progress to be reviewed at monthly MBSIA meetings
SECTION 2 Occupational Health and Safety								
1. Actions relating to external risks								

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
15	2.1 External	2.1.1 Recreational boating	Collision	To avoid all collisions between professional fishing vessels and other vessels in the Bay	To contact the peak recreational fishing and boating organizations, boat license providers and yacht clubs about developing some sort of education/awareness program about boating rules and interactions.	MBSIA elected volunteers	June 2007	Progress to be reviewed at monthly MBSIA meetings
SECTION 3 Food Safety								
1. Actions relating to internal risks								
15	3.1 Fishing	3.1.1 Product handling	The ice slurry that target species are placed into may melt on a very hot day, if there is insufficient ice or if the sorting process takes longer than usual – this can potential lead to physical, chemical and microbial	To produce safe and high quality product.	To develop a regional Moreton Bay food safety plan. All fishers to have a copy of the plan and comply with it.	All fishers	Plan to be developed by December 2006. To be circulated and complied with by June 2007	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			product contamination					
SECTION 4 Public Relations								
1. Actions relating to internal risks								
15	4.1 Pre-fishing	4.1.1 Loading fuel	Some fuel may potentially be spilled resulting in water pollution, potentially fire, personal injury to crew and likely increased public negativity towards the commercial fishing industry as a whole	To ensure that fuel spillage does not occur, that in the event of a spillage, that cleanup is swift and thorough and that media coverage of such an event is managed appropriately.	To develop a public education campaign to reassure the general public that fishers are complying with regulation in relation to handling fuel and avoiding fuel spillages.	All fishers	From June 2006 onwards	Progress to be reviewed at monthly MBSIA meetings
					Two media spokespersons to be elected at MBSIA AGM to handle media.	MBSIA trawl represen tatives	June 2006	Progress to be reviewed at monthly MBSIA meetings
					Procedure to be written on	EMS	June	Progress to be

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
					how to deal with crisis media situations.	Officer	2006	reviewed at monthly MBSIA meetings
					Options for subsidizing training to be investigated.	To be organized by MBSIA board and executive	May 2006	Progress to be reviewed at monthly MBSIA meetings
					Media training for media spokespersons to be organised.	To be organized by MBSIA board and executive	June 2006	Progress to be reviewed at monthly MBSIA meetings
25	4.1 Fishing	4.1.2 Interaction between nets and non-target species	Negative media may result from interaction of nets with non-target species, even if there are measures in places to	To take all precautions necessary to minimize interaction with non-target species and to regularly publish positive news articles relating to new measures and achievements with regard to eliminating	To organize some group training with regard to working with the media and communicating positive news stories. Also with how to deal with negative media as it arises.	As above	As above	As above

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			minimize it. This sort of media is catastrophic for the industry in terms of securing resource access and therefore a secure future	bycatch				
					Demonstrate through a verifiable process that fishers are committed to environmental sustainability – investigate the options for third party certification (or other forms of certification) e.g. ecolabelling.	MBSIA board	June 2008	Progress to be reviewed every third meeting at monthly MBSIA meetings
					Support research into options for fishers with regard to labeling/certification or other co-management options	MBSIA board	As projects arise	Progress to be reviewed at monthly MBSIA meetings
					Scope out an appropriate marketing strategy to promote the EMS and	MBSIA executive	December 2007	To be reviewed at monthly

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
					seafood caught by Moreton Bay fishermen operating under an EMS			MBSIA meetings
20	4.1 Fishing	4.1.3 Sorting the product	Negative attitudes may be formed by the public in relation to bycatch when viewed by the public	To minimize bycatch, education of the public about fishing practices, dispel myths and publish good news stories about the achievements of the industry with regard to minimizing bycatch, improving water quality and protecting important species	Design a public awareness program with regard to the professional trawl industry and combine efforts with other professional fisheries in the region to organize promotional activities at a regional level. Develop a communication strategy based on research into key stakeholder groups – e.g. education packages for schools	MBSIA working group	June 2007	Progress to be reviewed at monthly MBSIA meetings
2. Actions that relate to external risks								
25	4.2 External	4.2.1 Land-based farming	Chemicals in waterways	Members of the public may make the assumption that observations of reduced water quality in local waterways is linked with commercial fishing activities in that area.	Design a public awareness program with regard to the professional trawl industry and combine efforts with other professional fisheries in the region to organize promotional activities at a regional level. Develop a communication strategy based on research into key stakeholder groups – e.g.	MBSIA working group	June 2007	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
					education packages for schools			
30	4.2 External	4.2.2 Recreational fishing	Anecdotal evidence indicates that some recreational fishers have a negative view of the professional fishing industry due to lack of information about the industry and competition for resource access	To improve recreational fishers' awareness of the professional fishing industry, remove myths and educate this sector	To approach local incorporated recreational fishing and boating magazines about publishing factual articles in relation to professional fishing in their publications	MBSIA board	June 2007	Progress to be reviewed at monthly MBSIA meetings
SECTION 5 Economic								
1. Actions relating to external risks								
20	5.1 External	5.1.1 Re-zoning of Moreton Bay Marine Park	Reduced access to productive fishing grounds resulting in	To maintain access to productive fishing grounds, while implementing sustainable fishing practices.	To actively participate in and contribute to planning and consultative processes associated with re-zoning of the Moreton Bay Marine Park and to work with	MBSIA board represen tatives	Already underway and continuin g through the	To be reviewed at monthly MBSIA meetings.

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			loss of income and potential loss of business.		recreational fishing groups in ensuring equitable access for all.		process.	
25	5.1 External	5.1.2 Land-based farming	Chemicals in waterways	To contribute to positive discussion and action to assist with minimizing water pollution	Have an active role in broader catchment management of Moreton Bay‘s waterways, through having representation on the EPA board and the Brisbane Waterways Group.	MBSIA board	Already achieved and continuing	Ongoing review at monthly MBSIA meetings
15	5.1 External	5.1.3 Recreational fishing	Competition between recreational and professional fishers which may result in loss of access to fishing grounds	To build positive relationships between the recreational and professional fishing sectors and to work together on issues that are common	To contact the peak recreational fishing body and discuss what might be a common issue to work towards and to develop a project to work on together.	MBSIA working group	June 2007	Progress to be reviewed at monthly MBSIA meetings
18	5.1 External	5.1.4 Selling product	Fluctuating and poor prices, difficulty in finding a market or buyer, which	To have some financial security within the seafood industry	Contact the Brisbane City Council about their recent investigation about whether to establish a fish board where people can bid for product	MBSIA elected representative	June 2007	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			leads to financial loss and insecurity					
30	5.1 External	5.1.5 Selling product	Competition with cheaper imported product	To rebuild Australian consumer interest in purchasing local and fresh produce. To promote the local seafood products and to encourage consumer awareness about product quality and harvesting techniques	To formally support a project investigating ecolabelling	MBSIA board	As projects arise	Progress to be reviewed at monthly MBSIA meetings
					Scope out an appropriate marketing strategy to promote the EMS and seafood caught by Moreton Bay fishermen operating under an EMS	MBSIA executive	December 2007	To be reviewed at monthly MBSIA meetings
					to instigate a promotional campaign for locally caught seafood	MBSIA board and all fishers	December 2006	Progress to be reviewed at monthly MBSIA meetings
SECTION 6 Social								
1. Actions relating to internal risks								
30	6.1 Post-fishing	6.1.1 Selling the product	There is significant	To have financial security for families	Diversifying the family business into other areas to	All fishers	Ongoing	Progress to be reviewed at

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			social impact on families when prices are poor. It puts strain on family life, relationships and ability to provide for children.		provide security during times of economic instability			monthly MBSIA meetings
12	6.1 Internal	6.1.2 Fishing	The significant amount of fishing hours required to make a living (including maintenance, bookwork and other business activities) results in less time spent with family and partners, sometimes resulting in family breakdown and often	To operate a business where it is possible to have a balance between work and personal life	To utilize communication technologies such as mobile phones and email while at sea to have regular contact with family and partners.	All fishers	Ongoing	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			depression and health issues					
2. Actions relating to external risks								
20	6.2 Fisheries management issues	6.2.1 Fishing and participation in fisheries management	Competition for resource access, closure of fishing grounds can lead to industry insecurity, depression, strain on relationships and even suicide – this is a very significant problem	To work in a political environment where fishers can have some security and sense of ownership and participation in fisheries management decisions	To issue formal invitations to fisheries managers to have regular boat and ramp visits	MBSIA board	August 2006	Progress to be reviewed at monthly MBSIA meetings
25	6.2 Internal	6.2.2 Lack of industry initiative in addressing the issue of public relations (between industry and the general	Public perceptions have a significant impact on political debates and related issues such as	To improve the capacity and willingness of the industry to improve public perceptions of the industry through proactive initiatives	To arrange media training for key spokespeople for each fishing sector	To be organized by the MBSIA board and executive	June 2006	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
		public)	resource access for commercial fishers, in addition to restriction on catch and effort					

Code of Industry Best Practice

(Industry Standard for Moreton Bay otter trawl operators)

Pre-fishing

1. Operators will re-fuel according to procedures set out on signs at the fuel depot and will take due care in order to prevent potential spillages;
2. if not re-fueling at a depot, operator must follow procedure as set out by the relevant Government department;
3. in the event that fuel spillage does occur, operators will follow fuel depot procedures for clean-up and pollution prevention;
4. if you do not know what the re-fuelling procedures are at a particular depot, ask;
5. take care when loading stores and ice onto boats to prevent spillage, pollution and/or injury;
6. crew must follow relevant legislation pertaining to lifting heavy weights onto a marine vessel;
7. use common sense and be alert at all times when working on or around boat ramps;
8. each operator must have completed a food safety course and have their own food safety plan to ensure that the handling process is transparent and traceable – ACTION??;
9. nets must be checked that they are stacked carefully prior to fishing to avoid tangling;

Fishing

10. all operators are encouraged to trial and develop innovative bycatch reduction devices;
11. all operators will collect any waste (including personal or other) and dispose of it at an appropriate on-land waste facility;
12. operators will keep physical debris caught in nets that can safely be stored on board the vessel and dispose of this debris at an appropriate land-based waste facility;
13. inexperienced fishers to be trained or coached by experienced fishers so that the code of industry best practice may be understood and applied in all situations;
14. each sorting tray must have a shoot or hole (or an alternative method) whereby non-target fish are returned to the ocean as quickly as possible (to reduce mortality rate of bycatch);
15. all operators will use all available means to avoid catching non-target species (e.g. eco-sounders and/or tri-gear);
16. while fishing, if large physical debris (urban pollution) is observed, authorities to be notified (e.g. a rusting fridge);

17. while fishing, if visual evidence of chemical pollution is observed, authorities to be notified (e.g. dead or unhealthy fish floating in water, or oil/chemical slicks noticed on water surface);
18. if unusual or toxic algae (including Lyngbya or –Fireweed") is observed while fishing, authorities to be notified – or jotted in log book;
19. by possessing a professional fishers license, it is expected that the operator be trained in navigation, listen to correct radio channels, keep adequate watch at all times, obey speed limits and have lights on vessel operating at night in order to avoid collisions with other boats or objects;
20. each vessel must be fitted with appropriate safety/emergency equipment;
21. each skipper should be aware of their crew's capabilities and follow the individual boat safety procedures in the event of an emergency;
22. the crew must follow the skippers instructions at all times and be trained in boat procedures;
23. crew must be aware of and follow the operation's occupational health and safety procedure as set out by the skipper – for example, this may include wearing appropriate protective clothing and up-to-date knowledge on identification and handling of venomous marine animals;
24. any collisions with other vessels must be reported to boating and patrol;
25. fishers to take extra care when fishing in bad weather conditions; and

Post-fishing

26. biodegradable cleaning products (as approved by supplier) are to be used in accordance with the Material Safety Data Sheets (MSDS) provided by the supplier.

Review mechanisms

In addition to regular monitoring and documentation of progress against actions at MBSIA meetings, a period of review is required after the deadlines, to ensure that actions have been carried out.

As many of the actions are scheduled to be completed by June 2007, it is envisaged that a comprehensive review will commence in July 2007. This review will involve a series of workshops or meetings, where the MBSIA board will evaluate the progress of actions and the uptake and implementation of the EMS in general.

Each working group elected to work on certain actions will be required to report back to the board on their achievements and progress. Discussion will centre on key themes such as:

- What have been the key challenges to implementing the action?
- How have these challenges been resolved?
- What are the future directions, actions or projects leading from the completion of the original action?
- What support do fishers or teams require in order to achieve these actions?

For actions that involve modifications to fishing operations or gear (and that apply to all fishers in the sector), an appropriate method to ensure changes have been implemented needs to be established. This method will be decided on by the otter trawl fishing representative, in consultation with other otter trawl fishing members and the MBSIA board. This may be through, for example, boat inspections by the MBSIA or signed agreements stating compliance with the EMS.

The Code of Conduct should also be reviewed by the otter trawl representative and otter trawl members to ensure that it is relevant and up-to-date.

The findings of the review will be compiled into a report, which will be used by the board to set new actions, targets, deadlines and monitoring.

A similar review will be undertaken again in July 2008 to report of progress against actions (review of actions will be annual). This review will be more comprehensive than the July 2007 review. A full risk assessment should be undertaken, to ensure that actions are relevant and up-to-date. This will be undertaken through workshops with all members who have net fishing endorsements. In addition, the 2008 review will include updating the background information in the EMS, including updating statistics on catch and effort, number of vessels, species caught and external impacts on the environment (e.g. pollution). The key output of the 2008 review will be fully updated EMS documentation.

Following the 2008 review, a summary version of the revised EMS will be printed for fishers as a quick reference document, including vision, policy, actions and code of conduct.

