Identifying, communicating and integrating social considerations into future management concerns in inshore commercial fisheries in Coastal Queensland

Dr Sylvie Shaw, Dr Helen Johnson,
and Dr Wolfram Dressler
The University of Queensland

Project No. 2008/073

Australian Government
Fisheries Research and Development Corporation

Queensland Seafood Industry Association
www.queenslandseafood.com.au

The University Of Queensland
AUSTRALIA

Queensland Seafood Industry Association (QSIA)
Suite 15 & 16, 699A – 713 Sandgate Rd
Clayfield, Qld., 4011
Website: http://www.qsia.com.au/

Title: Identifying, communicating and integrating social considerations into future management concerns on inshore commercial fisheries in Coastal Queensland
ISBN: 978-0-646-55364-1
Authors: Dr Sylvie Shaw, Dr Helen Johnson, Dr Wolfram Dressler, The University of Queensland, 2011
Subject: Fish and Fisheries: Social Aspects of Fisheries Change

This publication may be cited as:
Shaw, S. H. Johnson, and W. Dressler. 2011. *Identifying, communicating and integrating social considerations into future management concerns in inshore commercial fisheries in Coastal Queensland.* Report to the Fisheries Research and Development Corporation Project No. 2008/073. Fisheries Research and Development Corporation, Canberra, and The Queensland Seafood Industry Association, Clayfield Qld.

CONTENTS

TABLE AND FIGURES

FIGURES

LIST OF TABLES

2008/073: Identifying, communicating and integrating social considerations into future management concerns in inshore commercial fisheries in Coastal Queensland

Principal Investigator: Dr Sylvie Shaw
Address: The University of Queensland
School of History, Philosophy, Religion and Classics
Brisbane QLD 4072
Telephone: 07 33656322 Fax: 07 33651968

OBJECTIVES

1. To examine the attitudes, values and experiences of fishers involved in inshore fisheries in three Queensland regions;
2. To identify the social and economic impacts on fishers, their families and ancillary businesses by examining the well-being, quality of life outcomes and social resilience as a result of fishing closures and fishing effort rationalisation;
3. To examine adjustments in households amongst fishers and spouses; and
4. To investigate the ways in which fishers and their families are adapting to social, economic and ecological change.

OUTCOMES ACHIEVED TO DATE

1. A detailed social analysis of the impacts of socio-economic change on commercial inshore fishers, their families and ancillary business owners in three Queensland regions that enables the optimisation of resource access and resource allocation for commercial fishers and for a neglected sector of the fishing industry, that of fisher families**.**
2. An analysis of the major health, well-being and quality of life risks perceived by and affecting fishers and their families that enables local and national fisheries management agencies to be informed of the social impacts of their policies, particularly in relation to the wellbeing of professional fishers, fishing families and fishing-related coastal communities.
3. An analysis of the attitudes, reactions and resilience of sixty interviewees across Moreton Bay, Hervey Bay and the Burdekin that provides **v**aluable information to enable fisheries management agencies to plan with and for the ways that fishers, families and communities adjust socially to the vulnerabilities that occur following restructuring.
4. An outline of the significant concerns of individuals affected by policy change at a 'micro' level as a consequence of Ecologically Sustainable Development (ESD). It provides an **a**ssessment of the social costs that arise with the downsizing of regional fisheries in view of the social component of the government policy of ESD, and potential mitigations that can be adopted by local and national fisheries management.
5. An examination of the social, familial and personal impacts of policy decisions that provided ground-truthed evidence to offset anecdotal evidence of the social impacts of fisheries decline. The data provides the bases for evidence-based planning and highlights the need for the inclusion of social impact assessments (SIAs) and the development of social impact management plans for all major management and policy change in fisheries and those related to marine protected areas.

6. Recommendations can be provided to relevant government and non-government agencies, industry stakeholders, fisher organisations and fisheries communities to assist in future planning for structural change. These address: the need for greater awareness of the implications of the social impacts of management decisions, better communications, the provision of retraining opportunities and business and career advice, and the understanding of the serious health and well-being outcomes connected with social and economic change and planning for the social impacts of economic and managerialist decisions.

KEYWORDS: Commercial fisheries, commercial fishers and families, fishers' health and well-being, social impact assessment, social aspects of fisheries management.

NON-TECHNICAL SUMMARY

This study interviewed fishers and their families in three regions along the coast of the state of Queensland during 2010 and 2011. It sought to examine the social impacts of fisheries change in Moreton Bay, Hervey Bay and the Burdekin on inshore fishers, their partners, and ancillary businesses. The study identified that commercial fishers' livelihoods and lives have been subject to a range of largely negative social and economic impacts that have been inadequately assessed, less adequately communicated to fishers, and have not been managed with structured social impact management plans. Even those fishers deemed to be 'success stories' within the industry are aware of the dramatic direct and indirect impacts upon the fishing industry. They speak of their good fortune in terms of their initially strong financial position prior to the changes and their need to work exceptionally long hours in order to retain a viable income and to benefit from the changes. The social and economic impacts have been generated by changes to marine park zones, industry restructuring, fisheries reviews and other regulatory and policy changes, and by government agencies' interventions into fishing as an occupation.

The study reveals how fishing people in the three regions have faced a series of challenges arising from these changes, with only limited consideration of, and support for, the social, personal and family implications of such change. Our research findings suggest that the current management focus on economic and ecological goals fails to sufficiently address the cumulative short and longer-term social impacts of fisheries change, in particular, the effect on the health, well-being and quality of life of the people interviewed for this study. These findings are analysed from the views and responses of the fishers and their families to the personal and social consequences they continue to experience.

Notably, the study shows there is a lack of communication from policymakers about the possible social ramifications or potentially damaging social impacts arising from management measures and major policy initiatives. The consequences of changes to marine parks and those wrought by restructuring are shown to negatively affect the health, well-being and quality of life of the interviewees. Interview responses provide evidence of the initial and ongoing effects of socio-economic change, and illustrate the way fishers' needs in adapting to the changed conditions have not been well-integrated into management actions and policy frameworks in Queensland.

This report is not intended as a simplistic critique of government policies and programs, arguing 'for the fishermen' and 'against management'. Rather, the goal is to provide an analysis of the fishers' perceptions and understandings towards changes in the industry, which can be constructively used in future policymaking. By focusing on the perspectives and experiences of commercial fishers and analysing them in the light of broader changes in the industry, we suggest that future policy actions can take such perspectives into account in more beneficial ways.

Importantly, this study finds that the limited consideration of the social ramifications of social, individual and family experiences of fisheries change is reflected in a number of factors that have relevance for management decisions and policy actions in Queensland:

- A lack of recognition of the importance of fishing as a way of life and choice of career;
- A gap in communication between managers, scientists and fishers on decisions affecting fishers' working lives;
- Limited inclusion of fishers' knowledge, expertise and experience in scientific research and decision making;
- A sporadic assessment of the effects of social, economic, cultural and structural change on fishers and fishing families;
- Limited attention to the health and well-being risks of fisheries change, especially those related to mental health issues including stress, anxiety, depression, and seriously contemplated and actual suicide;
- Minimal counselling (financial, professional and personal) related to the potential and actual social and economic impacts of policy change;
- Limited information about alternative career paths or skills training and retraining, and about financial assistance to undertake such training; and
- Little advice on how to manage or develop fishing businesses in light of the changes and impacts, and how to plan for the future.

Different fisheries are affected in different ways by industrial, social and economic change. Some fishers and their families seem to cope better than others, often because they are in a strong financial position prior to the changes wrought by restructuring. Our study also confirms research on social resilience by Marshall and Marshall (2007) and Tobin et al. (2010) on the factors affecting individual coping mechanisms and resilience.

Overall in the three sites, older, less well-educated or lower income 'lifestyle' fishers are finding it harder to cope with the impacts of shifting regulations and policy changes. Issues of grief and disillusionment are most apparent amongst this group, not only about the negative impact of change on individuals and families, but on fishing as way of life and its historical, community and coastal heritage. This contrasts with the more entrepreneurial fishers who are innovative, adaptive and doing well. However, fishers are resilient. They display a mental toughness born of years of 'at sea experience', which has allowed them to weather the changes and adjust to the new conditions.

The commonalities of interviewees' perceptions and experiences of change across the three regions and among different fisheries demonstrate the necessity to develop strategies for explicitly valuing and incorporating social concerns and attendant social impact assessments and social impact management plans into fisheries and environmental management in Queensland.