Review Form

(to be filled out by fishers at the July 2007 and July 2008 reviews)

Action	By whom	Deadline	Achieved? (yes/ no)	Challenges	How were challenges resolved?	Support required to carry out actions	New action, deadline, by whom and monitoring

Otter trawl fishery Risk Report and Corrective Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
SECTION 1 Environmental risks						
1.1 Pre-fishing	1.1.1 Load fuel	Fuel spillage	Pollution	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals provided by the re-fuelling depot Qld transport provide operating procedures for re-fueling that are advertised at depot	3	Code
1.1 Pre-fishing	1.1.2 Load stores and ice onto boat	Chemical spillage	Pollution	- loading stores and ice onto boats occurs at designated areas or ports, where appropriate procedures are in place - Crew training and operational manuals provided	3	Code
1.2 Fishing	1.2.1 Trawling	Non-target species may get caught in nets	Potential injury to animals	It is compulsory for all otter trawlers to have a Turtle-exclusion-device (TED) fitted to each net. This device ensures that not only turtles, but most non-target species never end up in the coded of a net. NB. Approximately 90% of fishers are voluntarily attaching larger TEDs than required, to ensure that ALL animals are	1	Code and action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
				released. In addition to this, some fishers are voluntarily fitting what are called –crab excluders" for vessels that are operating in high-density crab areas. This is a temporary device that not everyone uses, but can be attached to any net fitted with a TED. - fishers also tend to avoid areas that have high densities of unwanted or non-target catch		
1.2 Fishing	1.2.2 Trawling	Capture of non-target species	Mortality of non-target species before and/or after release	Most boats are fitted with sorting trays that have shoots. Shoots assist with the speedy release of non-target species.	5 (although difficult to determine due to lack of available information	Action and code
1.2 Fishing	1.2.3 Trawling	Damage to benthic flora and/or fauna	This will disrupt ecosystem flows	- The TEDs mentioned above also exclude large sponges and other similar plants. - each vessel utilizes different forms of –ground-chains" which dangle along the	5	Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
				bottom of the nets – some innovative designs considerably reduce the amount of damage to benthos on the seafloor - fishers are aware of ~~–k~~known" areas for seaweed and sponge and generally avoid these areas. - fishers have devices fitted in their vessels called plotters – these provide an indication of what is on the sea bottom (in terms of density) - in addition to the use of plotters, a short fishing session or ~~–s~~hot" is carried out to sample the area and test to see whether it is appropriate to fish in - generally the amount of time that nets are fished is limited and carrying out shorter ~~–s~~hots" is one way of minimizing capture of benthos		
1.2 Fishing	1.2.4 Generation of personal rubbish and waste associated with fishing	Rubbish is not disposed of in the correct manner	Rubbish may have a negative impact on the marine environment	Personal and other rubbish is collected on the boat and is disposed of at an appropriate waste facility (on land)	2	Code
1.2 Fishing	1.2.5 Generation of bilge water and	The bilge water may contain oil and/or other contaminants and	Contaminated bilge water may be discharged at sea and contribute	Bilge water must not be discharged within a certain distance to shore (according to legislation). When out at sea there are no current controls.	6	Action and code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	disposal of such water	may not be disposed of appropriately.	to water pollution			
1.2 Fishing	1.2.6 Fishing	The overall operation's energy efficiency rate, water use and potential air pollution may not be optimal	These factors may be having a direct or indirect adverse affect on the environment	No current controls in place	6 (although this is unknown until an assessment is carried out	Action
1.3 External risks	1.3.1 Urban pollution (physical debris)	Smothering of seagrass, and chemical breakdown of debris (e.g. food wrappings, cigarette butts, cars etc.)	Detrimental impacts on marine flora	No current controls in place	30	Action (3 actions) and code
1.3 External risks	1.3.2 Urban pollution (physical debris)	Marine animals may become trapped by large physical debris or choke to death on	Detrimental effects on marine fauna.	Introduction of biodegradable plastic bags.	30	As above

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
		plastic bags, be poisoned by cumulative effects of cigarette butts on water quality.				
1.3 External risks	1.3.3 Urban pollution (chemicals)	Drastically reduced water quality will significantly impact on marine fauna	direct absorption of chemical s by marine animals through their skin and other membranes	No current controls in place	24	action
1.3 External risks	1.3.4 Urban pollution (chemicals)	Drastically reduced water quality will impact on marine flora	Mangroves which form a nursery for many species juvenile marine animals, may be killed off. In addition, seagrass beds which form important breeding grounds and nurseries for juvenile marine animals (e.g. prawns) may be killed.	No current controls in place	24	Action
1.3 External risks	1.3.5	Destruction of	Mangroves and	Planning and development controls	30	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	Development of housing estates and commercial/ industrial enterprises	mangroves and other important marine habitats, in addition to changes in tidal flows	seagrass beds may be killed off which are important breeding grounds for many juvenile marine species.	regarding destruction of marine plants (fisheries legislation provides for protection of marine plants and declaration of key fish habitats as Fish Habitat Areas and restoration of fish habitats).		
1.3 External risks	1.3.6 Land-based farming	Chemicals in waterways	Degradation of marine flora and fauna due to decreased water quality.	No current controls in place	24	action
1.3 External risks	1.3.7 Recreational fishing	Over-fishing of fish stocks (there is no limit on the number of recreational fishers in Queensland, while there are highly restrictive limits on commercial fisheries).	Reduction or potential elimination of breeding stocks	No current controls in place	18	action
1.3 External risks	1.3.8 Ports and shipping	Expanding the port - dredging of rivers and other areas	The dumping of dredged sand/silt/mud close to shore causes	Approvals to disturb seagrass and other marine plants are required.	25	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
			smothering of seagrass beds and other plants, degradation of water quality and alters tidal flows			
1.3 External risks	1.3.9 Ports and shipping	Dumping of ballast water from foreign vessels	Introduction of exotic pests, which will result in downstream effects on marine ecosystems.	Ballast water management controls in place.	22	action
1.3 External risks	1.3.10 Dumping of sewage (treated or otherwise) into waterways	Increased nutrient content in water (especially nitrogen and phosphorus)	- Decreased water quality - many pest species (including flora and fauna) thrive on increase nutrient loads, e.g. fireweed or Lyngbya. This weed takes over seagrass beds and smothers them. Thus it kills off important breeding grounds and juvenile nurseries.	No current controls in place	25	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
SECTION 2 Occupational Health and Safety (OH&S) Risks						
2.1 Pre-fishing	2.1.1 Load fuel	Fuel spillage	Fire	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals provided by Queensland Transport Department	4	code
2.1 Pre-fishing	2.1.2 Load stores and ice onto boat	Chemical spillage	Pollution	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals provided by Queensland Transport Department	4	code
2.1 Pre-fishing	2.1.3 Load stores and ice onto boat	Lifting heavy weights	Personal injury	- take appropriate care when lifting heavy weights – ensure that there is more than one person lifting very heavy weights	8	code
2.2 Fishing	2.2.1 Travel to and from fishing grounds	Collision with other boats, the dock or with submerged objects	Personal injury	Crew trained in navigation. Crew possess appropriate certificates. Report collisions to boating and patrol authorities	15	code
2.2 Fishing	2.2.2 Steaming (driving boat along the water)	Bad or rough weather conditions	The boat may potentially capsize, causing personal injury	- deploy booms or _arms' of vessel to stabilize boat - visual assessment of weather conditions and bureau of meteorology weather reports	12	code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
				before commencing to leave the shore - for the skipper to have knowledge of the crew‘s capabilities and make sure that the crew follow the individual (boat-specific) specific boat safety procedures - have appropriate safety/emergency equipment on board vessel, e.g. flotation devices		
2.2 Fishing	2.2.3 Putting nets and boards out	Ropes may snap	Personal injury	Crew follow procedures according to vessel	5	code
2.2 Fishing	2.2.4 Shooting away and winching nets back on board the vessel	Entanglement of crew with winch or fishing apparatus	Personal injury	- the brakes are applied on the winch to prevent crew injury - Crew follow the individual vessel‘s Standard Operating Procedure (SOP).	15	code
2.2 Fishing	2.2.5 Trawling	Otter boards or nets may hook on obstructions on the bottom of the ocean (e.g. wrecks, rocks)	Personal injury as the boat may possibly capsize or throw a crew member over board. In the dark	- Each skipper usually has a set procedure to unhook or get out of such situations. The crew must follow the skippers instructions and the boat procedures.	6	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
			it can be difficult to locate a crew member gone overboard/			
2.2 Fishing	2.2.6 Drop coded above sorting tray and release product for sorting and grading.	One of the crew members may get stung by a marine animal or plant. A crew member may collide with a full coded in motion	Personal injury	All crew are appropriately trained (by the skipper)and aware of which animals are venomous. All boats supply crew with protective clothing. Each vessel has a first-aid kit on board the vessel and the skipper follows a set procedure specific to the type of sting or injury sustained.	12	code
2.2 Fishing	2.2.7 Sorting and grading product	One of the crew members may get stung or otherwise injured by a marine animal or plant	Personal injury	All crew are appropriately trained and aware of which animals are venomous. Some skippers encourage the use of protective clothing and gloves. Each vessel has a first-aid kit on board the vessel and an experienced skipper follows a set procedure specific to the type of sting or injury sustained. Each vessel is equipped with various methods of communicating in an emergency – radio etc.	12	
2.2 Fishing	2.2.8 Cooking product	- Crew members may spill hot water on their skin - there may be a gas explosion or	Personal injury	Crew must follow OH&S procedure as set out by skipper	15	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
		fire - lifting of heavy weights				
2.3 Post-fishing	2.3.1 Maintenance/ clean nets and gear after all shots are finished, wash boat down	A crew member may get stung or sustain a skin or eye injury from cleaning products	Personal Injury	All crew members must be alert and watch what they are doing. All crew must refer to the Material Safety Data Sheets (MSDS) provided by the supplier of cleaning products and must follow instructions as per the individual vessel induction and training.	2	code
2.3 Post-fishing	2.3.2 Tying boat up	Potential collision with dock or other vessel	Personal injury	Crew must follow the skipper instruction	3	
2.3 Post-fishing	2.3.3 Unloading product	Lifting many heavy boxes of products may strain back or other muscles.	Personal injury	* see sections on pre-fishing and loading stores	4	
2.3 Post-fishing	2.3.4 While crew are on boat (at all times)	There may be a gas leak and a crew member may breath these fumes in (in enclosed spaces such as the engine room)	Personal injury.	There are legislative controls on how to handle gas and gas bottles. In addition, visual checks of both fittings and hoses are carried out. All crew must follow the induction and training procedure and Standard Operating Procedure (SOP) of the individual vessel.	10	action
2.3 Post-fishing	2.3.5	Breathing in	Personal injury.	Follow instructions described Material	2	code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	Cleaning the refrigerated compartments or ice boxes	chemical fumes from cleaning agents.		Safety Data Sheets (MSDS) and induction training.		
2.4 External risks	2.4.1 Recreational boating	Collision	Personal injury and/or damage to vessels	See section above on collision		
SECTION 3 Food Safety						
3.1 Pre-fishing	3.1.1 Load fuel	Fuel spillage	Potential contamination of product	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals provided by Queensland Transport Department	2	
3.2 Fishing	3.2.1 Trawling	A shot may stay out longer than approximately 2 & ½ hours	Loss of product quality	An experienced skipper directs how long a shot should stay out for	2	
3.2 Fishing	3.2.2 Sorting and grading product	Sorting tray may not have been appropriately cleaned	Product contamination	The sorting tray and other gear used for sorting is cleaned appropriately before and/or after each fishing trip.	2	
3.2 Fishing	3.2.3 Washing/dipping product	Too much or too little metabisulphate	Product contamination	Follow instructions described Material Safety Data Sheets (MSDS) and induction training.	4	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
3.3 Post-fishing	3.3.1 Maintenance/ clean nets and gear after all shots are finished, wash boat down	Chemical spillage	Product contamination	All crew members must be alert and watching what they are doing. All crew must follow the Material Safety Data Sheets and training inductions.	4	
SECTION 4 Public relations risks						
4.1 Pre-fishing	4.1.1 Load fuel	Fuel spillage	Risk of pollution, fire, contamination of product etc.	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals provided by Queensland Transport Department	9	
4.2 Fishing	4.2.1 Trawling	Non-target species may get caught in nets	The common perception that trawlers catch large marine animals is generally based on mis-information and ignorance. However this perception can (&	No current controls in place to counteract public relations risk posed by potential capture of pelagic marine animals.	25	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
			has) had significant impacts on the industry in terms of negative media and security of resource access.			
4.2 Fishing	4.2.2 Trawling	Potential capture of benthic flora and/or fauna	There is a perception amongst the majority of community members that trawl nets scrape everything off the ocean floor. Thus the natural assumption is that all trawling activities have a significantly negative impact on ecosystems in which they operate.	No control measures are currently in place to counteract or reduce negative public relations risks posed by the potential impact of trawling on benthic flora/fauna.	25	action
4.3 External risks	4.3.1 Land-based farming	Chemicals in waterways	Members of the public may make the assumption that observations	No current control measures in place to address public relation risk associated with land-based farming and associated reductions in water quality	25	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
			of reduced water quality in local waterways is linked with commercial fishing activities in that area			
4.3 External risks	4.3.1 Recreational fishing	Recreational fishers have a negative view of the commercial fishing industry due to ignorance and competition for resource access	Recreational fishing lobby groups can be powerful and can help swing political decisions (which may not be favourable for commercial fishers)	No current controls in place	25	action
4.3 External risks	4.3.2 Recreational fishing	Recreational fishers have a negative view of the commercial fishing industry due to ignorance and competition for resource access	Typically, any significant reduction in fish stocks or breeding stocks is considered by the public to be as a result of over-fishing by commercial enterprises.	No current controls in place	25	action
4.3 External risks	4.3.3 Ports	Dumping of	This issue affects	There are legislative controls on where	10	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	and shipping	ballast water from foreign vessels	the public image of the commercial fishing industry as it is a problem often perceived as their fault.	ballast water can be dumped.		
SECTION 5 Economic Risks						
5.1 Pre-fishing	5.1.1 Load fuel	Fuel spillage	Pollution	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals provided by Queensland Transport Department	9	
5.2 Fishing	5.2.1 Travel to and from fishing grounds	Collision with other boats, the dock or with submerged objects	Damage to fishing vessel, injury or loss of life	Crew trained in navigation. Crew possess certificates where legislatively required or appropriate.	12	
5.2 Fishing	5.2.2 Stabilizing boat while traveling to fishing grounds (this is achieved by putting the	Bad or rough weather conditions	Gear/vessel damage, in addition to lost fishing time/injury	- deploy or lower booms in safe, calm environment as soon as practical, once the boat has left the dock. - deploy stabilizers if necessary (stabilizers are metal arms that sit under the water on either side of the boat to counteract vigorous motion of the vessel in bad weather conditions – see diagram in —trawl vessel" section.	12	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	boats ~~a~~rms" or ~~b~~ooms" down)					
5.2 Fishing	5.2.3 Putting nets out (winching nets)	Ropes may snap	Lost fishing time/injury	Crew follow individual vessel Standard Operating Procedure, as well as training and induction	5	
5.2 Fishing	5.2.4 Dropping the nets or ~~s~~hooting the gear"	A stay (supporting equipment) may break	Damage to boat (one of the arms may break) and lost fishing time	- Regular maintenance as per the ships manual. - each block should have a safety chain in case of collapse	2	
5.2 Fishing	5.2.5 Dropping the nets or ~~s~~hooting the gear"	A wire may break	Damage to vessel/injury	- Effective communication between winch operator and crew - correct operation of winch	6	
5.2 Fishing	5.2.6 Dropping the nets or ~~s~~hooting the gear"	The gear or nets may get hooked on the vessel	Net damage, lost fishing time, potentially vessel immobility/injury	- have boat in gear when deploying nets - no excessive engine revs Crew follow individual vessel Standard Operating Procedure, as well as training and induction	4	
5.2 Fishing	5.2.7 Dropping the nets or ~~s~~hooting the gear"	The gear/nets may become entangled	Lost fishing time/injury	Keep a proper lookout Crew follow individual vessel Standard Operating Procedure, as well as training and induction	5	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
5.2 Fishing	5.2.8 Trawling	Non-target species may get caught in nets	Damage to nets and gear, loss of product and lost fishing time	It is compulsory for all otter trawlers to have a Turtle-exclusion-device (TED) and bycatch reduction device (BRD) fitted to each net. This device ensures that not only turtles, but most non-target species never end up in the coded of a net.	1	
5.2 Fishing	5.2.9 Trawling	Potential capture of benthic flora/fauna	Fishers try and avoid catching benthic flora/fauna and other bycatch as it blocks the net and reduces catch rates	- The TEDs mentioned above also exclude large sponges and other similar plants. - each vessel utilizes different forms of ~~–~~ground-chains" which dangle along the bottom of the nets – some innovative designs considerably reduce the amount of damage to benthos on the seafloor - fishers are aware of ~~–~~known" areas for seaweed and sponge and generally avoid these areas. - fishers have devices fitted in their vessels called eco-sounders – these provide an indication of what is on the sea bottom (in terms of density) - in addition to the use of eco-sounders, when tri-gear (3 nets) is used, sampling occurs with a small third net and in the case of other fishing gear (2 or 4 nets) a short fishing session or ~~–~~shot" is carried out to sample the area and test to see	5	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
				whether it is appropriate to fish in - generally the amount of time that nets are left out to trawl is limited and carrying out shorter –shots" is one way of minimizing capture of benthos		
5.2 Fishing	5.2.10 Trawling	Overloading nets	Net damage, lost fishing time and possible capsize of vessels	According to legislation, devices called –Bycatch Reduction Devices" or BRDs must be used in all nets to reduce the amount of bycatch caught. This situation is also often avoided based on a skipper's experience.	8	
5.2 Fishing	5.2.11 Trawling	Otter boards or nets may hook on obstructions on the bottom of the ocean (e.g. wrecks, rocks, wonky holes)	Damage to boards, nets, fishing apparatus. The arms may bend or even break. The boat will probably be unbalanced for a period of time.	- Each experienced skipper usually has a set procedure to unhook or get out of such situations. The crew must follow the skippers orders. - experienced fishers are aware of known obstacles or obstacle-prone sites - plotters (computer equipment) have hook-ups marked, so that fishers can avoid those areas	12	action
5.2 Fishing	5.2.12 Trawling	Hooking nets on another vessel	Net damage and lost fishing time	- skipper and/or crew member must keep an adequate watch - fishers must follow the ocean –road rules" as set out in the International Prevention of Collisions at Sea document - vessels must communicate between one another in order to prevent accidents	5	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
5.2 Fishing	5.2.13 Trawling	Tri-gear may get damaged.	Economic loss as it is not giving any indication of potential product, lost fishing time, overall less efficient fishing.	Visual checks of tri-gear are used to prevent damage.	12	
5.2 Fishing	5.2.14 Winching up nets (bringing nets on board vessel)	A part of the gear may break, e.g.: - a stay or arm may possibly break; - a wire may break; - the net may get caught in a propeller (prop); or - a lazyline (this pulls coded onto boat) may break . (Marriage lines help move the lazyline).	Potential damage to the vessel	An experienced skipper has a procedure that crew must follow in the event of any of these risks occurring. In addition, appropriate maintenance of vessel and gear may reduce the likelihood of any of these events occurring. Also the skipper will radio if help is required.	0	
5.2 Fishing	5.2.15 Sorting and grading product	Inexperienced deck-hands may sort and grade product poorly.	The product will probably have to be sorted again, often at the loss of the owner of	Crew trained appropriately by skipper, experienced crew. Having crew that will follow the skippers procedures specifically and carefully.	8	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
			the commercial fishing business. Also if undetected, it may result in poor prices.			
5.3 Post-Fishing	5.3.1 Anchoring up	Dragging anchor whilst asleep.	Potential collision with rocks or other boat.	Alarms are set before going to sleep, to alert crew in the event that an anchor may move. The skipper is generally constantly aware, even while resting and is on stand-by for any movement of the vessel. Vessels that have auxiliary engines (that supply power to the vessel) are able to start up immediately.	8	
5.3 Post-Fishing	5.3.2 Tying boat up	Collision with dock or other vessel.	Damage to boat and obstruction (may be another boat)	Having experienced crew who follow the vessel Standard Operating Procedures and training and induction.	3	
5.3 Post-Fishing	5.3.3 Selling the product	Poor prices, Difficulty in finding a market or buyer	Financial loss, not being able to meet overheads of the business or pay staff.	Maintaining quality product to ensure salability	10	
5.4 External risks	5.4.1 Re-zoning of Moreton Bay Marine Park	Reduced access to productive fishing grounds	Reduced access to productive fishing grounds will result in loss of income which may put many	Attempts have been made to improve community perceptions of commercial fishing in the Bay through promotion of the EMS in brochures (available at seafood retailers & fish and chip shops) and in the media.	20	Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
			fishermen out of business give current poor market price and fuel costs.			
5.4 External risks	5.4.2 Land-based farming	Chemicals in waterways	Degradation of marine flora and fauna due to decreased water quality.	There are legislative controls in place that limit the dumping of chemicals in waterways.	25	action
5.4 External risks	5.4.3 Recreational fishing	Recreational fishers have few restrictions on catch and effort and directly compete with commercial fishers for resource access	Commercial fisheries may be economically unviable as a result of competition	According to legislation there are bag limits and some control which product can be kept based on gender of the animal.	20	action
5.4 External risks	5.4.4 Recreational boating	collision	Personal injury and/or damage to vessels	- communication between boats - requirements to radio - emergency equipment must be kept on board	12	
5.4 External risks	5.4.5 Selling the product	Fluctuating and poor prices, Difficulty in finding a market or buyer	- Financial loss, not being able to meet overheads of the business or pay staff.	Maintaining quality product	20	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
			- large margin between retail prices and fishers income			
5.4 External risks	5.4.6 Selling the product	Competition with ―cheaper" imported product	Financial loss	No current controls in place	30	action
SECTION 6 Social Risks						
6.1 External risk	6.1.1 Selling the product	- Fluctuating and poor prices, Difficulty in finding a market or buyer - Competition with ―cheaper" imported product	There is also a significant social impact on families of fishers when prices are poor. It puts significant strain on family life, relationships and ability to provide for children. Poor or fluctuating prices is a regular occurrence for fishers – there is little financial security or stability in this	No current controls in place	30	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
			industry as there is no guarantee of prices or markets. At the same time, a commercial fishing enterprise can be lucrative when prices are good.			
	6.1.2 Time or hours spent at sea	Less time spent with family and on relationships	- Family break-down - depression - health issues - potential loss of business	Fishers in Moreton Bay do not have to fish on weekends and generally only go out for day trips or over night, as opposed to lengthy trips, weeks or months at a time.	12	
	6.1.3 Pressure of business (i.e. to perform and provide for a family)	High expectations on self and others	- health issues - stress - possible break-down	No current controls in place	20	action
	6.1.4 Keeping up with maintenance, bookwork and other business	No time for a social life or to have time for self-interests	- health issues - stress - possible break-down	No fishing is permitted on weekends, which frees up time. Also fishers‘ partners/families often help with paperwork for the business.	12	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	activities					
	6.1.5 Industry management – contribution to State fisheries regulation processes	Time away from family and business	- health issues - stress - possible break-down	No current controls in place	15	action
	6.1.6 Lack of industry initiative in addressing the issue of public relations of a number of years.	Public perceptions of the fishing industry may (& have) become extremely negative in many cases	Public perceptions have a significant impact on political debates and related issues such as resource access for commercial fishers, in addition to restrictions on catch and effort	No current controls in place	20	action

The river and inshore beam trawl fishery

Description of the Fishery

The river and inshore beam trawl fishery is a relatively small yet important component of the Queensland East Coast Trawl Fishery (Kingston 2004), harvesting around 2.5% of the total Queensland trawl catch. Trawling occurs in rivers and inshore waters of Moreton Bay producing an average annual catch of 180 tonnes of prawns and approximately 1 tonne of by-product. Beam trawling occurs in several rivers and creeks flowing into the Albert River, the Caboolture River, the North and South Pine Rivers, and Tingalpa Creek. This fishery has an average annual GVP of approximately $1.3 million.

The beam trawl fishery is relatively small in terms of number of operating vessels compared to other Queensland fisheries. There are currently 57 beam trawl vessels endorsed to operate within rivers and inshore areas of the Bay. Principal species targeted by T5 operators are the greasy or greasyback prawns, bay prawns and banana prawns. These three species make up around 75 % of the total saleable catch and approximately 80% of the total prawn catch (DPI&F Chris Web data). Other reported species of prawn caught include tiger and school prawns.

The major season for beam trawling is similar to that of otter trawling in that greasyback prawns are taken from September to April, although catches of banana prawns are significant from April to July. As in the otter trawl fishery, blue swimmer crabs and squid form part of the saleable catch.

Based on 2003 catch data (DPI&F Chris Web), total harvest for the beam trawl fishery in Moreton Bay was approximately 205.6 tonnes. Of this:

- the estimated total prawn catch in 2003 was 195.3 tonnes (75% of the total saleable catch);
- squid and blue swimmer crabs each make up approximately 2.4% of the total catch; and
- bugs make up a very minor part of the catch.

Target species taken in Moreton Bay are short-lived, one-year cycle penaeid prawns.

Due to the life cycle of the target species, the input controls and the small size of the fishery, the potential for localized stock depletion is low.

Fishing method

This type of trawl fishing involves towing a rigid frame called the beam (instead of otter boards) that keeps the mouth of the trawl net open (see Figure 31). The net, attached to the beam, is lowered over the stern of the vessel, with the main towing wire or warp paid out as the vessel moves off. The configuration of the net (skid height and point of attachment to the beam) can be modified to suit particular bottom types or target species.

Boats used in the T5 fishery are generally set up as day boats with a length no greater than 9 meters. They vary between small (<6m) timber boats powered by small inboard engines, to 9m vessels fitted with high speed diesel engines and hydraulic winches. These vessels are usually operated by one fisher who is generally the owner.

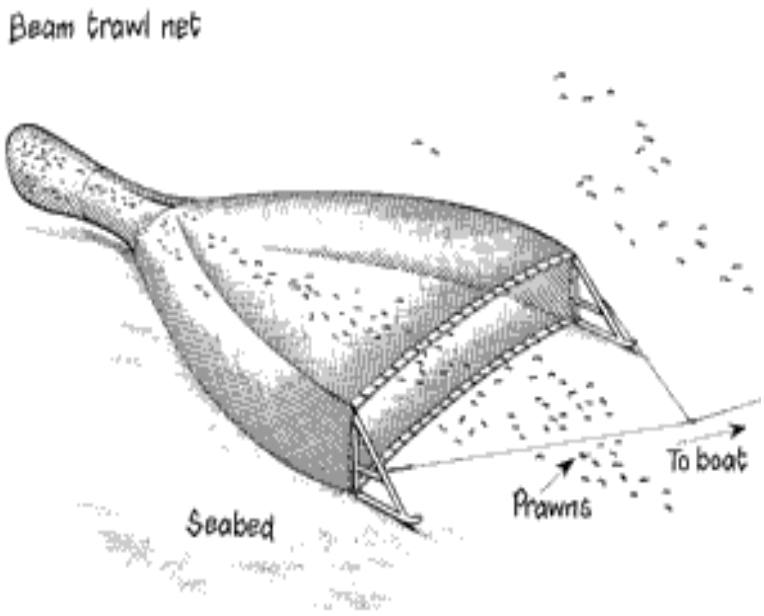


Figure 31 – diagram of beam trawl net taken from DPI&F website

T5 vessels are entitled to work in rivers and creeks, from Double Island Point to the New South Wales boarder. They are permitted to tow a single 5m net (the mouth of which is held apart in the water by a beam) made of mesh no smaller than 28mm. In addition, the coded must be no smaller than 25mm.

A seasonal closure applies to beam trawling in Boggy Creek, Pinkenba, from 1 November to 30 April each year. A weekend closure also applies to all trawling and netting activities from 6 p.m. each Friday to 6 p.m. each Sunday.

T5 licenses allow the use of otter trawl gear in the Laguna Bay area only and beam trawl gear in all other tidal waters of the T5 area which includes:

- Brisbane River – Victoria Bridge to Juno Point area;
- Brisbane River mouth area - north;
- Brisbane River mouth area – south;
- Logan and Albert Rivers;
- Caboolture River;
- Pine River;
- Coomera River; and

- Tingalpa Creek.

Trends in catch and effort

The following graphs indicate that over the past 17 years the number of river and inshore beam trawl (T5) vessels operating in Moreton Bay has remained relatively constant (Figure 34). Whilst there was a decrease in the number of vessels operating during the mid-1990‘s, the number of vessels in 2005 is almost the same as 1988. The mean annual catch levels have varied over the past 17 years, with lower catches during the early 1990‘s (90.6 tonnes), while more than double these amounts were caught during the late 1990‘s (286 tonnes). Currently the annual catch rate is hovering around 200 tonnes (Figure 32). Historical trends in catch for the main species targeted are difficult to assess as no log book data is available on greasy prawns for four years from 1996 – 1999 and no data for bay prawns is available for the late 1980‘s. The available data indicates that while higher levels of greasy prawns than bay prawns are currently caught, during the 1990‘s more bay prawns were caught than greasy prawns (Figure 33). Catches of Banana prawns are typically lower than Greasy or Bay prawns and historical trends indicate that catches of this prawn have varied over the years also.

Whilst overall effort (days fished) in the river and inshore beam trawl fishery has increased considerably over time, it has decreased again over the past seven years (Figure 35). Based on 2005 data, the effort per boat was approximately 100 days per year, compared to 125 days per year in 1998. Despite increases in effort during the mid - late 1990‘s, the estimated catch rates per boat per day have remained relatively constant during this time. In 2005 the estimated catch per day per boat was approximately 53 Kg.

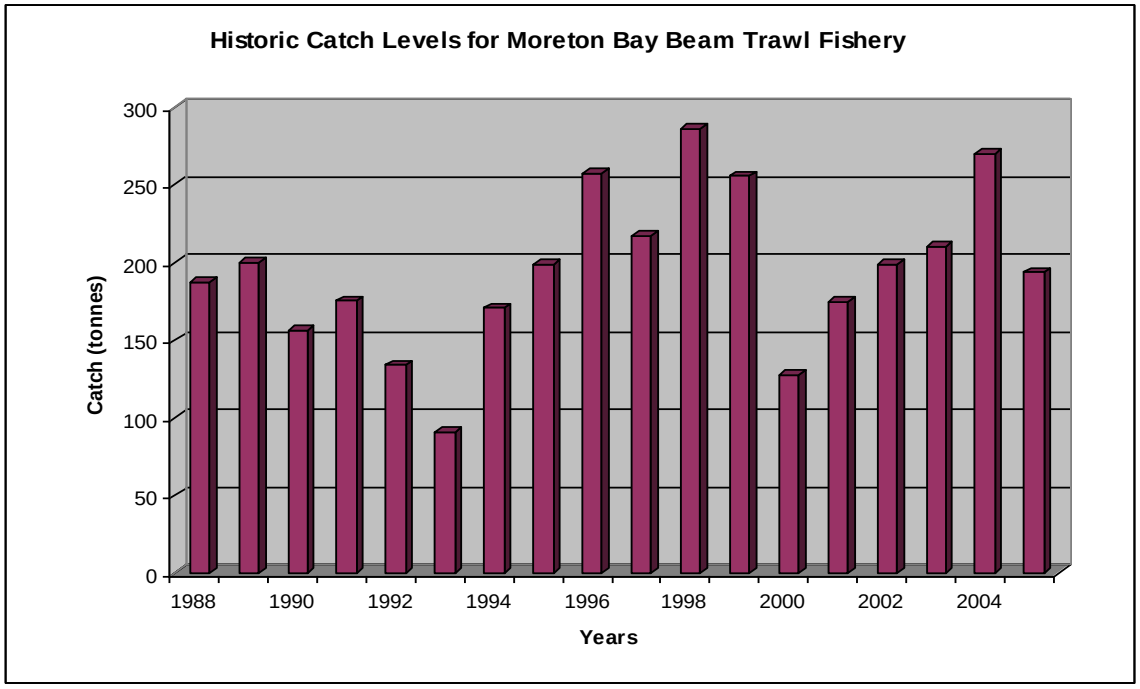


Figure 32 – catch levels displayed over time for Moreton Bay beam trawl fishery (compiled from DPI&F Chris Web data