Our study affirms the results of similar studies conducted both internationally and within Australia on the social and economic impacts of fisheries change. It contends that significant training in the social and economic impacts of government-driven restructuring, as well as greater attention to meaningful communication across the differing sectors (fisheries, science, management), would assist in the future planning, design, implementation, and enactment of interventions in fishing and allied occupational sectors.

ACKNOWLEDGEMENTS

This research was made possible through funding from the Fisheries Research and Development Corporation and the Queensland Seafood Industry Association (QSIA). The research team is most grateful to QSIA's Board of Directors and Chief Executive Officer, Winston Harris, for their support. Our thanks particularly go to the project's participants for their generous commitment of time and for sharing their ideas, insights, and experiences with us. Thanks are also due to Ms Lucy Campbell and Dr Mark Schubert for their assistance with gathering data, and Dr Michael Fabinyi for his fieldwork and literature research. Their involvement in this research study was invaluable. Acknowledgements are given to Dr Daryl McPhee and Dr John Kirkwood for their comments on drafts of this report. Thanks also go to the Moreton Bay Seafood Industry Association (MBSIA) and President John Page for his helpful advice during the research. Our special thanks go to Neil Green, QSIA's former president, whose unwavering support for this project has been gratifying and significant.

NEED

The Queensland Seafood Industry Association (QSIA) determined the need for a detailed investigation of how fishers and family members negotiate and respond to social and economic uncertainty during and after fisheries closures. Evidence from the QSIA suggests extreme social duress occurs among fisher families, yet few studies have considered the attendant social and economic costs of fisheries closures, which involve significantly restructuring the way of life of inshore fishers, their families and communities. Their economic viability is increasingly threatened by the cumulative impact of several interrelated factors, namely: rising fuel costs; swelling overseas imports competing with local supply; marine degradation; and the implementation of no-take marine protected areas (MPAs) which restrict fishers from accessing valuable fishing areas. The resulting industry restructuring has compounded these impacts, leading to dramatic structural adjustments where compensation is paid to offset the economic costs of reducing fishing activities.

The social aftermath of these decisions has received little scrutiny to date in Queensland. However, research on the impacts of fisheries change, and from social impact assessments conducted in fisheries and related industries both internationally and within Australia, indicate that substantial economic and social well-being issues are involved. While financial compensation may be successful in reducing the initial economic losses of fisheries decline and in limiting fishing capacity, the sustained impact on the social and economic investment in fishing as a life-course for fishers and their families is enduring, challenging, and in urgent need of critical attention.

OBJECTIVES

The initial objectives of the study were:

1. To examine and compare the attitudes, values and experiences of those involved in viable and vulnerable fisheries, both inshore and offshore and also those fishers and their families who have left the industry;
2. To identify the social and cultural impacts by examining well-being, quality of life outcomes and social resilience as a result of fishing closures and fishing effort rationalisation;
3. To examine adjustments in households amongst fishers and spouses; and
4. To investigate the ways in which fishers, their families and local communities are adapting to social, economic and ecological change.

Due to the relatively small numeric sample (i.e. sixty interviewees) selected, and the diversity of issues located in an initial pilot study, as well as the complexity associated with the number of government authorities involved in fisheries and marine park management, it was decided to focus on the inshore fisheries for the purposes of this study.

LIST OF ACRONYMS

AFFA	Agriculture, Fisheries and Forestry – Australia (Department of)
AFMA	Australian Fisheries Management Authority (Commonwealth)
CRC	Cooperative Research Centre
DEEDI	Department of Employment, Economic Development and Innovation (includes Fisheries Queensland)
DEH	Department of the Environment and Heritage
DEHA	Department of the Environment, Heritage and the Arts
DERM	Department of Environment and Resource Management
DEWHA	Department of the Environment, Water, Heritage and the Arts
DPI	Department of Primary Industries
DPI&F	Department of Primary Industries & Fisheries (includes Fisheries Queensland)
DSEWPC	Department of Sustainability, Environment, Water, Population and Communities.
EBM	Ecosystem-based Management
EBFM	Ecosystem-based Fisheries Management
ECOTF	East Coast Otter Trawl Fishery
ECT	East Coast Trawl
EPA	Environment Protection Agency (now DERM)
EPBC	Environment Protection and Biodiversity Conservation (Act)
FRDC	Fisheries Research and Development Corporation
GBR	Great Barrier Reef
GBRMP	Great Barrier Reef Marine Park
GBRMPA	Great Barrier Reef Marine Park Authority
GBR-RAP	Great Barrier Reef - Representative Areas Program
GBR-SAP	Great Barrier Reef – Structural Adjustment Package
GBRWHA	Great Barrier Reef World Heritage Area
GSMP	Great Sandy Marine Park
GVP	Gross Value of Production
HB	Hervey Bay
LEK	Local ecological knowledge
MB	Moreton Bay
MBMP	Moreton Bay Marine Park
MBSIA	Moreton Bay Seafood Industry Association
MEY	Maximum Economic Yield
MSY	Maximum Sustainable Yield
QSIA	Queensland Seafood Industry Association
RAP	Representative Areas Program
SAP	Structural Adjustment Package (or Program)
TAC	Total Allowable Catch

PART 1: A FOCUS ON THE COMMERCIAL FISHING INDUSTRY

SECTION 1: BACKGROUND

Section 1 describes the organisation of the report and outlines the background to the present study on the social impacts of fisheries change in three regions in Queensland. It provides the rationale for undertaking this study, describes the three regions involved and discusses the qualitative approach used in the research process.

1.1 Introduction to the Report

This report is divided into three parts:

Part 1: A Focus on the Commercial Fishing Industry
Part 2: A Focus on Fishers and Social Change
Part 3: Benefits, Recommendations, Outcomes and Conclusion

Part 1, 'A Focus on the Commercial Fishing Industry', provides an overview of the commercial fishing industry in Queensland. Initially it maps the mechanics of this research study and reviews the dynamics of fisheries management practices over time, including a focus on property rights, ecologically sustainable development, individual transferable quotas, marine protected areas and structural adjustment measures - all concepts that have affected the Queensland fisheries sector. Part 1 concludes with an analysis of the scholarly literature related to the influence of social change in fisheries in both Australia and overseas.

Part 2, 'A Focus on Fishers and Social Change', reviews the results of a series of interviews undertaken in Moreton Bay, Hervey Bay and the Burdekin. It examines the attitudes and experiences of fishers, their partners and fisheries-related business owners towards the social impacts of increasing regulations, including the introduction of marine parks, in the three regions. Part 2 addresses the impacts of these social and economic changes on the health, well-being and quality of life of fishers and their families, and the industry in which they work.

Part 3, 'Benefits, Recommendations, Outcomes and Conclusion', summarises the major findings of the report and provides an outline of the benefits and recommendations arising from the report directed specifically towards: (i) research; (ii) management; and (iii) government action. It concludes with a summary of the study's findings emphasising the role of social impacts in fisheries and environmental management.

1.2 Background to the Study

Fisheries management has long been based in the ecological logic of Maximum Sustainable Yield (MSY), and the economic logic of Maximum Economic Yield (MEY). The outcome of these approaches has, in many cases, led to diminishing returns for fisheries. This has been seen particularly in areas where strong political and economic interests have controlled and exploited marine resources, including the most severely depleted stocks, for financial gain (e.g. Newfoundland's Grand Banks). In the process, little, if any, detailed consideration has been given to the social, cultural and

psychological impacts of fisheries decline on communities, households and families whose way of life is inextricably linked with the sea.[1]

Australian fisheries, arguably, are in better shape than in many other countries, but here too, commercial fishers have seen vast changes to their industry, fishing grounds, and livelihoods. In particular, the commercial fishing industry has become an increasingly restricted occupation with declining numbers. The East Coast Trawl (ECT) fishery, for example, once had well over a thousand boats in the 1980s, in part due to the provision of interest-free loans used to encourage people to invest in the industry, but this number has since dwindled to around 600. As elsewhere, there are many reasons driving the decline but, in general, most sectors of the industry in Queensland perceive themselves to be threatened due to:

- a state and federal fisheries management sector that maintains an economic and environmental focus;
- being 'squeezed out' by marine protected areas and the consequent increase of fishing effort in acceptable areas;
- more assertive competition from other fisheries sectors (e.g. recreational fisheries); and
- ultimately, severe dislocation and disenfranchisement leading to extreme social stress at the individual and family level.

These interrelated 'threats' form part of a broader trend of restructuring that has seen commercial fishing become an increasingly restricted occupation. The historical impact of Australia's policy environment has partly facilitated the move toward fisheries restructuring, where outcomes have included overuse and social marginalisation.

Since the 1980s, Australian fisheries management, at both Commonwealth and state levels, has been strongly influenced by two management paradigms that have gradually restricted the access of commercial fisheries to fishing grounds. These management paradigms are:

1. Economic approaches, using (among other tools) output controls such as Individual Transferable Quotas (ITQs), which aim to avoid the race to fish, to enable fishers to fish at optimal times, to overcome the risks of overexploitation due to technological advances, and to consolidate operations for economic efficiency.

2. Ecosystem-based approaches, adopting (among other tools) marine protected areas which restrict spatial access for commercial fishers through the declaration of no-take zones.

Such management practices have been deemed necessary for improving the long-term sustainability of fisheries. However, the need to incorporate the social concerns of fishers and their families into broader and sector management frameworks, especially in

[1] See Lehtonen (2004:200) for a critique of sustainable development as an environmental issue concerned solely with the integration of environmental concerns into economic decision-making.

response to restructuring, has been insufficiently addressed, and has contributed to a situation of severe social stress that remains 'hidden' and unabated.

1.3 Methods

Commercial fishers, their families and ancillary business owners were interviewed in three sites along the Queensland coast: Moreton Bay, Hervey Bay and the Burdekin region. Each region has seen the introduction of marine protected areas (MPAs) and each was chosen as a representative case study to examine the social, cultural and familial impacts of marine parks, pre- and post-implementation, and other effects, as a result of management policy actions.

This study used multiple methods to obtain data. Initially, a comprehensive review of the literature and research studies from Australia and overseas was conducted. This was followed by sixty in-depth, face-to-face interviews across the three regions. Later a number of follow up interviews in each region were undertaken to compare the initial and subsequent responses of interviewees to fisheries change. As the research progressed, it was noted that participants' responses began to cover a similar terrain, with fishers holding shared perspectives and common experiences about changes to their industry, and the impacts on their well-being and quality of life, i.e. the subjective experience of physical, emotional and social well-being (Smith and Clay 2010). For example, there was remarkable similarity in responses relating to the social and family impacts of fisheries change experienced by the interviewees regardless of location or fishery, as well as about the way the marine parks were implemented, how the stakeholder consultations were conducted, and how the licence buyout in Moreton Bay and structural adjustment package in the Great Barrier Reef region were administered. The issues that anchor the responses, and a more detailed description of the research methodology, are provided in greater depth in Part 2 of this report '**A Focus on Fishers and Social Change'.**

1.4 Locations Selected

Figure 1 illustrates the three regions under investigation and the marine protected areas under the jurisdiction of the Queensland Government. The federally-administered Great Barrier Reef Marine Park is shown in Figure 2.

1.4.1 Moreton Bay

Moreton Bay is home to a number of significant commercial fisheries delivering $39 million to the value of output in the regional Brisbane-Moreton regional economy (Robinson and Mangan 2008). Moreton Bay is also widely recognised for its unique natural and cultural heritage values. As one of the largest estuarine bays in Australia, and one resting on the edge of a growing capital city, it supports a diverse range of habitats, including wetlands of international significance as well as populations of rare and endangered marine species.

In March 2009, the Queensland Government sought to more effectively protect these valuable resources by extending the boundaries of the 1993 Moreton Bay Marine Park (MBMP), dividing the Bay into conservation no-take or green zones that have subsequently become contested spaces in the Bay.

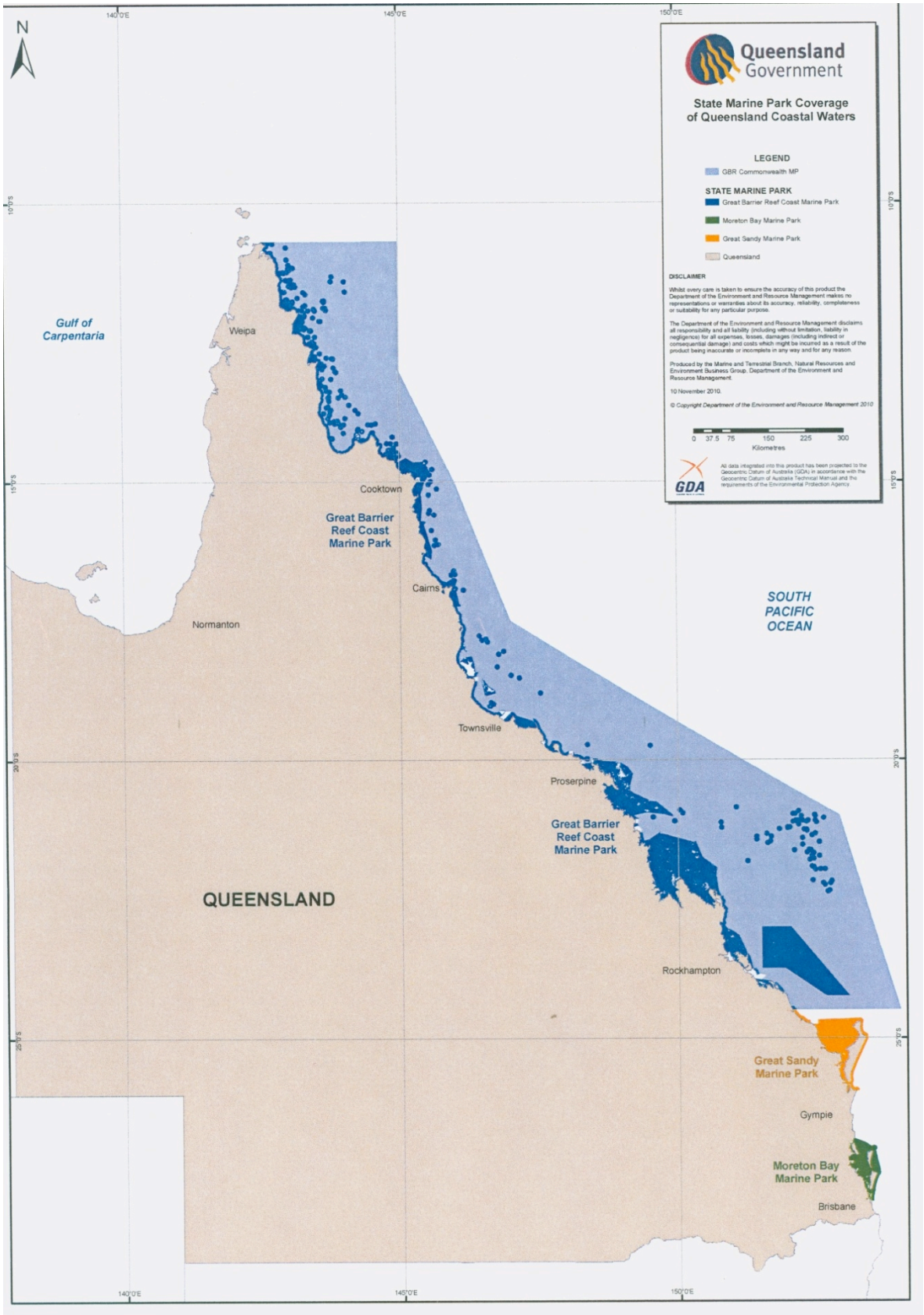

Figure 1: State Marine Parks in Queensland (Dept. of Environment and Resource Management)[2]

[2] This map only lists the parks under the jurisdiction of the Queensland Government that are relevant to this study.