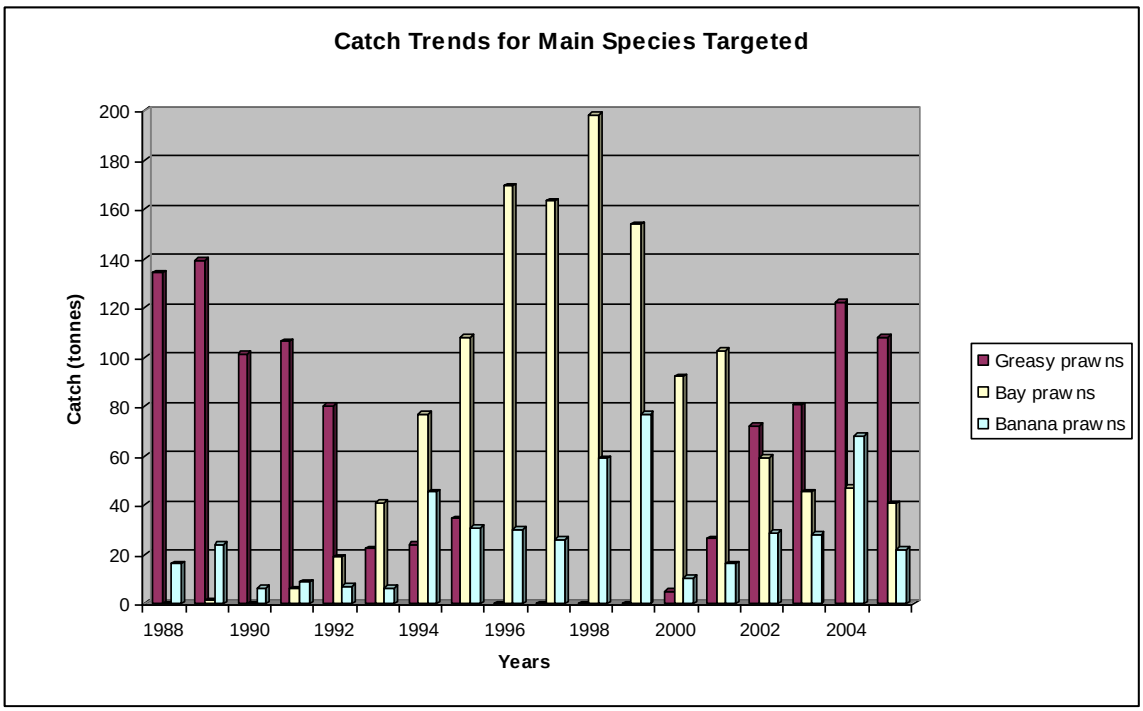


Figure 33 – catch levels displayed over time for top four species caught in Moreton Bay beam trawl fishery (compiled from DPI&F Chris Web data)

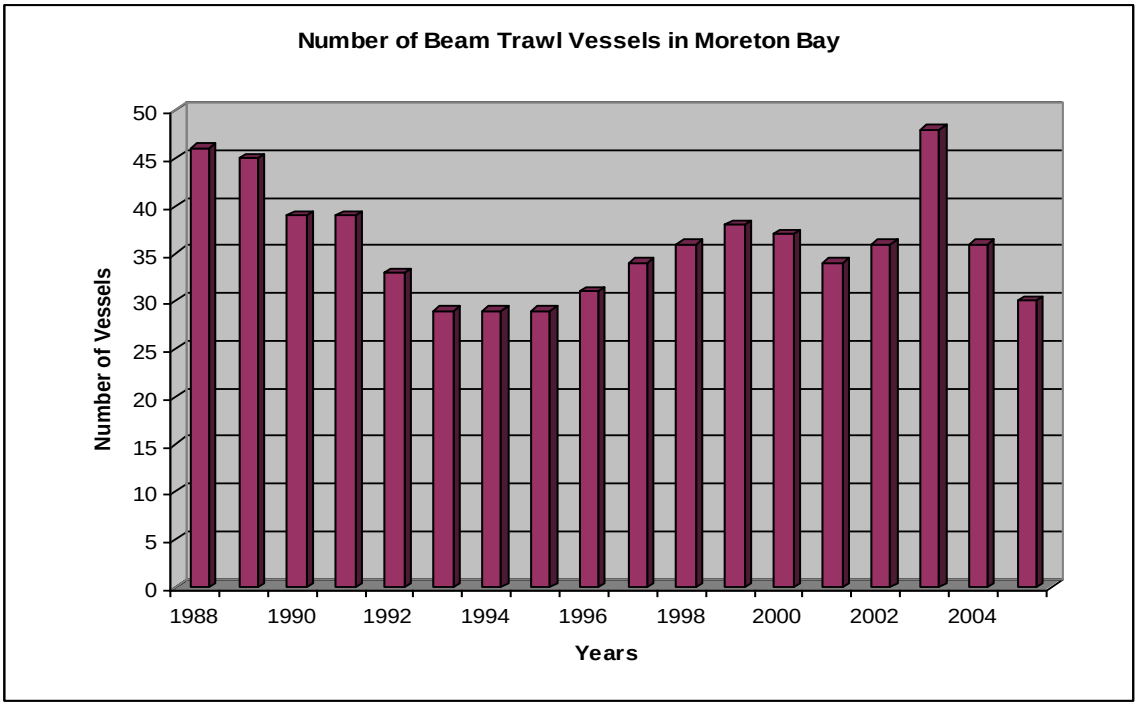


Figure 34 – number of boats operating over time within the Moreton Bay beam trawl fishery (compiled by DPI&F Chris Web data)

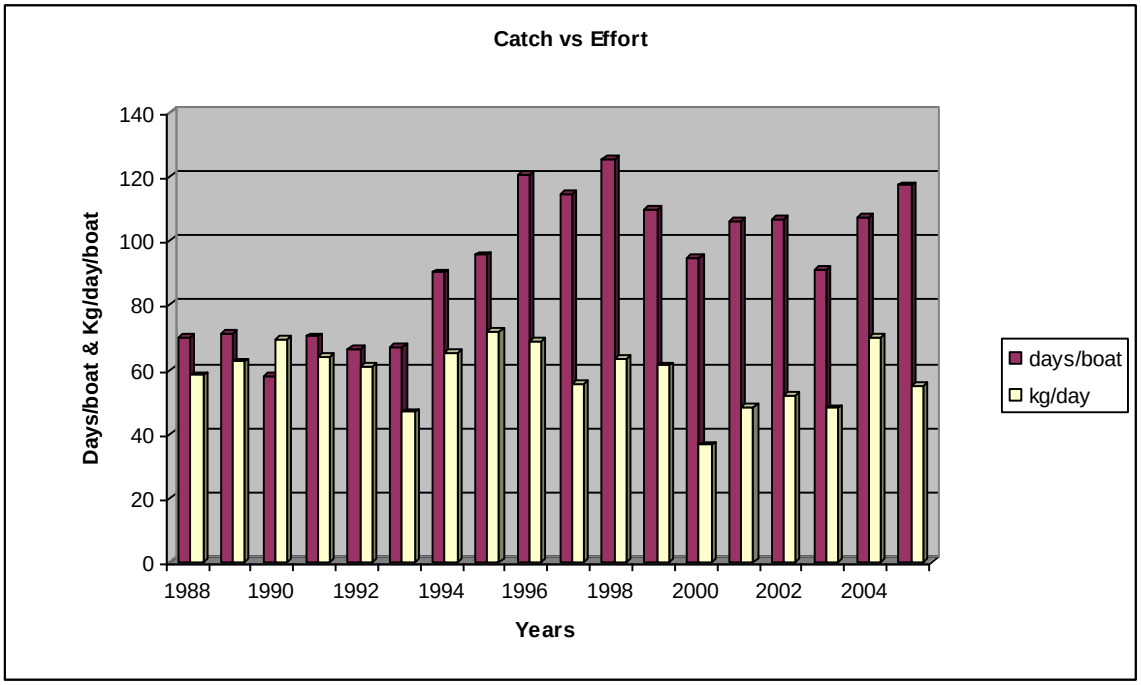


Figure 35 – mean daily harvest (Kg) for beam trawl fishery vs. effort or mean days fished over time (compiled from DPI&F Chris Web data)

The environment likely to be affected by the fishery

There is currently limited data on Moreton Bay's river and estuary environment (Kingston 2004). These environments are generally highly-turbid with muddy substrates. The sediment held in the water column generally prevents significant seagrass or weed assemblages from growing. In areas where dredging does not occur, benthic fauna assemblages along with prawn populations and some finfish exist.

Previous studies have found beam trawling to have little impact on finfish stocks (Dredge 1983 and Hyland 1988). These studies found that less than 10 per cent of beam trawl catches comprise commercially or recreationally valuable finfish. In addition, several studies have found that the environmental disturbance caused by beam trawling is minor compared to other natural and human-induced impacts (e.g. floods, tidal action, dredging, urban and agricultural run-off) (Hyland 1988, Coles and Greenwood 1986, Dredge 1983).

Current/proposed management arrangements for the fishery

The professional river and inshore beam trawl fishery in Moreton Bay is managed by the Queensland Fisheries Service (QFS) which is part of the Queensland State Department of Primary Industries and Fisheries (DPI&F) through the use of the:

- *Queensland Fisheries Act 1994;*
- *Queensland Integrated Planning Act 1997;*
- *Queensland Fisheries Regulation 1995 (amendments – 2003, 2004);*
- *Fisheries (East Coast trawl) Management Plan 1999 and its amendments (the Trawl plan);*
- *Marine Parks Act 1982;*
- *Marine Parks Regulation 1990; and*
- *Marine Parks (Moreton Bay) Zoning Plan 1997.*

Under these statutory provisions stringent operating rules apply to both the otter and beam trawl fleets. There are weekend closures when no trawling is permitted, as well as a series of areas closed to trawling, which protect both the estuarine habitats and the juveniles of all species. In addition, trawl fishers are not permitted to keep species such as whiting, and must meet the minimum standard fish size limits required by all professional fishers.

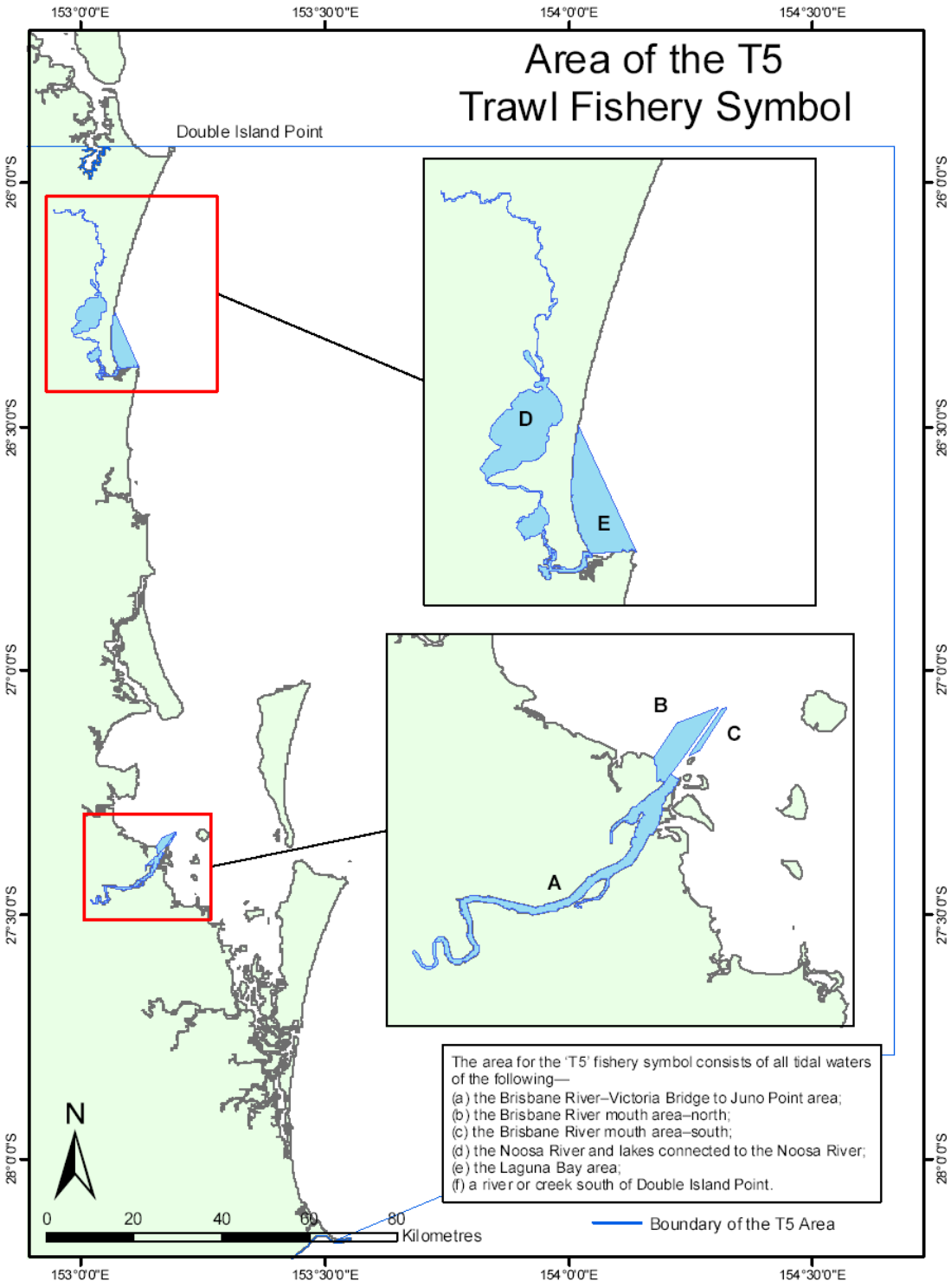


Figure 36 - Map taken from DPI&F website (current as of 3 January 2006). This map represents the approximate area where fishing operations are permitted under the fishery symbol. Please refer to the relevant fisheries legislation (e.g. Regulation or Management Plan) for the exact boundaries of an area.

Risk assessment of the fishery

The most significant element of an Environmental Management System (EMS) is the completion of a thorough risk assessment. In this case we used a risk assessment tool that meets the *ISO 14001* standards for EMS development. Using this tool (located on the SSA website) we evaluated risks to our businesses that may occur pre-fishing, during fishing and post-fishing within the following categories - environmental, food safety, occupational health and safety, economic, public relations and social risks.

We identified hazards and risks associated with each activity that is undertaken during professional trawl operations and ranked risks using the tables below. The risk assessment involved evaluating internal risks associated with our activities, as well as external risks that we cannot control but which may influence our livelihood. The risk ranking tables assisted us to evaluate the likelihood of a particular threat or risk occurring and the consequence if it did occur (i.e. worst case scenario).

NB - It must be noted that in many cases there is insufficient scientific information on the potential impact of an activity. This made it difficult to accurately rank the risk. Thus while practical actions have been developed to mitigate risks, in many instances this initial risk assessment will mainly be useful in identifying knowledge gaps. Once these knowledge gaps are filled, it will then be possible to more accurately assess the impact of activities on the environment or other factors. In turn this will make it possible to develop more specific actions to address high risk activities.

The full risk report undertaken is attached at the end of the beam trawl section. Those activities that were assigned a risk ranking of 15 of higher are considered high risks and corrective actions have been developed to address each of these risks. These actions form our action plan below. Those activities that were assigned a risk ranking of 14 or lower are considered low or moderate risks and a code of best industry practice has been developed to ensure that each of these risks are minimized.

Table 1: LIKELIHOOD LEVELS OF AN IMPACT

Likelihood	Score	Definition
Likely	**6**	It is expected to occur
Occasional	**5**	May occur
Possible	**4**	Some evidence to suggest this may possibly occur
Unlikely	**3**	Uncommon, but has been known to occur
Rare	**2**	May occur in exceptional circumstances
Remote	**1**	Never heard of, but not impossible

Table 2: CONSEQUENCE LEVELS OF IMPACT

Consequence	Score	Definition
Negligible	**0**	Very insignificant impacts. Unlikely to be measurable.
Minor	**1**	Possibly detectable but minimal impact on structure/function.
Moderate	**2**	Maximum acceptable level of impact – recovery measured in months or years.
Severe	**3**	This level will result in wider and longer term impacts – recovery measured in years.
Major	**4**	Very serious impacts with relatively long time frame likely to be needed to restore to an acceptable level – recovery measured in years to decades.
Catastrophic	**5**	Widespread and permanent/irreversible damage or loss will occur – unlikely to ever be fixed.