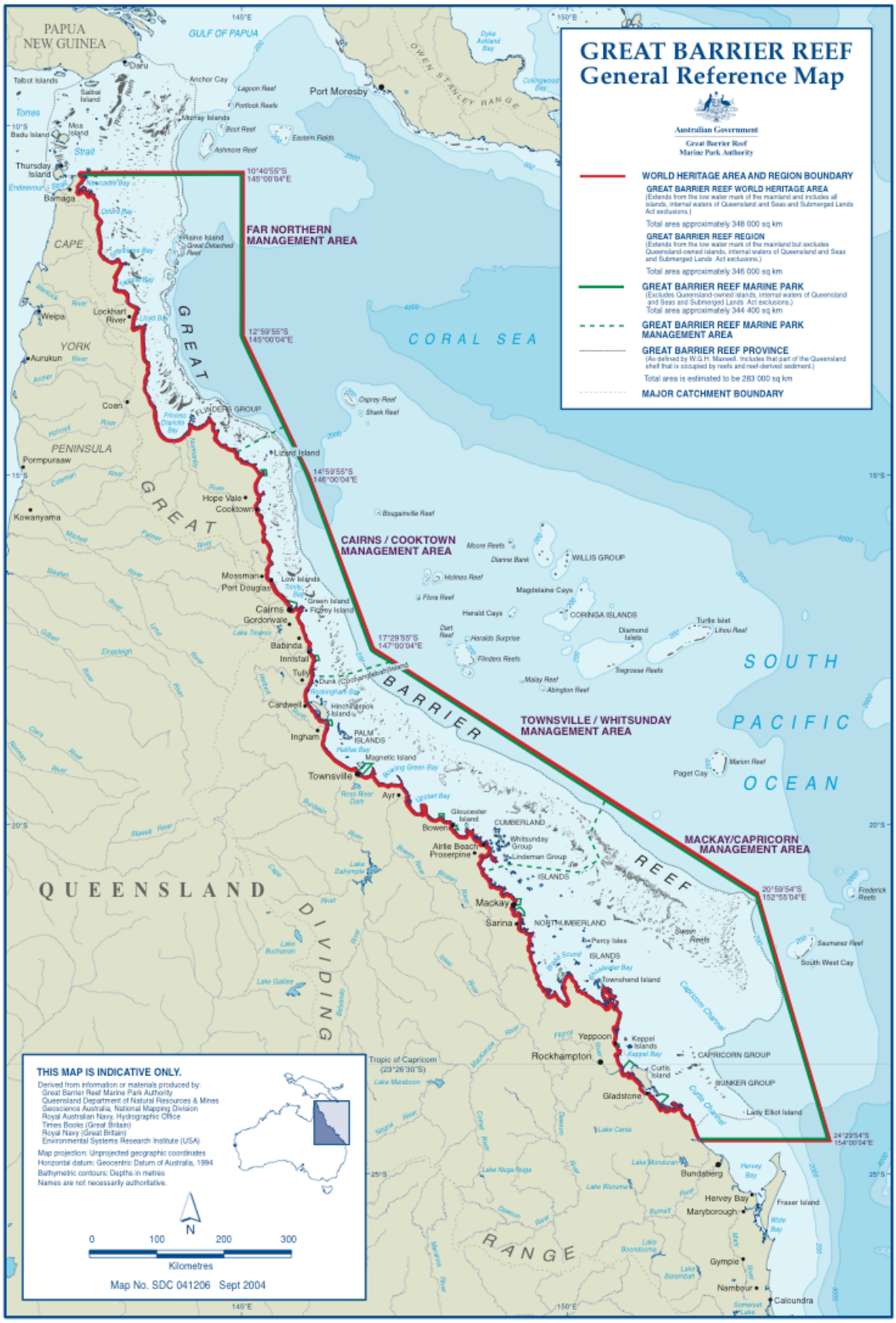

Figure 2: Great Barrier Reef Marine Park (Source: GBRMPA, 2004)

Fishers are mostly small scale owner-operators involved in the following fisheries: inshore and ocean beach net, otter and beam trawl, crab, line, and specimen shell collection. The majority have strong family linkages to Moreton Bay; often their fathers and grandfathers fished the same areas. However, the decision to extend the conservation and habitat zones of the 1993 marine park, and to curtail fishing in green zones, has caused fishers to reconsider their futures and the future of the industry.

1.4.2 Hervey Bay

A world-renowned whale-watching centre, Hervey Bay, located on the boundary between the populous south-east corner of Queensland and the central coast, is working to reinvent itself from a fishing community into a haven for tourism. This shift has affected local fishers due to the Queensland Government's decision to introduce the Great Sandy Marine Park in 2006, which supplemented the pre-existing Hervey Bay and Woongarra Marine Parks.

Fisheries affected by this change include the net, line and crab as well as the trawl sector, but, as the majority of the park is zoned 'general use', commercial operations and recreational fishing are permitted in the park area (Macintosh and Bonhady 2009). The Great Sandy Marine Park is designed to protect marine and coastal habitats and provide vital seasonal resources for several endangered migratory species such as humpback whales, wading birds and marine turtles, as well as the resident dolphins, dugongs and myriad fish species. Of particular concern to local fishers, however, has been the introduction of the MPA's go slow zones, and expectations about the East Coast Trawl review conducted by Fisheries Queensland during 2010 and into 2011.

1.4.3 The Burdekin Region

The region covering the 'mighty' Burdekin River, various river and creek estuaries, and incorporating the Great Barrier Reef (GBR), shown in Table 2, provides some of the best fishing in the country (Laspina 2007). In 1981 the Great Barrier Reef, considered one of the world's natural treasures, was designated a World Heritage Area. To further conserve this iconic region, the federal government extended the zoning of the Great Barrier Reef Marine Park in 2005. Inshore fisheries in this region are a combination of net, line and crab, with some reef trawlers operating offshore.

At least one fisher combines barramundi net fishing in estuaries with reef trawl for coral trout although this practice is dependent on seasonal variations, spatial restrictions, costs of fuel, boat upkeep, and costs and availability of crew. A large proportion of Queensland seafood comes from the area and contributed $139 million to the Australian economy in 2006-2007 (GBRMPA 2010).

1.5 The Participants

In each of the three sites, twelve fishers (those currently working or who had retired or changed professions), five wives or partners, and three ancillary-fisheries business owners were initially interviewed. A number of follow up interviews were conducted towards the end of the process. The focus of these later interviews was on the changes that interviewees had experienced, and the adaptations they had made, since the initial discussion.

The majority of fishers, grew up in fishing families, learning their trade from their fathers and grandfathers. Most have been in the industry since they left school in their mid-teenage years. They work in the net, line, crab, trawl and beam trawl sectors. Wives (or partners) often work in the family business or outside the home in full or part-time occupations, including running their own businesses.

Former and retired fishers are still connected in various ways to the industry, for example, through their family connections and by being involved in fisheries-related activities and professions such as working in government and non-government marine-centred agencies.

The ancillary business owners interviewed include wholesalers and distributors, brokers, those running commercial fish shops and those engaged in providing industry training. While managing their businesses, some business owners still continue to be engaged in commercial fishing operations.

1.6 Scope of the Study

This study focuses on the attitudes and experiences of commercial fishers, families and fisheries-related businesses as a result of fisheries and environmental change. Managers and others involved in the creation, rezoning and governance of the three relevant marine parks, including fisheries managers and scientific researchers, were not included in this study and therefore were not formally interviewed. For this reason, the report is not a broad-ranging, general policy analysis or a critique of the marine parks and their management. It argues instead for a greater understanding of the perspectives of individuals affected by fisheries management plans and policies. The results from the study aim to assist in the framing of future policies that are holistic in their design and application, and take into account the social impacts and ramifications of policy change.

Integrating a holistic approach into environmental and fisheries management processes will enable Australian agencies to plan their activities within guidelines for social impact assessment and management that are accepted globally and are put into effect across national and state jurisdictions. Including information on the social impacts of major policy developments may assist in alleviating some of the more serious health, well-being and quality of life concerns presented in this report. These relate to the capacity of people to adapt to change, to retain a sense of control over their lives, and to be happy (Kofinas and Stuart Chapin III 2009). It may also help mitigate potential areas of conflict or misunderstanding between sectors, and may contribute to building resilience rather than resistance in the face of change.

In the next section, the report provides an overview of the background to the legislation and management approaches that frame the fishing industry in Queensland.

SECTION 2: FISHERIES IN AUSTRALIA AND QUEENSLAND

2.1 Introduction

This section sets out the legislative and conceptual framework for fisheries management in Queensland and Australia. In particular, it outlines perspectives on property rights, ecologically sustainable development, and the use of marine protected areas as both a conservation enhancement and fisheries management tool.

2.2 Legislative and Managerial Landscape for Commercial Fishing in Queensland

In the twentieth century, Queensland fisheries were considered an open-access resource and commercial fishers enjoyed the right to fish in all waters throughout the state. State legislation did little to restrict fishing efforts, other than through 'classic legislative measures of closed seasons, closed areas and regulatory curbs on gear efficiency' (Haysom 2001:134). After the 1950s, the boom in otter trawling for prawns, the development of preservation technology, and the influence of modern fisheries management theories led to the increasing professionalisation of both the commercial fishing industry and management (Haysom 2001). By the mid 1970s, this social shift culminated in the *Fisheries Act* (1976), which incorporated 'modern' management options such as licence limitations (Haysom 2001:134). This period also marked a pronounced turn towards the adoption of an economic approach in Queensland fisheries.

Queensland fisheries are currently managed under the Department of Employment, Economic Development and Innovation (DEEDI) which governs management according to a revised and updated *Fisheries Act* (1994).[3] The Act is accompanied by the *Fisheries Regulation* (2008) that specifies the legal requirements for the operation of commercial, recreational, and traditional and customary fisheries. It follows the basic principles of ecologically sustainable development (ESD) for the overall management of Queensland fisheries, including the regions considered in this study. The Act also sets out procedures for the administration of fisheries management plans, while making it clear that there is no general right of compensation to fishers affected by changes in management plans (Section 42C). It is the role of the sectoral management plans to determine whether compensation will be provided or approved.

The management of these legislative frameworks combines economic and ecosystem-based fisheries management (EBFM) approaches. Where social impacts are considered, however, it tends towards a narrow focus on the socio-economic aspects of fisheries change. Nonetheless, regardless of the considerable downsizing that has already occurred, not all cases of industry restructuring have included financial compensation, although it is increasingly being suggested as a mechanism to offset loss of fishing grounds and reduce effort (ABARE 2004).

[3] By 2007-08, the gross value of fisheries production in Queensland was $278.6 million, producing 29 000 tonnes (ABARE 2008).

2.3 Policy and Legislative Landscape of Fishing at the National Level

The background to current fisheries management approaches is framed by a predominant interest in economic efficiency and ecological sustainability which is outlined in the following discussion. It briefly examines the significant policy frameworks associated with state and federal fisheries management including: (i) ecologically sustainable development; (ii) individual transferable quotas; and (iii) marine protected areas.

2.3.1 Ecologically Sustainable Development

Ecologically sustainable development (ESD) has become the unifying conceptual framework for all programs and laws related to Australia's environment and so has been transferred to fisheries. Accompanying ESD was the implementation of the *Environment Protection and Biodiversity Conservation (EPBC) Act* (1999). For fisheries, the *EPBC Act* contains two main principles related to ecological sustainability, that: (i) the fishery should not lead to overfishing, and (ii) it should minimise its impact on the ecosystem. These principles apply to all Commonwealth and state or territory-managed fisheries. Apposite to this study's findings is that the ecosystem approach of the federal government's Oceans Policy aims to integrate environmental, economic and social concerns at every level of planning, and to hold extensive public consultations with all stakeholders as a crucial element in the process (Commonwealth of Australia 1998; DEWHA 2010; National Oceans Office 2003; cf. Vince 2006).

Despite the existence of the Oceans Policy, ESD is applied and defined in different ways under different fisheries programs. In Commonwealth fisheries, for example, the Australian Fisheries Management Authority (AFMA) does not incorporate the social or economic performance of fisheries in its assessments of ecological sustainability. AFMA argues that 'it is implicit that if the above [ecological] issues are not adequately addressed then there will be significant social and economic implications' (AFMA 2009a:4). However, a 1997 Federal Court decision and a review of Commonwealth fisheries policy in 2003 confirmed that AFMA does not have responsibility for the human aspects of ESD (AFFA 2003; Minnegal and Dwyer 2008b). Similarly, strategic assessments of fisheries under the *EPBC Act* (1999) are only taken with reference to the ecological sustainability of the fishery. In contrast, the Queensland *Fisheries Act* (1994) states that the main purpose of the Act is to 'apply and balance the principles of ESD', to 'promote ESD', and further adds that: '[i]n balancing the principles, each principle is to be given the relative emphasis appropriate in the circumstances' (*Fisheries Act* s3:1-2).

The key principles of ESD take into account inter and intra generational fairness, the protection of ecological processes, and consideration of the precautionary principle. The strength of ESD lies in the concept's ability to unite stakeholders with different interests. However, this strength also exposes an equally significant weakness: that it is simply too vague to apply to specific situations, and ignores the very real possibility of conflict, tension and contradiction. As a result, and in practice, precedence may be given to economic and environmental goals, with only a limited inclusion of social goals and outcomes. This assessment is emphasised in the Australian Government's guidelines for sustainably managing fisheries, which state that ESD 'is essential not only for long term species and ecosystem viability but also to underpin economic sustainability' (DEWR 2007). In light of this emphasis, the practical application of ESD may play out as a 'trade off' between economic, ecological and social goals (Brooks 2008). Instead, as

Brooks (2008:13) advises, management approaches need to 'acknowledge and understand that the symbiotic relationship between social circumstance; the health of the environment; and the economic benefits to be derived from it, is fundamental to achieving positive outcomes from any management change', such as the provision of individual transferable quotas.

2.3.2 Economic Approaches and Individual Transferable Quotas

Broader economic trends in international fisheries in the western world have strongly influenced fisheries management at the national and state level in Australia (Gordon 1954). Without defined property rights, it was thought that existing fishers would increase their effort through the expansion of new capital, while new fishers would continue to enter into the fishery, leading to 'overcapitalisation', and ultimately, overfishing. Property rights institutions, however, were considered as a means to overcome this problem by way of introducing individual incentives in the form of individual transferable quotas (ITQs). These ITQs were a method for establishing nationally recognised and legitimate property rights for individual fisheries (Hannesson 2006).[4]

By the early 1990s, fisheries management law had adopted more comprehensive approaches, addressing social issues and concerns, albeit not explicitly. In Commonwealth waters, the *Commonwealth Fisheries Management Act* (*CFMA*) (1991) continued to place considerable emphasis on economic efficiency and the introduction of ITQs as the 'preferred management method' (AFFA 2003:2). The *CFMA* (1991), for example, first focused on the economic aspects of the fisheries, with environmental sustainability and economic efficiency falling next in line. More recently, with an emphasis on uncertainty, complexity and holistic views of the environment, Australian fisheries have shifted from single-species and sectoral-based management towards the recognition that management must adopt a larger ecosystem perspective and incorporate concepts of ecologically sustainable development (see Cripps et al. 2001; Pikitch et al. 2004; McLeod et al. 2005; Christie et al. 2007).

ITQs are sometimes regarded as 'the economist's fix to fishery problems' (Degnbol et al. 2006:538). The goal behind the implementation of ITQs was (and is) to reduce overcapitalisation, first by setting a Total Allowable Catch (TAC) and then by allocating shares of the TAC to particular licence holders. These shares or quotas can then be traded amongst licence holders. However, whether granting ownership over a particular quota of the fishery to particular licence holders would ease or enhance overall fishing effort and thus promote economy efficiency, remains a contested issue. Equally, taking a strict property rights approach to fisheries management excludes social issues, particularly health and welfare-related outcomes, for those who depend on marine resources for a living.

Proponents of ITQs argue that they increase economic efficiency (Hannesson 2006) and act as a force for sustainability (Costello et al. 2008), while critics draw attention to the negative social consequences associated with ITQs, i.e. the ways quota is allocated and how small-scale fishers tend to be 'squeezed' (rationalised) or 'squeezed out' in the process. In many fisheries, quota has become concentrated in the hands of fewer players, leading to fisheries with smaller numbers of larger operators (Pálsson and Helgason

[4] Queensland's first ITQ-managed fishery was the spanner crab fishery, which moved to ITQs in 1997.

1995; McCay 1995; Lowe and Carothers 2008). As quota becomes increasingly concentrated, it also becomes harder for younger people and new entrants to take up fishing (Butler 2008). Studies on the effects of ITQs indicate a possible shift in wealth and social stratification in a fishery, for example, between 'entrepreneurial' and 'traditional lifestyle' fishers (Aslin et al. 2001:64), as well as the demise of the small-scale operators (Stewart et al. 2006). Further research shows fishers lose a sense of identity, pride and independence through the process (Carothers 2008), which may result in poor mental health outcomes such as substance abuse, domestic violence and suicide.

These issues are underlined by research that followed the introduction of ITQs into various Commonwealth fisheries during the 1990s. Studies show the introduction was marked by a great deal of 'dissatisfaction' (Grieve and Richardson 2001:380) and 'protracted hostility and legal challenges' (Aslin et al. 2001:5) involving 'bargaining and conflict…and considerable uncertainty' (King 2006:98). In a detailed review of ITQ implementation in the South East Fishery, Aslin et al. (2001) reported mixed levels of success in terms of economic, social and ecological objectives, noting a range of social impacts that had occurred but remained unaddressed (see also Kaufmann et al. 1999).

More broadly, critics suggest that ITQs are part of a general trend towards 'neoliberalism' in fisheries management (St. Martin 2001, 2007; Mansfield 2004a, 2004b, 2007, 2008). They contend that the strategy is often presented as a 'value-free' way of regulating fisheries, and argue that presenting fisheries management within this framework, 'silences important debates about the political, economic and social assumptions implicit in this fundamental change in the way fishing access is regulated and allocated' (Carothers 2008:56).