To calculate the risk ranking for each of the identified risks, the number chosen from table 1 is multiplied by the number chosen from table 2. These numbers will fit into one of the categories shown in the table below.

Table 3: RISK RANKING CATEGORY

Score		Category
0	=	**Negligible risk**
1 – 6	=	**Low risk**
8 – 12	=	**Moderate risk**
15 – 18	=	**High risk**
20 - 30	=	**Extreme risk**

For table 2, the fishers involved made a set of rules to make it easier and more consistent. In table 2, all cases were considered worst-case scenarios, so long as fishers can remember at least one instance of it ever occurring to anybody.

The consequences were ranked as follows:

NEGLIGIBLE - less than a day to recover;
MINOR – a day to a week to recover ;
MODERATE – a few months to recover;
SEVERE – years to recover;
MAJOR – years to decades to recover;
CATASTROPHIC – either the person/business will never recover (e.g. somebody may die, a risk where you may lose your business (financial/economic) or a risk where the public perception would be so bad that a whole fishery may be threatened).

River and inshore beam trawl fishery Action Plan

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
SECTION 1 Environmental								
1. Actions relating to internal risks								
2 - low	1.1 Fishing	1.1.2 Trawling	Potential injury to non-target species during the release process (e.g. too much time spent out of water)	Although the risk ranking is considered low for this activity, we want to ensure that we are aiming for world's best standards with regard to minimizing our impact on the environment. As a result, our specific goal for this activity is to maximize survival rates of non-target species catch.	To trial and develop innovative but affordable modifications to gear to ensure high survival rates of non-target species	All fishers	June 2007	Progress to be reviewed at monthly MBSIA meetings
5- low	1.1 Fishing	1.1.3 Generation of bilge water and disposal of such water	The bilge water may contain oil and/or other contaminants and may not be disposed of appropriately.	To aim for nil discharge of contaminated bilge water at any time	To trial the inclusion of simple (and affordable) bilge water filtering devices on board T5 vessels in Moreton Bay	MBSIA working group	June 2007	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
6 – low	1.1 Fishing	1.1.4 The overall operation‘s energy efficiency rate, water use and potential air pollution may not be optimal	These factors may be having a direct or indirect adverse affect on the environment	To minimize the ecological footprint of beam trawl operations (i.e. the indirect impacts on the environment)	To investigate the costs associated with contracting an environmental consultant to undertake a cleaner production assessment of Moreton Bay beam trawl vessels	MBISA board and executive	June 2006	Progress to be reviewed at monthly MBSIA meetings
					To scope funding options to offset costs of undertaking a cleaner production assessment	MBSIA board and executive	Novembe r 2006	Progress to be reviewed at monthly MBSIA meetings
					To utilize the findings and recommendations of the cleaner production assessment to make recommendations that may apply to all Moreton Bay beam trawl vessels	MBSIA board and executive	12 months from the completio n of the assessme nt	Progress to be reviewed at monthly MBSIA meetings
2. Actions relating to external risks								
24 - extreme	2.1 External	2.1.1 Urban pollution and land-based farming (including chemicals, silt, pesticides	Silt may smother flora and fauna, chemicals and pesticides will reduce water quality and	Minimize input of pollution by all resource users to the marine ecosystem	Have an active role in broader catchment management of Moreton Bay‘s waterways, through the having representation on the waterways partnership group	MBSIA represen tative	May 2006	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
		and fertilisers)	fertilizers will increase nutrient content in water		Assist where possible with research, such as water quality monitoring programs and water sampling.	all fishers to volunteer for research where possible	ongoing	Progress to be reviewed at monthly MBSIA meetings
					Publicly support and contribute to conservation groups attempting to prevent land-based pollution.	MBSIA board	As projects arise	Progress to be reviewed at monthly MBSIA meetings
30 - extreme	2.1 External	2.1.2 Development of housing estates and commercial/ industrial enterprises	Destruction of mangroves and other important marine habitats, in addition to changes in tidal flows	To assist in preserving flora critical to the health of the Moreton Bay marine ecosystem	To have a Moreton Bay seafood industry representative on the EPA board and to contribute to the approvals process for developments.	MBSIA representative	May 2006	Progress to be reviewed at monthly MBSIA meetings
					Actively contribute to the Moreton Bay Waterways and Catchments Partnership (by having a delegate to represent)	MBSIA representative	May 2006	Progress to be reviewed at monthly MBSIA meetings
24 - extreme	2.1 External	2.1.3 Recreational fishing	Over-fishing of fish stocks through illegal amateur fishing (where	To ensure the future of fish stocks in Moreton Bay by building a more positive and cooperative relationship between	To approach boating patrol about enforcing the law in relation to recreational cast netters.	MBSIA working group	May 2006	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			cast netters take more than the prescribed amount of prawn)	professional fishers and recreational anglers.				
25 - extreme	2.1 External	2.1.4 Ports and shipping	Expanding the Brisbane port - the dredging of rivers and other areas.	To ensure that the relevant authorities are aware of the potential or real impacts of dredging and port expansion on marine flora and fauna in Moreton Bay.	To provide input regularly on water quality issues through meetings with the Port of Brisbane Corporation.	MBSIA represen tative	First meeting by June 2006	Progress to be reviewed at monthly MBSIA meetings
					Volunteering to assist with research into water quality issues and the effects of dredging and/or expansion of ports on marine ecosystems.	All fishers	Ongoing as projects arise	Progress to be reviewed at monthly MBSIA meetings
					To record any obvious changes to flora and fauna as a result of dumped silt close to shores – for example smothering of seagrass beds or reduction in catches following such activity. These records to be collated and reported to the EPA and DPI&F.	All fishers	Ongoing from June 2006	Progress to be reviewed at monthly MBSIA meetings
22 – extreme	2.1 External	2.1.5 Ports and shipping	Dumping of ballast water from foreign	To ensure that the relevant authority is aware of the potential	To have MBSIA representation on the relevant committees with	As above`	As above	As above

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			vessels	impacts of pest species on fish stocks and to encourage strict rules on handling of ballast water from foreign vessels	the Port of Brisbane Corporation and the Brisbane Waterways Group.			
25 - extreme	2.1 External	2.1.6 Dumping of sewage (treated or otherwise) into Moreton Bay waterways	Increased nutrient content in water column (particularly nitrogen and phosphorus)	To ensure that relevant authorities and the community are aware of the potential and real impacts of increased nutrient content or eutrophication on water quality – for example increases in algal blooms such as Lyngbya.	To record any obvious changes to flora or fauna near river mouths and in general – for example the presence of new or unusual algal blooms or increased presence of Lyngbya. These records to be collated and reported to the EPA and DPI&F.	All fishers	Ongoing from June 2006	Progress to be reviewed at monthly MBSIA meetings
					Support researchers who are attempting to map eutrophication in Moreton Bay.	All fishers	As projects arise	Progress to be reviewed at monthly MBSIA meetings
					To support conservation groups who are trying to raise awareness about water quality issues in the Bay.	MBSIA board	June 2008 or sooner	Progress to be reviewed at every third monthly MBSIA meetings

SECTION 3 Occupational Health and Safety

1. Actions relating to external risks

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
12 – moderate	3.1 Fishing	3.1.1 Drop coded above sorting tray and release product for sorting and grading	One of the crew members may get stung by a marine animal or plant or a crew member may collide with a full coded in motion	To avoid or minimise personal injury during this activity	All T5 vessels to be equipped with first aid kits	All fishers	June 2007	Progress to be reviewed at monthly MBSIA meetings
15	3.1 Post-fishing	3.1.2 Unloading product	Lifting many heavy boxes of products	To minimize the incidence of injury	Fishers not to lift more than they can handle and when lifting, to use appropriate/safe technique	All fishers	December 2006	Progress to be monitored by MBSIA at monthly meetings
SECTION 4 Food Safety								
1. Actions relating to internal risks								
5 – low	4.1 Fishing	4.1.1 Sorting and grading product	Sorting tray may not have been appropriately cleaned and time taken to sort may reduce product quality (product may deteriorate in	Although the risk ranking is considered low for this activity, we are aiming for world's best practice in our operations. Subsequently our goal is to have nil product contamination at all times	All fishers must have completed the food safety course and thus have a completed food safety plan relating to their individual operation	All fishers	June 2007	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			heat)					
9 – moderate	4.1 Fishing	4.1.2 Washing product and addition of preservatives to product (e.g. sodium metabisulphate)	Adding too much preservative	Although the risk ranking is considered moderate for this activity, we are aiming for world's best practice in our operations. Subsequently our goal is to have nil product contamination at all times	All fishers must have completed the food safety course and thus have a completed food safety plan relating to their individual operation	All fishers	As above	As above
SECTION 5 Public Relations								
1. Actions relating to internal risks								
15	5.1 Pre-fishing	5.1.1 Loading fuel	Some fuel may potentially be spilled resulting in water pollution, potentially fire, personal injury to crew and likely increased public negativity towards the commercial	- To ensure that fuel spillage does not occur; - that in the event of a spillage that cleanup is swift and thorough and that media coverage of such an event is managed appropriately.	All fishers to follow code of conduct in relation to loading fuel and cleanup of any spillage.	All fishers	From June 2006	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			fishing industry as a whole					
15 – high	5.1 Fishing	5.1.2 Trawling	Negative media may result from interaction of nets with non-target species, even if there are measures in places to minimize it. This sort of media is catastrophic for the industry in terms of securing resource access and therefore a secure future	To take all precautions necessary to avoid interaction with non-target species and to regularly publish positive news articles relating to new measures and achievements with regard to minimising bycatch	To organize some group training for key industry representatives with regard to dealing with the media and communicating positive news stories. Also with how to deal with negative media as it arises.	MBSIA board members and elected media spokespersons	June 2006	Progress to be reviewed at monthly MBSIA meetings
					Demonstrate through a verifiable process that fishers are committed to environmental sustainability – investigate the options for third party certification (or other forms of certification) e.g. ecolabelling. - Support research into options for fishers with regard to labeling/certification	MBSIA board	June 2008	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
					Scope out an appropriate marketing strategy to promote the EMS and seafood caught by Moreton Bay fishermen operating under an EMS	MBSIA executive	December 2007	To be reviewed at monthly MBSIA meetings
10 – moderate	5.1 Fishing	5.1.3 Trawling	Potential capture of benthic flora and/or fauna	The risk for this activity is considered moderate due to the fact that in many places where river trawling occurs there are minimal flora and fauna communities due to natural scouring and dredging activities. However we acknowledge that there is a common public perception that all forms of trawling cause considerable damage to benthic assemblages. To address this, our goal is to increase public awareness of our real impacts and to promote positive news stories about our industry in the media.	Combine efforts with other professional fisheries in the region to design a regional public awareness program with regard to the professional fishing industry and to develop a regional communication strategy based on research into key stakeholder groups – e.g. education packages for school	MBSIA working group	December 2006	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
2. Actions that relate to external risks								
8 – moderate	5.2 External	5.2.1 Land-based farming	Chemicals, pesticides, fertilizers and silt can indirectly end up in waterways through run-off	Although we consider that the risk for this activity is moderate, we are striving to improve the public perception of our industry. Our goal is to ensure that the general public has a broad understanding of the numerous factors that can influence water quality and fish stocks (professional fishing is not the only activity that has an impact)	Combine efforts with other professional fisheries in the region to design a regional public awareness program with regard to the professional fishing industry and to develop a regional communication strategy based on research into key stakeholder groups – e.g. education packages for schools.	As above	As above	As above
8 – moderate	5.2 External	5.2.2 Recreational fishing	Anecdotal evidence indicates that some recreational fishers have a negative view of the professional fishing industry due to lack of	To improve awareness and understanding of the industry with recreational anglers and to improve the relationship between the two groups	To approach amateur fishing magazines and other publications about putting some factual articles in about professional fishing - to find an issue that both groups have in common (e.g. water quality issues) and develop a joint strategy to deal with the issue.	MBSIA board	June 2007	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			information about the industry and competition for resource access					
8 – moderate	5.2 External	5.2.3 Ports and shipping	Dumping of ballast water from foreign vessels	Although we consider that the risk for this activity is moderate, we are striving to improve the public perception of our industry. Our goal is to ensure that the general public has a broad understanding of the numerous factors that can influence water quality and fish stocks (professional fishing is not the only activity that has an impact)	Combine efforts with other professional fisheries in the region to design a regional public awareness program with regard to the professional fishing industry and to develop a regional communication strategy based on research into key stakeholder groups – e.g. education packages for schools??.	As above	As above	As above
SECTION 6 Economic								
25 – extreme	6.1 Post-fishing	6.1.1 Selling the product	Poor prices, difficulty in finding a market or buyer and competition	To put strategies in place to assist with making the fishing industry more economically viable.	- to support labeling programs to ensure that all seafood product is labeled with country of origin - to diversify businesses	MBSIA board	As projects arise	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			with imported product					
2. Actions that relate to external risks								
25 – extreme	6.2 External	6.2.1 Land-based farming	Chemicals, fertilizers, pesticides and silt may indirectly impact on water quality through runoff	See goal as per environmental section	See action as per environmental section			
15	6.2 External	6.2.2 Recreational fishing	Illegal amateur fishers (i.e. cast netters who take more than the prescribed amount of prawn and illegally sell it) directly compete with commercial fishers for resource access and for prices through illegal selling	To build positive relationships between the recreational and professional fishing sectors and to work together on issues that are common	To contact the peak recreational fishing body and discuss what might be a common issue to work towards and to develop a project to work on together.	MBSIA working group	June 2007	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
SECTION 7 Social								
25 - extreme	7.1 Post-fishing	7.1.1 Selling the product	There is significant social impact on families when prices are poor. It puts strain on family life, relationships and ability to provide for children.	To have financial security for families	Diversifying the family business into other areas to provide security during times of economic instability	All fishers	Ongoing	Progress to be reviewed at monthly MBSIA meetings
20 - extreme	7.1 Internal	7.1.2 Fishing	The significant amount of fishing hours required to make a living (including maintenance, bookwork and other business activities) results in less time spent with family and partners, sometimes	To operate a business where it is possible to have a balance between work and personal life	To utilize communication technologies such as mobile phones and email while at sea to have regular contact with family and partners.	All fishers	Ongoing	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			resulting in family breakdown and often depression and health issues					
20 – extreme	7.1 Internal	7.1.3 Pressure of business (i.e. to perform and provide for a family)	High expectations of self and others can lead to health issues, stress and possible nervous break-downs	To reduce stress	To involve the family more in the management of the business or look at alternative solutions to minimizing stress	All fishers	Ongoing	Review at monthly MBSIA meetings
20 - extreme	7.1 Internal/ external	7.1.4 Fishing and participation in fisheries management	Competition for resource access, closure of fishing grounds can lead to industry insecurity, depression, strain on relationships and even suicide – this is a very	To work in a political environment where fishers can have some security and sense of ownership and participation in fisheries management decisions	To issue formal invitations to fisheries managers to have regular boat and ramp visits	MBSIA board	June 2006	Progress to be reviewed at monthly MBSIA meetings

Risk Rank	Operation	Activity	Hazard	Goal	Action	By Whom	Deadline	Monitoring
			significant problem					

Code of Industry Best Practice

(Industry Standard for Moreton Bay beam trawl operators)

Pre-fishing

1. Operators will re-fuel according to procedures set out on signs at the fuel depot and will take due care in order to prevent potential spillages;
2. in the event that fuel spillage does occur, operators will follow fuel depot procedures for clean-up and pollution prevention;
3. if you do not know what the re-fuelling procedures are at a particular depot, ask;
4. take care when loading stores and ice onto boats to prevent spillage, pollution and/or injury;
5. crew must take appropriate care when lifting heavy weights onto a marine vessel;
6. use common sense and be alert at all times when working on or around boat ramps;

Fishing

7. all T5 operators are to minimize bycatch and are encouraged to trial the addition of innovative bycatch reduction devices to their nets (in addition to those prescribed in legislation);
8. all operators will collect any waste (including personal or other) and dispose of it at an appropriate on-land waste facility;
9. operators will keep physical debris caught in nets that can safely be stored on board the vessel and dispose of this debris at an appropriate land-based waste facility;
10. fishers to take appropriate care when shooting away and winching nets in so that crew do not become entangled with fishing apparatus;
11. each skipper to train crew in procedure for high risk situations that may arise while working e.g. what to do when the net hooks up;
12. inexperienced fishers to be trained or coached by experienced fishers so that the code of industry best practice may be understood and applied in all situations;
13. while fishing, if large physical debris (urban pollution) is observed, authorities to be notified (e.g. a log or pylon);
14. while fishing, if visual evidence of chemical pollution or pest species are observed, authorities to be notified (e.g. dead or unhealthy fish floating in water, or oil/chemical slicks noticed on water surface);
15. if unusual or toxic algae (including Lyngbya or ~~–~~Fireweed") is observed while fishing, authorities to be notified – or jotted in log book;
16. by possessing a professional fishers license, it is expected that the operator be trained in navigation, listen to correct radio channels, keep adequate watch at all times, obey speed limits and have lights on vessel operating at night in order to avoid collisions with other boats or objects;

17. each vessel must be fitted with appropriate safety/emergency equipment;
18. each skipper should be aware of their crew‘s capabilities and follow the individual boat safety procedures in the event of an emergency;
19. the crew must follow the skippers instructions at all times and be trained in boat procedures;
20. crew must be aware of and follow the operation‘s occupational health and safety procedure as set out by the skipper – for example, this may include wearing appropriate protective clothing and up-to-date knowledge on identification and handling of venomous marine animals;
21. when anchoring check that the anchor has grabbed and take care not to tangle the anchor while lowering;

Post-fishing

22. biodegradable cleaning products (as approved by supplier) are to be used in accordance with the seafood safety course.

Review mechanisms

In addition to regular monitoring and documentation of progress against actions at MBSIA meetings, a period of review is required after the deadlines, to ensure that actions have been carried out.

As many of the actions are scheduled to be completed by June 2007, it is envisaged that a comprehensive review will commence in July 2007. This review will involve a series of workshops or meetings, where the MBSIA board will evaluate the progress of actions and the uptake and implementation of the EMS in general.

Each working group elected to work on certain actions will be required to report back to the board on their achievements and progress. Discussion will centre on key themes such as:

- What have been the key challenges to implementing the action?
- How have these challenges been resolved?
- What are the future directions, actions or projects leading from the completion of the original action?
- What support do fishers or teams require in order to achieve these actions?

For actions that involve modifications to fishing operations or gear (and that apply to all fishers in the sector), an appropriate method to ensure changes have been implemented needs to be established. This method will be decided on by the beam trawl fishing representative, in consultation with other beam trawl fishing members and the MBSIA board. This may be through, for example, boat inspections by the MBSIA or signed agreements stating compliance with the EMS.

The Code of Conduct should also be reviewed by the beam trawl representative and beam trawl members to ensure that it is relevant and up-to-date.

The findings of the review will be compiled into a report, which will be used by the board to set new actions, targets, deadlines and monitoring.

A similar review will be undertaken again in July 2008 to report of progress against actions (review of actions will be annual). This review will be more comprehensive than the July 2007 review. A full risk assessment should be undertaken, to ensure that actions are relevant and up-to-date. This will be undertaken through workshops with all members who have net fishing endorsements. In addition, the 2008 review will include updating the background information in the EMS, including updating statistics on catch and effort, number of vessels, species caught and external impacts on the environment (e.g. pollution). The key output of the 2008 review will be fully updated EMS documentation.

Following the 2008 review, a summary version of the revised EMS will be printed for fishers as a quick reference document, including vision, policy, actions and code of conduct.

Review Form

(to be filled out by fishers at the July 2007 and July 2008 reviews)

Action	By whom	Deadline	Achieved? (yes/ no)	Challenges	How were challenges resolved?	Support required to carry out actions	New action, deadline, by whom and monitoring

River and inshore beam trawl fishery Risk Report and Corrective Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
SECTION 1 Environmental risks						
1.1 Pre-fishing	1.1.1 Load fuel	Fuel spillage	Pollution	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals provided by the re-fuelling depot - Qld transport provide operating procedures for re-fuelling that are advertised at depot	2	Code
1.1 Pre-fishing	1.1.2 Load stores and ice onto boat	Chemical spillage	Pollution	- loading stores and ice onto boats occurs at designated areas or ports, where appropriate procedures are in place - crew training and operational manuals provided	2	Code
1.2 Fishing	1.2.1 Trawling	Non-target species may get caught in nets	Potential injury to animals	- by law all T5 operators must have at least one BRD fitted to each net at all times. The BRD‘s used must meet DPI&F specifications. Approximately 80% of T5 vessels have a second BRD fitted to nets to minimize bycatch – e.g. a jellyfish excluder is often used.	2	code
1.2 Fishing	1.2.2 Trawling	Potential capture of benthic flora and/or fauna	This may disrupt ecosystem flows	There are no restrictions by law on ground gear used on T5 vessels. Natural scouring and dredging prevents seagrass and	0	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
				sponges from growing. Thus silt buries any plants or sessile animals.		
1.2 Fishing	1.2.3 Generation of personal rubbish and waster associated with fishing	Rubbish may not be disposed of in the correct manner	Rubbish may have a negative impact on water quality and flora an fauna	Personal and other rubbish is collected on the boat and is disposed of at an appropriate waster facility (on land)	1	code
1.2 Fishing	1.2.4 Generation of bilge water and disposal of such water	The bilge water may contain old and/or other contaminants and may not be disposed of appropriately	Contaminated bilge water may be discharged at sea and impact on water quality	Bilge water must not be discharged within a certain distance to shore (according to legislation – check this). When at sea there are no current controls.	5	Action and code
1.2 Fishing	1.2.5 Fishing	The overall operation‘s energy efficiency rate, water use, noise and air pollution may not be optimal	These factors may have a direct or indirect adverse affect on the environment	No current controls in place	6 (although this is unknown until a risk assessment is carried out)	Action
1.3 External risks	1.3.1 Urban	chemical	Detrimental impacts	Fishers collect rubbish caught in nets	16	Code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	pollution (physical debris)	breakdown of debris (e.g. various metals) as well as interaction between marine animals and debris	on water quality and marine animals may become trapped by large physical debris or choke to death on plastic bags	(rubbish that is not there own)		
1.3 External risks	1.3.2 Urban pollution and land-based farming (including chemicals, silt, pesticides and fertilisers)	Silt may smother flora and fauna, chemicals and pesticides will reduce water quality and fertilizers will increase nutrient content in water	- Increased nutrients may lead to growth in algae and will have negative impacts on mangrove health - direct absorption of chemicals by marine animals through their skin and other membranes, in addition to	No current controls in place	24	Action
1.3 External risks	1.3.3 Development of housing estates and commercial/ industrial enterprises	Destruction of mangroves and other important marine habitats, in addition to changes in tidal flows	Mangroves and seagrass beds may be killed off which are important breeding grounds for many juvenile marine species.	Some fishers report incidences to QFS. Also planning and development controls regarding destruction of marine plants (fisheries legislation provides protection of marine plants and declaration of key fish habitats as Fish Habitat Areas and restoration of fish habitat areas)	30	Code and action
1.3 External risks	1.3.4 Recreational fishing	Over-fishing of fish stocks through illegal amateur fishing (where cast netters take more	Reduction or potential elimination of breeding stocks	Some fishers have sent in submissions to QFS outlining these issues. This resulted in limits being prescribed for how many prawns amateur cast netters may keep.	24	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
		than the prescribed amount of prawn) - limits such as time closures, area closures and even limits on numbers of recreational fishers do not exist in Queensland, while there are highly restrictive limits on commercial fisheries				
1.3 External risks	1.3.5 Ports and shipping	Expanding the port - dredging of rivers and other areas	Dredging sucks up prawns and all other fauna and flora from the river bottom and kills them in the process. The dredged sand/silt/mud is dumped and results in smothering of animals and plants, degradation of water quality and altered tidal flows.	Some fishers have lobbied the Port of Brisbane Corporation and have participated in consultation processes	25	action
1.3 External risks	1.3.6 Ports and shipping	Dumping of ballast water from foreign	Introduction of exotic pests, which will	Ballast water management controls in place.	22	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
		vessels	result in downstream effects on marine ecosystems.			
1.3 External risks	1.3.7 Dumping of sewage (which has been treated to various levels) into waterways	Increased nutrient content in water (especially nitrogen and phosphorus)	- Decreased water quality - many pest species thrive on increased nutrient loads, e.g. fireweed or lyngbya. This weed takes over seagrass beds and smothers them. Thus it kills off important breeding grounds and juvenile nurseries.	No current controls in place	25	action
SECTION 2 Occupational Health and Safety (OH&S) Risks						
2.1 Pre-fishing	2.1.1 Load fuel	Fuel spillage	Fire and/or personal injury e.g. through breathing in fumes	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals provided by Queensland Transport Department	4	code
2.1 Pre-fishing	2.1.2 Load stores, chemicals and ice onto boat	Chemical spillage	Personal injury	Most fishers ensure that lids of chemical containers are appropriately secured.	4	code
2.1 Pre-fishing	2.1.3 Load stores, chemicals	Lifting heavy weights	Personal injury	- take appropriate care when lifting heavy weights – ensure that there is more than	8	code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	and ice onto boat			one person lifting very heavy weights		
2.2 Fishing	2.2.4 Travel to and from fishing grounds	Collision with other boats, the dock or with submerged objects	Personal injury	Crew trained in navigation. Crew possess appropriate certificates.	10	code
2.2 Fishing	2.2.5 Putting nets out (shooting away)	Entanglement of crew with winch or fishing apparatus	Personal injury	- the breaks are applied on the winch to prevent crew injury - Crew follow procedures in ships manual.	10	code
2.2 Fishing	2.2.6 Trawling	beam or nets may hook on obstructions on the bottom of the river (e.g. wrecks, rocks, dredge holes and silt)	Personal injury can occur as the boat may possibly capsize or throw a crew member over board (this usually only occurs during extreme changes in currents caused by floods).	- Each experienced skipper usually has a set procedure to unhook or get out of such situations. The crew must follow the skipper‘s instructions and procedures.	10	code
2.2 Fishing	2.2.7 Winching up nets (bringing nets on board vessel)	-the crew may become entangled with the winch or fishing apparatus (e.g. aprons or body parts) - a snag may occur and crew may become injured while removing the snag	Personal injury	- An experienced skipper has a procedure that crew must follow in the event of any of these risks occurring - In addition, appropriate maintenance of vessel and gear may reduce the likelihood of any of these events occurring	10	code
2.2 Fishing	2.2.8 Drop	One of the crew	Personal injury	All crew are appropriately trained by the	12	Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	coded above sorting tray and release product for sorting and grading.	members may get stung by a marine animal or plant or a crew member may collide with a full coded in motion		skipper and aware of which animals are venomous. Most vessels have a first-aid kit on board and an experienced skipper follows a set procedure specific to the type of sting or injury sustained. All boats supply crew with protective clothing.		
2.2 Fishing	2.2.9 Sorting and grading product	One of the crew members may get stung or otherwise injured by a marine animal or plant	Personal injury	As above	12	Action as above
2.2 Fishing	2.2.9 Cooking product	- Crew members may spill hot water on their skin - there may be a gas explosion or fire - lifting of heavy weights	Personal injury	Crew must follow OH&S procedure as set out by skipper	10	code
2.3 Post-fishing	2.3.1 Maintenance/ clean nets and gear after all shots are finished	A crew member may get stung or sustain a skin or eye injury from cleaning products or a crew member may slip over on a slippery deck while cleaning	Personal Injury	All crew members must be alert and take care according to safety procedures set out by the skipper.	2	code
2.3 Post-fishing	2.3.2 Tying boat	Potential collision	Personal injury	Experienced crew, follow crew manual	2	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	up	with dock or other vessel				
2.3 Post-fishing	2.3.3 Unloading product	Lifting many heavy boxes of products may strain back or other muscles.	Personal injury	Experienced crew, following crew manual.	15	action
2.3 Post-fishing	2.3.4 Cleaning the refrigerator or ice box	Breathing in chemical fumes from cleaning agents.	Personal injury.	Experienced crew, following crew manual.	2	code
2.4 External risks	2.4.1 Recreational boating	Collision	Personal injury and/or damage to vessels	- communication between boats	2	
SECTION 3 Food Safety						
3.1 Pre-fishing	3.1.1 Load fuel	Fuel spillage	Potential contamination of bins or ice box	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals provided by Queensland Transport Department - care should be taken not to contaminate product (e.g. through contaminating ice boxes or baskets)	2	
3.2 Fishing	3.2.1 Sorting and grading product	Sorting tray may not have been appropriately cleaned and time	Product contamination or spoil	The sorting tray and other gear used for sorting is cleaned appropriately after each shot and cleaned with chemicals after each fishing trip.	5	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
		taken to sort may reduce product quality (product may deteriorate in heat)				
3.2 Fishing	3.2.2 Washing product and addition of preservatives to product (e.g. sodium metabisulphate)	Adding too much preservative	Product contamination	Preservatives are currently measured according to how one fisher has seen another fisher apply it	9	action
3.2 Fishing	3.2.3 Cooking product	Product may not be cooked enough	Product contamination	The prawns are cooked properly and cooled in clean water and then stored at the required temperature	9	code
3.3 Post-fishing	3.3.4 Maintenance/ clean nets and gear after all shots are finished, wash boat down	Chemical spillage	Product contamination	All crew members must be alert and watching what they are doing	4	code
SECTION 4 Public relations risks						
4.1 Pre-fishing	4.1.1 Load fuel	Fuel spillage	Risk of pollution, fire, contamination of product etc.	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals	9	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
				provided by the re-fuelling depot - Qld Transport provide operating procedures for re-fuelling that are advertised at depot		
4.2 Fishing	4.2.1 Trawling	Non-target species may get caught in nets	The common perception that trawlers catch large marine animals is generally based on mis-information and ignorance. However this perception can (& has) had significant impacts on the industry in terms of negative media and security of resource access.	No current controls in place to counteract public relations risk posed by potential capture of pelagic marine animals.	15	action
4.2 Fishing	4.2.2 Trawling	Potential capture of benthic flora and/or fauna	There is a perception amongst the majority of community members that trawl nets scrape everything off the ocean floor. Thus the natural assumption is that all trawling activities have a significantly negative	No control measures are currently in place to counteract or reduce negative public relations risks posed by the potential impact of trawling on benthic flora/fauna.	10	action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
			impact on ecosystems in which they operate.			
4.3 External risks	4.3.1 Land-based farming	Chemicals in waterways	Members of the public may make the assumption that fish fatalities or reduced fish stocks are connected with commercial fishing, rather than reduced water quality	No current control measures in place to address public relation risk associated with land-based farming and associated reductions in water quality	8	action
4.3 External risks	4.3.1 Recreational fishing	Recreational fishers have a negative view of the commercial fishing industry due to ignorance and competition for resource access	Recreational fishing lobby groups can be powerful and can help swing political decisions (which may not be favourable for commercial fishers) and typically, any significant reduction in fish stocks or breeding stocks is considered by the public to be as a result of over-fishing by commercial enterprises.	QSIA lobbies on behalf of fishers	8	action
4.3 External risks	4.3.2 Ports and	Dumping of ballast	This issue affects the	No current controls in place	8	Action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	shipping	water from foreign vessels	public image of the commercial fishing industry in cases where introduced species impact on fish stocks - as it is a problem often perceived as their fault.			and code
SECTION 5 Economic Risks						
5.1 Pre-fishing	5.1.1 Load fuel	Fuel spillage	the cost of cleaning up pollution and fines incurred	- Fueling occurs at designated re-fueling stations at ports, where appropriate procedures are in place - Crew training and operational manuals provided by Queensland Transport Department	6	code
5.2 Fishing	5.2.1 Travel to and from fishing grounds	Collision with other boats, the dock or with submerged objects	Damage to fishing vessel and cost of repairs	Crew trained in navigation. Crew possess appropriate certificates.	6	Code (as above in OH&S section)
5.2 Fishing	5.2.2 Putting nets out (shooting away)	Damage to gear from negligence or hooking up on river bottom or another vessel‘s gear and/or personal injury	Lost fishing time and cost of repairs	- Crew follow procedure as set out by the skipper. - regular maintenance and keeping a proper lookout - gear of appropriate quality to the operation to be used	8	Code (refer to OH&S section)
5.2 Fishing	5.2.3 Trawling	Non-target species	Damage to nets and	- by law all T5 operators must have at	3	code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
		may get caught in nets	gear, loss of product and lost fishing time	least one BRD fitted to each net at all times. The BRD‘s used must meet DPI&F specifications. Approximately 80% of T5 vessels have a second BRD fitted to nets to minimize bycatch – e.g. a jellyfish excluder is often used.		
5.2 Fishing	5.2.4 Trawling	Overloading nets with silt and mud	Net damage, lost fishing time and possible capsize of vessels	Keep an adequate watch at all times	4	code
5.2 Fishing	5.2.5 Trawling	beam or nets may hook on obstructions on the bottom of the river (e.g. wrecks, rocks, dredge holes and silt)	Damage to beam, nets, fishing apparatus and equipment.	- Each experienced skipper usually has a set procedure to unhook or get out of such situations. The crew must follow the skippers orders. - experienced fishers are aware of known obstacles or obstacle-prone sites	12	code
5.2 Fishing	5.2.6 Trawling	Hooking nets on another vessel	Net damage and lost fishing time	- skipper and/or crew member must keep an adequate watch	6	code
5.2 Fishing	5.2.7 Winching up nets (bringing nets on board vessel)	Damage to equipment may occur e.g. through net or rope tangling around the propeller and/or personal injury may occur	Cost of repairs and lost fishing time	- An experienced skipper has a procedure that crew must follow in the event of any of these risks occurring. - In addition, appropriate maintenance of vessel and gear may reduce the likelihood of any of these events occurring.	10	code
5.2 Fishing	5.2.8 Sorting and	Inexperienced	The product will	Crew trained appropriately by skipper,	4	code