In addition, several ethnographic studies have documented the social impacts of property rights in fisheries governance, examining how fishing communities have been affected and how they have tried to adapt (Jamieson et al. 2009; Lowe and Carothers 2008). A recent collection of case studies has emphasised the overriding theme that 'fisheries privatization has real effects on real people in real places' (Lowe and Carothers 2008: vii). A similar observation about the effects of change is identified in research on marine protected areas (MPAs).

2.3.3 Marine Protected Areas

Legislatively, MPAs are situated within both federal and state jurisdictions. At the federal level is the National Representative System for Marine Protected Areas (NRSMPA). The NRSMPA aims to 'establish and manage a comprehensive, adequate and representative system of marine protected areas to contribute to the long-term ecological viability of marine and estuarine systems, to maintain ecological processes and systems, and to protect Australia's biological diversity at all levels' (DEHA, 2010). It also undertakes to minimise adverse socio-economic impacts.

In Queensland, marine protected areas are regulated under the *Marine Parks Act* (2004) and *Marine Parks Regulation* (2006) and managed by two separate agencies: the Queensland Department of Environment and Resource Management (DERM), which administers the Moreton Bay Marine Park (MBMP) and the Great Sandy Marine Park (GSMP) amongst others, and the Australian Government agency, the Great Barrier Reef Marine Park Authority (GBRMPA), which manages the Great Barrier Reef Marine Park (GBRMP). Set up under the *Great Barrier Reef Marine Park Act* (1975), the GBRMPA

has responsibility for the overall planning and management of the marine park. The Australian Government has ceded the responsibility for fisheries management in the area to the Queensland Government through Fisheries Queensland (Jennings 2009). Both state and federal MPAs were introduced as conservation measures designed to preserve the biodiversity of the regions and protect fish populations (and targeted species) into the future.

MPAs are frequently used as a management tool for regimes governed by ecosystem-based management (EBM) and ecosystem-based fisheries management (EBFM). Significantly, as McPhee (2008:128) contends, MPAs 'represent the linchpin of precautionary and ecosystem-based approaches to fisheries management and marine biodiversity conservation'. The potential benefits they offer for biodiversity conservation have led to their advocacy, research and introduction in many Australian regions under both state and federal jurisdictions (McCook et al. 2010; Pillans et al. 2003). However, this conceptualisation of benefits shows how the interests of conservation are generally prioritised over those of fisheries management. Indeed, Jones (2007:39) states that 'it is increasingly accepted that the primary goal of NTMPAs [no-take MPAs] is to conserve marine biodiversity, with fisheries management being a secondary objective.' (cf. Gray and Hatchard 2008; Hilborn et al. 2004).

In theory, MPAs are widely seen as organised spaces that can satisfy various stakeholders. For conservationists and managers, MPAs, specifically the green zones, provide spaces that are protected from the effects of fishing. For those more interested in effective fisheries management, MPAs potentially offer an increase in fish populations *outside* the MPA. By restricting fishing access to one particular area, the goal is that fish will be able to grow and reproduce in peace and that a 'spillover effect' will occur (Russ 2002), along with enhanced recruitment due to increases in the fecundity of fish *inside* the MPA.

The spillover effect arises where fish spawned within a protected area spill over into the waters surrounding the MPA. However, the benefits of spillover, and the science surrounding MPAs in general, continue to be debated (Roberts et al. 2003; Weible 2008)[5], especially the role of no-take marine zones which prohibits the extraction of living and non-living resources (Jones 2008). In the GBRMP, for instance, the effectiveness of the no-take zones has already been demonstrated by research from Russ et al. (2008) which shows incidences of decreased fishing mortality and increases in reef species like coral trout in the restricted areas over a two year period.

The hope attendant upon MPAs is that the interests of all conservation stakeholders will be satisfied through marine protection (Alcala and Russ 2006; Klein et al. 2008; Roberts and Hawkins 2003). However, it is the provision of no-take fisheries exclusion zones which is contested by fishers, especially in fisheries targeting migratory fish populations, and which may gave rise to, or exacerbate, conflicts between user groups

[5] A review by Russ and Alcala (2011) of 25 years of MPA research shows the effect of changes over time: of enhanced species richness and diversity inside the no-take area, increases in predator species inside and outside the MPA, and greater diversity spreading into outside areas. They draw attention to the possibility of heightened catch rates and fishing effort near the MPA border but found that fishers (at least in one case) had created a 'self-imposed' buffer zone, fearing accusations of illegal fishing. Earlier research by Sale (2002) observed that the science showing that protection works within the MPAs is actually much stronger than the science showing that fish stocks increase in the area outside the MPA, while Hilborn et al. (2004) pointed to the limitations of MPAs, noting, for example, that they are less effective for more mobile species.

over space, access to resources and environmental protection (Bess and Rallapudi 2007; Hoffman and Pérez-Ruzafa 2009). The underlying rationale for developing MPAs as a way of protecting biodiversity, habitats and species or to operate as a fisheries management strategy, has affected the practice of commercial fishing in Queensland (McPhee 2008) and the livelihoods of fishers.

For instance, even though stakeholder consultation is a main feature of MPA planning and management in Australia, Baelde (2005) has observed that the process has failed to sufficiently acknowledge fishers' long-term industry-based expertise. She specifically notes a lack of willingness by management to address fishers' concerns and a lack of appreciation of their knowledge and experience (see also Soto 2006).

In contrast, a number of overseas studies have documented smoother MPA implementation processes where co-management and collaborative working arrangements across sectors have proved beneficial (Gleason et al. 2010). For example, research by Guidetti and Claudet (2010) found that co-management involving fishers, MPA managers, and scientists had positive benefits for both marine park planning and conservation goals.[6] Their study notes three important criteria for success: the strict enforcement of no-take zones, the active participation of fishers, and the need to include socio-cultural factors in marine park management. In conclusion, Guidetti and Claudet (2010:317) suggest that,

> partial protection of coastal areas together with an adaptive comanagement plan that involves fishers, scientists, and managers may benefit fishing communities and reduce overfishing. Incorporating fishers' input, in particular, alleviates their skepticism toward scientists, increases the likelihood they will respond positively to marine reserves, and can be one of the most important criteria for successful fisheries management.

To develop such a co-management approach and provide the kind of benefits suggested by Guidetti and Claudet (2010) and others (Berkes 2009; Carlson and Berkes 2005; Jentoft 2005), a study is being undertaken in Queensland's Burdekin region. Funded by the FRDC and led by Dr Daryl McPhee, the project, *'Who's fish is it anyway? Investigation of co-management and self-governance solutions to local issues in Queensland's inshore fisheries',* involves different community sectors working together to devise solutions for the local region, as well as provide a forum where community concerns can be raised. Members of the Working Group include commercial and recreational fishers and other stakeholders representing the wider community. The study entails a broad community consultation process designed to highlight a course of action that will allow for co-management on a regional level. Findings from the study will be presented to the project's Steering Committee and Fisheries Queensland for consideration.

[6] Initially the Italian MPA comprised a closed no-take area and conservation buffer zone. In 2005 a section of the buffer zone was opened to fishing, but under a strict protocol to limit fishing effort and overfishing. The study monitored fishing practices inside and outside the MPA and measured catch per unit effort (CPUE) over the next three years. The results suggest that 'fisheries comanagement within MPAs may enhance collaborative approaches among fishermen thus reducing the usual strong competition for shared fishing resources (the so-called "race to fish") (Guidetti and Claudet 2010:318).

2.4 In Summary

Broadly speaking, marine management in Australia is the joint responsibility of environmental and fisheries agencies. Major changes to fisheries and marine management practice have been undertaken and further change is ongoing. These have largely centred on: the implementation of ecologically sustainable development, individual transferable quotas, marine protected areas and other legislative measures affecting fisheries such as Australia's Oceans Policy, and structural adjustment packages following industry restructuring. However, less consideration is given to the human dimensions of fisheries management, in particular the social, non-economic aspects of fisheries restructuring that are the focus of the next sections of the report.

SECTION 3: MARINE MANAGEMENT IN QUEENSLAND

PART A: COMMERCIAL FISHERIES MANAGEMENT

3.1 Introduction

Section 3 is divided into two parts as follows:

> Part A - introduces the management of fisheries in Queensland; and
> Part B - reviews the management of marine protected areas and structural adjustment schemes.