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	grading product	deck-hands may sort and grade product poorly.	probably have to be sorted again, often at the loss of the owner of the commercial fishing business.	experienced crew. Having crew that will follow the skippers procedures specifically and carefully.		
5.3 Post-Fishing	5.3.1 Anchoring up	Dragging anchor whilst asleep.	Potential collision with rocks or other boat.	Check that the anchor has grabbed and take care not to tangle anchor whilst lowering. The skipper is generally constantly aware, even while resting and is on stand-by for any movement of the vessel.	6	code
5.3 Post-Fishing	5.3.2 Tying boat up	Collision with dock or other vessel.	Damage to boat and repair cost	Experienced crew, following crew manual.	2	code
5.3 Post-Fishing	5.3.3 Selling the product	Poor prices, Difficulty in finding a market or buyer and competition with imported product	- Financial loss, not being able to meet overheads of the business or pay staff. - large margin between retail prices and fishers income	Some fishers have lobbied the government about this issue	25	action
5.4 External risks	5.4.1 Land-based farming	Chemicals, fertilizers, pesticides and silt in waterways	Decrease water quality will lead to decreases in fish stocks, which may result in reduced catches and therefore less income	No control measures in place	25	action
5.4 External risks	5.4.2 Recreational	illegal amateur fishers (where cast	Commercial fisheries may be economically	Some fishers have lobbied the Queensland Fisheries Service about this and have	25	Code and action

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	fishing	netters take more than the prescribed amount of prawn) directly compete with commercial fishers for resource access - there is no limit on the number of recreational fishers in Queensland, while there are highly restrictive limits on commercial fisheries	unviable as a result of competition	succeeded in having bag limits introduced for cast netters targeting prawn.		
5.4 External risks	5.4.3 Recreational boating	collision	Personal injury and/or damage to vessels	- ensure that cones/shapes and lights are well lit and displayed	2	
SECTION 6 Social Risks						
6.1 External risk	6.1.1 Selling the product	- Fluctuating and poor prices, Difficulty in finding a market or buyer - Competition with ~~-e~~heaper" imported	There is also a significant social impact on families of fishers when prices are poor. It puts significant strain on family life,	No current controls in place	25	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
		product	relationships and ability to provide for children. Poor or fluctuating prices is a regular occurrence for fishers – there is little financial security or stability in this industry as there is no guarantee of prices or markets. At the same time, a commercial fishing enterprise can be lucrative when prices are good.			
	6.1.2 Time or hours spent at sea	Less time spent with family and on relationships	- Family break-down - depression - health issues - potential loss of business	No current controls in place	20	
	6.1.3 Pressure of business (i.e. to perform and provide for a family)	High expectations on self and others	- health issues - stress - possible break-down	No current controls in place	20	
	6.1.4 Keeping up with maintenance,	No time for a social life or to have time for self-interests	- health issues - stress - possible break-	No current controls in place	20	

Operation	Activity	Hazard	Risk (potential impacts)	Current control measures	Risk Rank	Corrective Action
	bookwork and other business activities		down			
	6.1.5 Industry management – contribution to State fisheries regulation processes	Time away from family and business	- health issues - stress - possible break-down	No current controls in place	20	
	6.1.6 Lack of industry initiative in addressing the issue of public perceptions of a number of years.	Public perceptions of the fishing industry may (& have) become extremely negative in many cases	Public perceptions have a significant impact on political debates and related issues such as resource access for commercial fishers, in addition to restrictions on catch and effort	No current controls in place	20	

GLOSSARY

Benchmark - Point of reference against which change may be measured.

Beneficiaries of fisheries research and development (R&D) -The people who receive the economic, environmental and social benefits of fisheries R&D are the three sectors of the fishing industry, seafood consumers, and the people of Australia.

Biodiversity - See ecologically sustainable development.

Biological diversity/biodiversity – the variability among living organisms from all sources (including marine and other aquatic ecosystems and the ecological complexes of which they are part). Includes 1) diversity within species and between species; and 2) diversity of ecosystems.

Bycatch – species that are discarded from the catch or retained for scientific purposes. This includes discards of commercially valuable species.

By-product – species that are retained because they are commercially valuable but are not the main target species.

Crustacea or crustaceans - Arthropod animals, characterised by a hard, close-fitting shell that is shed periodically. Includes prawns, crabs, lobsters, shrimps, bugs and freshwater crayfish.

Customary sector (also referred to as the Traditional sector) - The customary sector comprises enterprises and individuals associated with fisheries resources from which Aboriginal and Torres Strait Islander people derive products in accordance with their Traditional customs.

Ecologically sustainable development (ESD) - Using, conserving and enhancing the community‘s resources so that ecological processes, on which life depends, are maintained and the total quality of life (now and in the future) can be increased. [Definition of the national Strategy for ESD, 992].

Ecologically sustainable – use of natural resources within their capacity to sustain natural processes while maintaining the life support systems of nature and ensuring that the benefit of the use to the present generation does not diminish the potential to meet the needs and aspirations of future generations.

Ecologically viable stock – ecologically viable stock has a general meaning rather than specific meaning. It refers to the maintenance of the exploited population at high levels of abundance designed to maintain productivity, provide margins of safety for error and uncertainty and maintain yields over the long term in a way that conserves the stocks role and function in the ecosystem.

Ecosystem - A community of organisms interacting with each other, and the environment in which they live.

EPBC Act - The *Environment Protection and Biodiversity Conservation Act 1999*, which promotes ecologically sustainable development and seeks to conserve biological diversity through an effective, efficient national approach to environmental management at all levels of government.

Exclusive Economic Zone (EEZ) - The area between the lines 2 nautical miles and 200 nautical miles seaward of the territorial sea baselines. A lesser distance is declared where the distance between the baselines of Australia and another country is less than 00 nautical miles.

Australian Fishing Zone (AFZ) - corresponds closely to the exclusive economic zone.

Fish - In the broadest sense, living aquatic vertebrate and invertebrate organisms, including marine mammals and reptiles, and such organisms after they have been harvested.

Fish products - All products derived from fish after the fish have been harvested for sale or consumption.

Fisheries managers - Persons appointed by government agencies to manage Commonwealth, State or northern Territory fisheries.

Fishery - A class of activities by way of fishing, including activities identified by reference to all or any of:
• a species or type of fish;
• a description of fish by reference to sex or any other characteristic;
• an area of water or seabed;
• a method of fishing;
• a class of boats;
• a class of persons; and/or
• a purpose of activities, as determined by the relevant management authority.

Fishing by Aboriginal and Torres Strait Islander people - Includes fishing and shell-collecting by Aboriginal and Torres Strait Islander people in accordance with their Traditional customs (the customary sector of the industry); their recreational fishing (that is, not using customary practices); subsistence fishing (following customary or recreational practices); and commercial fishing.

Fishing industry - Includes any industry or activity conducted in or from Australia concerned with: taking, culturing, processing, preserving, storing, transporting, marketing or selling fish or fish products. There are three principal fishing industry sectors:

• The commercial sector comprises enterprises and individuals associated with wild-catch or
aquaculture resources and the various transformations of those resources into products for sale. It is also referred to as the ‗seafood industry', although non-food items such as pearls
are included among its products.
• The recreational sector comprises enterprises and individuals associated – for the purpose
of recreation, sport or sustenance – with fisheries resources from which products are derived
that are not for sale.
• The customary sector comprises enterprises and individuals associated with fisheries resources from which Aboriginal and Torres Strait Islander people derive products in accordance with their Traditional customs.

Harvest - To catch or gather wild or aquacultured natural resources.

Hopper – a device that is fitted to a trawler that holds sea water. Product caught are placed into the water-filled hopper so that marine animals are kept alive while sorting and grading occurs. Some larger hoppers have conveyor belts inside. Trials show that this significantly reduces the mortality rate of non-target species catch.

Key Performance Indicator (KPI) - A specification for measuring performance. Example: benefit-cost ratios for nominated projects.

Landed value - The value of a product at the wharf or aquaculture tank, before value-adding. When referring only to aquaculture, the equivalent term of ‗farmgate value' is usually used.

Ministerial powers - Powers exercised under the provision of legislation, especially the PIERD Act, by the federal Minister for Agriculture, Fisheries and Forestry; the Parliamentary Secretary to the Minister; or the Minister for Fisheries, Forestry and Conservation. All three ministers exercise ministerial powers in relation to the FRDC, either in their own right or by delegation.

Nutraceuticals - Food components that provide demonstrated physiological benefits or reduce the risk of chronic disease, above and beyond their basic nutritional functions. They are similar to
‗functional foods' – the distinction being that functional food is similar to a conventional food
(examples are breads fortified with Omega-3 polyunsaturated fatty acids, fortified beverages,
and cereals fortified with fibre, iron and calcium), whereas a nutraceutical is isolated from a
food and sold in dosage form.

Output - The goods and services (mainly knowledge, processes and technology) that the FRDC and its R&D partners produce for external organisations or individuals.

Precautionary principle - Where there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation. In the application of the precautionary principle, public and private decisions should be guided by:
• careful evaluation to avoid, wherever practicable, serious or irreversible damage to the environment; and
• an assessment of the risk-weighted consequences of various options.

Quality management - Management of all activities through a systematic and determined focus on continual improvement, above minimum levels of performance set by a formal quality management standard. The standard against which the FRDC is certified is AS/nZS ISO 900 :2000. Otherquality management standards suitable for the seafood industry are promoted by SeafoodServices Australia.

Recfish Australia - Trading name of the Australian Recreational and Sport Fishing Industry Confederation, the peak body representing the recreational sector of the fishing industry.

Recreational sector - The recreational sector comprises enterprises and individuals associated – for the purpose of recreation, sport or sustenance – with fisheries resources from which products are derived that are not for sale.

Research and development (R&D) - In relation to the fishing industry: systematic experimentation and analysis in any field of science, technology or economics (including the study of the social or environmental consequences of the adoption of new technology) carried out to:
• acquire knowledge that may be of use in obtaining or furthering an objective of the fishing industry, including knowledge that may be of use for the purpose of improving any aspect of the production, processing, storage, transport or marketing of goods that are the produce, or that are derived from the produce, of the fishing industry; or
• apply such knowledge for the purpose of attaining or furthering such an objective; or
• create new or improved materials, products, devices, processes or services for the purpose of attaining or furthering such an objective.

Seafood Products - derived from aquatic natural resources, including fish and fish products, for human consumption.

Seafood industry - The commercial sector of the fishing industry: see fishing industry.
Seafood Services Australia

A company limited by guarantee, with the FRDC and the Australian Seafood Industry Council
as its members, which aims to be proactive in providing an Australia-wide service for people
who catch, farm, process, transport, wholesale, retail, export, import or cook seafood. The service includes:
• value-adding through seafood product and process development;
• product quality, food safety and consumer health;
• management systems and standards for quality and ecologically sustainable development;
• market development;
• seafood marketing names;
• seafood emergency management; and
• information and advice on other technical issues.

Social resilience
Relates to the social (including political) capacity of groups of people to effectively develop
and represent their interests and to advocate their contributions to the Australian community.
having such a capacity is essential in our robust democratic society, especially if the group
is likely to be affected by others who are better at representing their own self-interests. It is
widely recognised that the social resilience of the three main sectors of the fishing industry is
presently low.

Stakeholders - People, organisations or groups with an interest or stake in a line of business. The FRDC‘s stakeholders are the fishing industry (see definition); the federal, state and the territory governments; and the people of Australia.

Strategy - A focus for activities that produce the outputs required to achieve planned outcomes — in the FRDC context, in Program (the Management and Accountability Program).

Supplier - A person or organisation engaged by the FRDC to provide goods or services that affect the FRDC‘s delivery of its outputs. Includes consultants, who are described in the May 999
issue of the Department of Prime Minister and Cabinet Requirements for departmental annual
reports.

Sustainable - A characteristic of a process or a state that can be maintained indefinitely. See ecologically sustainable development.

Sustainable development - Management and conservation of the natural resource base and the use of technological and institutional change to ensure the attainment of human needs for present and future generations. Such development is environmentally nondegrading, technically appropriate, economically viable and socially acceptable. [Un Food and Agriculture Organization, 2000]

Traditional sector (also referred to as the customary sector) - The customary sector comprises enterprises and individuals associated with fisheries resources from which Aboriginal and Torres Strait Islander people derive products in accordance with their Traditional customs.

Value-adding - Any activity that results in products, processes and services becoming more valuable, competitive, effective and/or efficient, thus increasing financial returns or achieving other desired outcomes. Value-adding elements can include products, processes, packaging,
equipment, quality, knowledge gaps and aspects of marketing. Although increased profits are
the goal, sometimes new products and processes need to be adopted to enable a business to remain economically viable without increasing economic performance.

Source: FRDC Annual Report 2003-2004.

APPENDICES

Appendix A - Terms of Reference

The Environmental Management System should:

- be documented, publicly available and transparent;
- be developed through a consultative process providing opportunity to all interested and affected parties, including the general public;
- be strategic containing objectives and performance criteria by which the effectiveness of the management arrangements are measured;
- provide for the periodic review of the performance of the fishery management arrangements and the management strategies, objectives and criteria;
- be capable of 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; and
- comply with relevant legislation and regulations, including State, national and international.

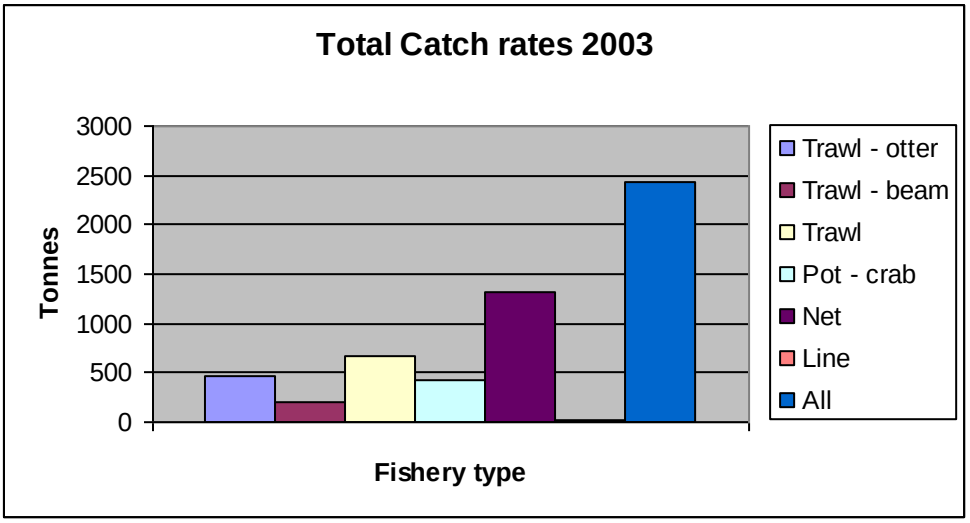
Compliance with such statutory requirements does not mean that the Moreton Bay Seafood Industry Association cannot elect to enforce controls that are more stringent than those required through the State, national or international regime.

Appendix B – Funding bodies for the project

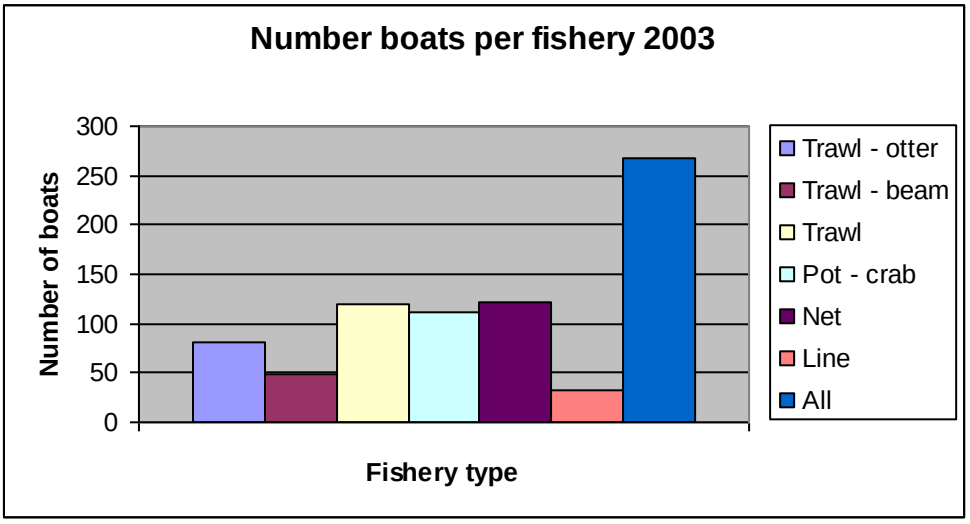
Funding bodies for this project include:

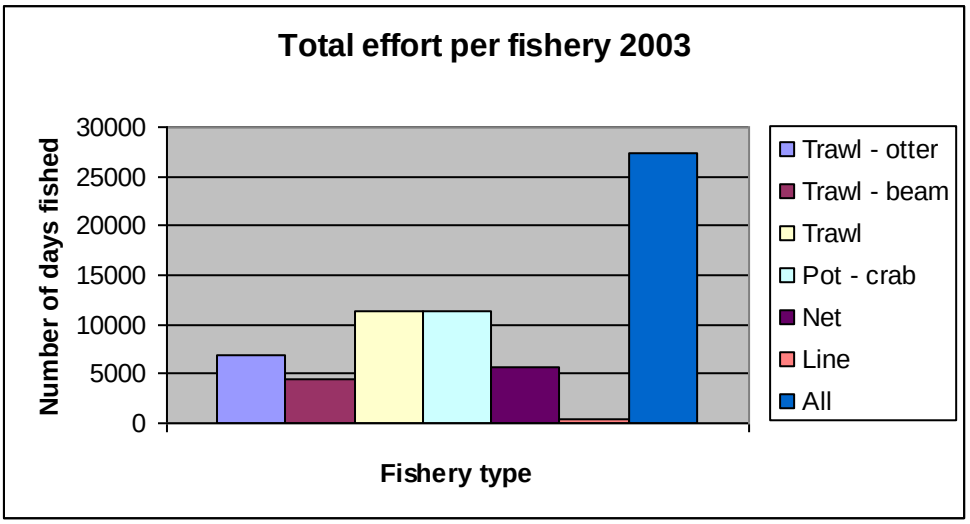
- Natural Heritage Trust
- Seafood Services Australia
- Fisheries Research and Development Corporation
- Queensland Environmental Protection Agency
- Queensland Department of Primary Industries and Fisheries
- Queensland Seafood Industry Association
- Moreton Bay Seafood Industry Association
- CRC Reef
- University of Queensland
- Ecofish
- Seanet

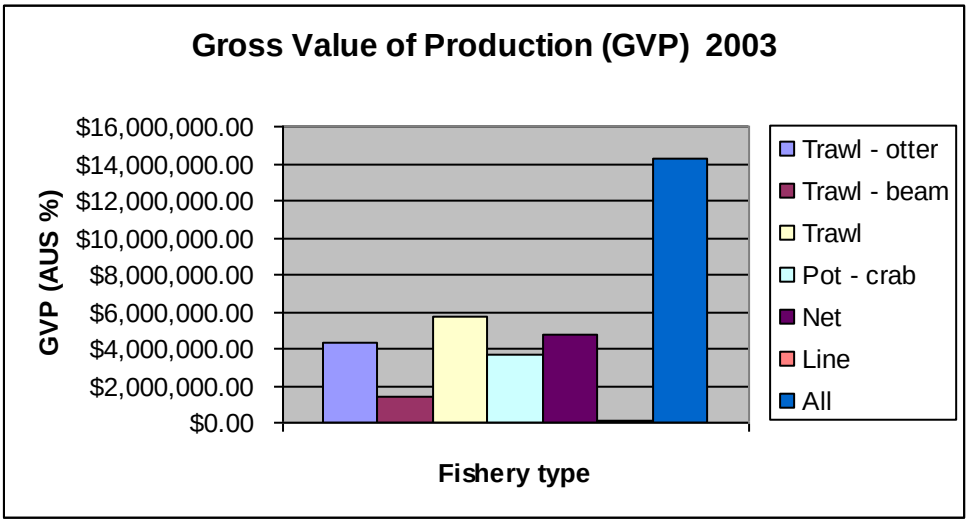
Appendix C - Moreton Bay Statistics



Data extracted from ChrisWeb DPI&F information service




Total effort per fishery 2003
Number of days fished
30000
25000
20000
15000
10000
5000
0
Fishery type
Trawl - otter
Trawl - beam
Trawl
Pot - crab
Net
Line
All


Gross Value of Production (GVP) 2003
GVP (AUS %)
$16,000,000.00
$14,000,000.00
$12,000,000.00
$10,000,000.00
$8,000,000.00
$6,000,000.00
$4,000,000.00
$2,000,000.00
$0.00
Fishery type
Trawl - otter
Trawl - beam
Trawl
Pot - crab
Net
Line
All

Appendix D - Moreton Bay Seafood Industry Association (MBSIA) Board members
(as at March 2006)

(the board forms the EMS management committee)

Secretary	- Vicky Baker
Chair	- Warwick (Wally) Newnham
Vice-Chair	- Mark Smythe
Treasurer	- Mark Smythe
Trawl representative	- Warwick Newham
Deputy trawl	- Kevin baker
Net representative	- John page
Deputy net	- Dave Thomson
Line representative	- Dave Thomson
Crab representative	- Tony Reisenweber
Beam trawl representative	- Mark Smythe
Deputy beam	- Luke Beetham
Bribie Island/Pumicestone area representative	- Dave Sterling
Scarborough/Redcliffe area representative	- Jim Finlay
Sandgate/Cabbage Tree Creek area representative	- Steve Wrayford
Brisbane River/Doboy Creek area representative	- Luke Beetham
Wynnum/Redlands/ Nth Stradbroke Island area representative	- Dave Thomson
Jumpinpin/northern Broadwater area representative	- Tony Reisenweber
Marine and coastal environment representative	- John Page
Deputy environment	- Jim Finlay

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15. Appendix 4: Brochures promoting Moreton Bay EMS with local communities


Why you can buy guilt-free
SEAFOOD!

Moreton Bay Seafood Industry Association

A healthy fishery for future generations…

Winner of the
Sustainable Primary Production Award
and the
Most Outstanding Contribution to Primary Industries
award in Queensland's Primary Industries Awards

Moreton Bay Seafood Industry Association fishers are commited to sustainable and responsible practices to catch the seafood products that you enjoy, ensuring that the marine environment is protected for future generations.

OUR FUTURE

By only harvesting what nature can replace, Moreton Bay fishers are assuring the future of their businesses for their children and grandchildren.

COMMITMENT

Moreton Bay fishers continually improve their fishing practices, demonstrating their strong commitment to environmental sustainability on a daily basis.

ACTION

Moreton Bay fishers work closely with fisheries scientists to ensure their catches are sustainable.

Everyday, from Coolangatta to Caloundra, Moreton Bay fishers set out to FISH SMARTER, NOT HARDER.

For a copy of the Moreton Bay Seafood Industry Association's Environmental Plan (EMS), please go to the following internet link:

http://www.seafood.net.au/files/mbsia.pdf

or email us at: mbsia@hotmail.com

Proudly supported by:

BACK CREEK ESTATE

Queensland Government
Environmental Protection Agency

Catching Fish for Everyone!
QSIA
QUEENSLAND SEAFOOD INDUSTRY ASSOCIATION INC

PORT of BRISBANE
Here for the future

Australian Government
Fisheries Research and Development Corporation

SEAFOOD SERVICES AUSTRALIA

CRC Reef Research Centre

SANDGATE FISHERMAN'S CO-OP SOCIETY LTD.

RAPTIS

Samies Girl

17. Appendix 5: Surveys to evaluate awareness of industry participants of the value of EMS

Survey

Group A

(fishermen who have been involved with EMS development since commencement)

1. Which fishery or fisheries do you fish in? *Please tick boxes that apply to you.*

otter trawl beam trawl net fishing line
crab specimen shell collection

other, please specify _____

2. How much time have you contributed to the development of the Moreton Bay EMS?

little considerable heavy involvement

3. Do you think an EMS is: *tick the boxes that apply to you*

a way to help me achieve my business goals

a process that will help minimize my impact on the environment and ensure the future of my industry

a written document that will not make much difference

just extra paper work

other or any additional comments

_____
_____
_____

4. Has your involvement with developing the Moreton Bay EMS encouraged you to think about how you might apply the regional EMS actions to your individual operation?

Yes Yes, with reservations No

4. **If No, what were the main reasons for deciding not to implement the EMS within your own operation or vessel?**

cost expertise time constraints

other……..

5. **If you think that doing an EMS will have a positive impact on your business/industry, do you think this will happen in the:**

short term long term

6. **Do you think an EMS will:** *please tick as many boxes as you think apply*

help improve the profitability of your business

minimize your impact on the environment

help maintain security of resource access

keep professional fishing businesses viable

improve community perceptions of the fishing industry

help build positive relationships between professional fishers and other resource users such as recreational fishers and beach users

help to ensure that fish stocks are available for future generations

7. **How can information on EMS be best distributed to individual fishers** *(please rank from 1 – 6 with 1 being the preferred option).*

through the MBSIA or QSIA key fisherman or industry champions
government initiatives regional industry clusters/groups
industry sectors supported by industry associations/government
an independent EMS officer working on behalf of fishers

8. **Would you prefer to receive information and advice regarding the EMS from a fisherman (as opposed to someone from outside of the industry)?**

Yes No

9. **If yes, what sort of support do you think they might need?**

training funding administrative support

other ……..

10. **Do you think it will be useful to share the Moreton Bay EMS so that other groups can use it as an example of how to go about developing their own EMS?** yes no

If yes, how should the EMS document be shared?

should only be shared at the industry association level
should be on a case by case basis
should be shared state-wide
should be shared nationally

Survey

Group B

(Fishermen new to the EMS development process)

1. **Which fishery or fisheries do you fish in?** *Please tick boxes that apply to you.*

   otter trawl beam trawl net fishing line
   crab specimen shell collection
   other, please specify _____

2. **Have you heard of Environmental Management Systems or EMS prior to development of the Moreton Bay EMS**

   yes no

3. **Do you think an EMS is:** *tick the boxes that apply to you*

   a way to help me achieve my business goals

   a process that will help minimize my impact on the environment and ensure the future of my industry

   a written document that will not make much difference

   just extra paper work

4. **How did you find out about the EMS and/or this meeting?**

   the Queensland Fisherman magazine or other QSIA publication
   word of mouth invitations sent to you in the mail
   government notices and publications other……..

5. **Have you attended EMS meetings or workshops previously?**
   yes no

If yes how many?

   One two or three more than three

6. **Do you think and EMS is:**

   a voluntary industry initiative government-driven

7. **Are you likely to consider making changes to your own operation/vessel to meet the Moreton Bay EMS actions?**
   Yes Probably No

If No, what are your main reasons for deciding not to sign-on to the EMS?

cost expertise time constraints

other……..

8. **Do you think an EMS will:**

help improve the profitability of your business

minimize your impact on the environment

help maintain security of resource access

keep professional fishing businesses viable

improve community perceptions of the fishing industry

help build positive relationships between professional fishers and other resource users such as recreational fishers and beach users

help to ensure that fish stocks are available for future generations

9. **If you think that doing an EMS will have a positive impact on your business/industry, do you think this will happen in the:**

short term long term

10. **How can information on EMS be best distributed to individual fishers** *(please rank from 1 – 6 with 1 being the preferred option).*

through the MBSIA or QSIA key fisherman or industry leaders
government initiatives regional industry clusters/groups
industry sectors supported by industry associations/government
an independent EMS officer working on behalf of fishers

11. **Would you prefer to receive information and advice regarding the EMS from a fisherman (as opposed to someone from outside of the industry)?**

Yes No

If yes, what sort of support do you think they might need?

training funding administrative support

other ……..

12. **Do you think it will be useful to share the Moreton Bay EMS so that other groups can use it as an example of how to go about developing their own EMS?** yes no

If yes, how should the EMS document be shared?

should only be shared at the industry association level
should be on a case by case basis
should be shared state-wide
should be shared nationally