Commercial fisheries management in Queensland is maintained through a mixture of input and output controls including limiting the number of licences, controlling the type of fishing gear that can be used, and limiting fishing effort. This section reviews the present management regime for fisheries and marine parks in Queensland. Its aim is twofold: (i) to describe the management of fisheries and marine parks in the three Queensland regions under investigation; and (ii) to outline the effect on fishers of structural adjustment schemes, specifically those related to the marine parks in the Great Barrier Reef region and Moreton Bay.

3.2 Fisheries and Fishers in Queensland

The majority of Queensland fisheries work in tidal waters and within river estuaries and target a wide range of species, particularly prawns, crabs, reef and finfish. The fishing fleet comprises 1,500 licensed boats that contribute more than ten percent of the national seafood production in both 'quantity and value' (DEEDI 2010a). To operate commercially, all fishers must hold a commercial fishing licence for trawl, line, net and/or crab fisheries and each licence is marked with specific symbols to indicate the particular fishery being worked. The boat must also be licensed and endorsed for each fishery. Other regulations pertain to specific fisheries (see DEEDI 2009b).

Of all fisheries plying their trade in Queensland waters, the trawl sector is the most dominant, with 600 vessels producing up to 10,000 tonnes of product valued at $110 million per annum (DEEDI 2010b). However, this fishery is not expanding. No new licences or symbols are issued for existing fisheries, although licences can be transferred from person to person and fishery symbols transferred from one licence to another. There are four main trawl fisheries: the East Coast Otter Trawl Fishery; the Moreton Bay Otter Trawl Fishery; the River and Inshore Beam Trawl Fishery; and the Fin Fish (Stout Whiting) Trawl Fishery, which target a range of prawn species, finfish, squid and shellfish.

Other major Queensland fisheries relevant to this study are:

(i) Line Fishery

This fishery targets such species as coral trout, Spanish mackerel, red-throat emperor, snapper and trevally. The total value of the catch is approximately $31 million per annum (DEEDI 2010a). The Great Barrier Reef region accounts for approximately 85

percent of the total fish caught. The number of operators in the fishery is limited to balance both economic and ecological viability.

(ii) Net Fishery

The net fishery comprises the East Coast Inshore Fin Fish Fishery and the Ocean Beach Fishery (a subset of the East Coast Inshore Fin Fish Fishery) and is valued at $19.6 million. Net fishers are also found operating in crab and line fisheries to ensure fishing effort is spread more widely. A review of the fishery was undertaken in 2007 - 2008 and new management arrangements were introduced in July 2009.

Targeted species differ between regions: in the north, it is barramundi and threadfin, whereas in the south it is mullet, tailor and whiting, amongst others. Most catch is sold on the local market, while increasing demand for shark fin in Asia has expanded the export market. Fishing methods used are decided through regulatory restrictions, fishing efficiency, gear effectiveness and product quality (DEEDI 2010c).

(iii) Crab Fisheries

These fisheries are divided into three sub-sectors: the Mud Crab, Blue Swimmer Crab, and Spanner Crab fisheries. The total catch is currently valued at $6.08m, $15.3m and $4.1m respectively. About 40 percent of Australia's mud crab harvest comes from Queensland, while in 2009 over 97 percent of the blue swimmer crab catch was harvested from fisheries south of the Great Barrier Reef World Heritage Area (DEEDI 2010d), with 60 percent emanating from Hervey Bay and Moreton Bay. The majority of the Spanner Crab catch is sent as 'live fish' to meet the growing demand in Asia.

Following a recommendation by Fisheries Queensland to review the Blue Swimmer Crab and Mud Crab fisheries, a Working Group has been established to provide stewardship on behalf of stakeholders. The Working Group has identified and prioritised issues that need to be addressed as part of the review, as well as drafting future management arrangements for this important fishery (QSIA 2011a). The review is scheduled to be completed by early 2012.

3.3 Fisheries Management Plans

The management plans for specific fisheries in Queensland are legislated within the *Fisheries Act* (1994). The Act states that the role of these plans is to deal with the way the fishery is to be managed, including the particular fishing methods used, gear types, number of vessels, and period of fishing. It also details regulations for recreational and commercial fisheries as well as the formulation and funding of structural adjustment schemes. The Act also covers research, education and environmental issues, and includes the protection of fish habitats and fish restocking and enhancement programs. Management plans relevant to this study are:

Fisheries (East Coast Trawl) Management Plan 1999
Fisheries (Coral Reef Fin Fish) Management Plan 2003
Fisheries (Spanner Crab) Management Plan 1999.

(i) East Coast Trawl Fishery

The East Coast Trawl (ECT) fishery is Queensland's largest fishery. It is co-managed with the Great Barrier Reef Marine Park Authority (GBRMPA) as two thirds of the fishery is located in the Great Barrier Reef World Heritage Area. Over time the ECT has been considered a 'relatively well-managed fishery' (DSEWPC 2009), complying with ESD under the *EPBC Act.* From 2009 and into 2011, the ECT has been reviewed again. Reactions from fishers have been mixed with larger 'entrepreneurial' operators welcoming the trawl plan and the potential for boosting profitability and efficiency (Fraser Coast Chronicle 2010). Although not part of that review, a major concern raised by trawl operators is related to the effects of urban, industrial and agricultural pollution on fisheries ecosystems (QSIA 2010a).

Fishing in the ECT is controlled using input (effort) and output (harvest) strategies, limited entry and other restrictions to ensure ESD and reduced by-catch. Through the allocation of 'effort quota', operators are allocated a certain number of nights when they are allowed to fish; these nights are tradeable, except in the Moreton Bay trawl fishery, which restricts fishing to weeknights only. A substantial reduction in fishing effort occurred in 2001 when over 15 percent of effort was removed through a jointly-funded Commonwealth and Queensland Government structural adjustment scheme and a voluntary licence surrender associated with GBRMP's zoning arrangements.

The review of the East Coast Trawl Plan is ongoing in 2011. Fisheries Queensland has assembled a Technical Advisory Group (TAG) and Scientific Advisory Group (SAG) to develop future management arrangements for the East Coast Otter Trawl Fishery. The QSIA Trawl Committee has also been closely involved in these processes. After some 12 months of targeted stakeholder consultation, Fisheries Queensland has advised that a Regulatory Assessment Statement (RAS) will be released in 2011 as part of their wider community consultation phase of this review.

.

(ii) Coral Reef Fin Fish Fishery

This fishery is dominated by the catch of coral trout (35%), Spanish mackerel (20%) and red throat emperor (15%). Notably, coral trout is a high-value fishery with product largely exported to markets in Asia. Due to the high demand and value of this species, fishing effort expanded rapidly and the fishery became overfished (DEH 2005: 3). In an effort to protect these resources, quota limits have been introduced for both coral trout and Spanish mackerel (Little et al. 2008).

(iii) Spanner Crab Fishery

This fishery was one of the first three fisheries in Australia to receive environmental accreditation under the *EPBC Act*, and was re-accredited in 2007. Most of the Queensland catch is exported as live product to Asia, principally to Taiwan and Hong Kong. While the export market brings substantial earnings into the state, the lucrative trade has led to a rapid expansion of the fishery, largely due to the activation of latent licences (McPhee 2008).

In the 1990s, concerns by fishers, processors, managers and researchers about the future sustainability of the resource instigated moves towards the protection of spanner crabs and the fishery's later environmental accreditation (Brown et al. 2001). Figures from

Fisheries Queensland document this change through the loss of licences in the industry, dropping from 137 licences in 1999 to 67 licences a decade later. Over this time, there was a noticeable reduction in the numbers of fishers generating their entire annual fishing income from harvesting this species, and also a reduction in fishers' earnings in the fishery (DEEDI 2010e).

(iv) Rocky Reef Fin Fish Fishery

In 2010, Fisheries Queensland commenced a review of the management arrangements in the fishery with the objective of rebuilding the snapper stock over the next ten years. This was the result of a recent stock assessment that showed the stock to be depleted (Campbell et al. 2009). The fishery also harvests pearl perch and teraglin jew. All species play a significant role in providing sustainable seafood for local markets (DEEDI 2010f; QSIA 2010).

3.4 Annual Status Reports

Fisheries Queensland collects annual data on each fishery in its Annual Status Reports and recent reports are available via the agency's website. However, relevant data from the regions under examination in this study have proven difficult to access. Much of the information that is available covers Queensland as a whole, together with specific fisheries data. However, it fails to provide useful details such as the number of fishers in each region, the number holding various licences/endorsements/symbols, the number of days each fisher works during the year or season in particular fisheries, or the number of fishers who move between fisheries and locations, and in which fisheries they operate (see also FERM 2004).

More specific information assessed over time would provide significant baseline data enabling valuable comparisons on the impact of policy decisions in each region, and more specifically, how these decisions have affected or influenced fisher numbers, licences held, fishing effort, and locations and fisheries fished.

Table 1 provides an indication of the state of fisheries relevant to this study, including the gross value of production (GVP) and the number of licences involved. As Fisheries Queensland does not provide data on the actual numbers of fishers working in each fishery or region on its website, the information in Table 1 is limited to the number of licences held and those operating in a particular fishery during the data collection period. Also apparent in Table 1 is the discrepancy between the total number of licences held and the number of licences used during the year in which the assessment was made.

Table 1: Annual status reports, various fisheries Queensland (Source: DEEDI, 2010a)

Fishery	Date of report	Total number of licences (commercial)	Total number of licences used	Total commercial catch	Gross value of production (GVP)
Blue Swimmer Crab	2010	429 (pot) 442 (trawl)	172 (pot) 220 (trawl)	772.5t	$6.08m
Mud Crab	2010	429	401	956t	$15.3m
Spanner Crab	2010	224	67	1003t	$4.1m
East Coast Otter Trawl	2010	397	340	7880 t	$99.0m
East Coast Inshore Fin Fish	2009	2406	1068	5955t	$22.4m
East Coast Spanish Mackerel	2009	267	173	308t	$2.8m
River & Inshore Beam Trawl	2009	114	88	420t	$2.8m
Coral Reef Fin Fish	2009	369	242	1800t	$39.5m
Rocky Reef Fin Fish Fishery	2009	1351	319	257t	$1.7m

Table 2 shows an estimation of the unused capacity in the fishery as assessed by the discrepancy between the number of licences held and those used in the data collection period. Figures from 2009 and 2010 document a difference in the licences held and used in that period. One problem with this data, however, is that the figures do not distinguish between the licences that were used throughout the entire year, and those that were only used for one or two days during the season. All that can effectively be concluded is that licences that remained unused (i.e. those showing no catch or effort) for a given year can be deemed latent for that year, and this differs between fisheries. However, for net, line and crab fisheries, the discrepancy may also be explained through the practice of fishers swapping fisheries and gears according to seasons and stock availability.

Table 2: Differences in licences held and used, 2009-2010

Fishery	Discrepancy in no. of licences held and used
Blue Swimmer Crab	479 (pot & trawl)
Mud Crab	28
Spanner Crab	157
East Coast Otter Trawl	59
East Coast Inshore Fin Fish	1338
East Coast Spanish Mackerel	94
River & Inshore Beam Trawl	26
Coral Reef Fin Fish	127
Rocky Reef Fin Fish Fishery	1032

Trying to provide accurate comparisons in catch and licence information of the various fisheries over time is thwarted to some extent by the differing ways the data is recorded in the Annual Status Reports for the years 2004, 2005, 2006, 2009 and 2010. Although the data should be available from logbook records, it is either not readily accessible or not computed to take account of changes over the different time frames and locations.

While it has been possible to compare the discrepancy between licences held and those used in 2009 and 2010, unused licence information is not listed in the earlier status reports. Table 3, however, provides an assessment of fisheries data in Queensland from 2004, 2005 and 2006 (depending on the publication date of each status report).

Table 3: Licence, catch, and GVP 2004, 2005, 2006
(Source: DEEDI, Annual Status Reports, 2004, 2005, 2005 and 2006)[7]

Fishery	Date of report	Number of licences (commercial)	Total commercial catch (tonnes)	Gross value of production (GVP) $m
Blue Swimmer Crab	2005	879	1400t	$10.25m
Mud Crab	2005	879	1135t	$12.0m
Spanner Crab	2005	NA	1500t	$5.4m
East Coast Otter Trawl	2004	510	8453t	$100.0m
East Coast Inshore Fin Fish	2005	499 net 1649 line	5437t	$23
East Coast Spanish Mackerel	2005	298	326t	$2.4 - $3.5m
River & Inshore Beam Trawl	2004	153	594t	$3.0m
Coral Reef Fin Fish	2006	412 RQ	1544t	$33.0m
Rocky Reef Fin Fish Fishery	2005	1542 primary 1702 tender	170t	$1.0m (2003)

[7] The 2004, 2005 and 2006 Annual Status Report data was provided by Fisheries Queensland.

Table 4 provides a comparison of figures over time. In most cases it shows a decline in the number of licences used and the total amount of product caught.

Table 4: Comparison of Commercial Fisheries' Licences and Catch, 2004-2006 and 2009-2010 (Source: Annual Status Reports, DEEDI)

Fishery	Difference in licences 2004-2006 and 2009-2010	Total number of commercial licences 2004-2006	Total number of commercial licences 2009-2010	Total commercial catch 2004-2006 tonnes	Total commercial catch 2009-2010 tonnes	Difference in total catch 2004-2006 and 2009-2010
Blue Swimmer Crab	8 1%	879	429 (pot) 442 (trawl)	1400t	772.5t	-627.5t
Mud Crab	459 52.2%	879	429	1135t	956t	-179t
Spanner Crab	NA	NA	224	1500t	1003t	-497t
East Coast Otter Trawl	123 24%	510	397	8453t	7880 t	-573t
East Coast Inshore Fin Fish	250 11%	499 net 1649 line	2406	5437t	5955t	+510t
East Coast Spanish Mackerel	31 10.4%	298	267	326t	308t	-18t
River & Inshore Beam Trawl	39 25.5%	153	114	594t	420t	-174t
Coral Reef Fin Fish	43 10.4%	412 (RQ)	369	1544t	1800t	+256t
Rocky Reef Fin Fish Fishery	1093 33.7%	1542 primary 1702 tender	1351	170t	257t	+87t

3.5 Fisheries Management Strategy

Since the 1990s, a range of laws, policies and management approaches have been introduced to regulate Queensland fisheries across its commercial sectors, often according to competing political and economic interests. In 2010, Fisheries Queensland released its Fisheries Strategy for Queensland, 2009-2014 (DEEDI 2009a). Entitled *Your Fish, Your Future,* the strategy has three major aims: 'protecting habitat, managing harvest, and maximising value' across the state. The strategy critiques current management approaches for being overly inflexible and dominated by regulation. It argues instead for a 'fresh approach' and the need to 'adapt' and show greater flexibility. Importantly, the strategy recommends incorporating both social and economic assessments in its deliberations. However, as with pre-existing approaches at the state and federal levels, management goals continue to concentrate on 'optimising the net value of fisheries', with a focus on developing aquaculture (DEEDI 2009a).

Submissions on the draft strategy were requested by July 31, 2009. In general, stakeholder concerns focused on the lack of consideration of social and political dimensions in the strategy, particularly for the commercial and recreational sectors.[8] Comments also centred on environmental and fisheries sustainability. One commercial fisher looked to the future, seeking to ensure that, 'we assist enough young people's entry into the commercial fishing industry, upgrade skills in both the harvest and post-harvest sectors and deliver the necessary industry investment [which] are the keys to a future that maintains and grows prosperity'. Similarly, another affirmed the ecosystem-based management strategy, stating, 'the aim should be ensuring important issues affecting fisheries such as climate change, socio-economic issues and fish habitat are all addressed simultaneously' (DEEDI 2009c:2-3).

3.6 In summary

Part A of this section has described the structure of commercial fisheries Queensland. It has briefly defined the scope of the different fisheries, outlined specific management plans, reviewed the data collection from the Annual Status Reports and their limitations, and looked to future developments through a discussion of Queensland's fisheries management strategy.

The second part of Section 3, Part B, continues to review the important issues affecting local fisheries by focusing on the governance of marine protected areas. It considers how the establishment of marine protected areas and the advent of structural adjustment packages have impacted commercial operators, specifically those in Moreton Bay, Hervey Bay and the Burdekin region.

PART B: MARINE PROTECTED AREAS

3.7 MPA Management

State-controlled marine parks such as the Great Barrier Reef Coast Marine Park, the Great Sandy Marine Park, the Moreton Bay Marine Park and the federally-administered Great Barrier Reef Marine Park are all framed by robust legislation, rules and regulations which shore up the primary objective of ecosystem management and biodiversity protection. Often such regulatory approaches, in addition to MPAs, have led to clashes between and among stakeholders and with the authority administering the MPA. Significant discord is well-documented (Agardy et al. 2003; Charles and Wilson 2009; Stamieszkin et al. 2009). Various studies conclude that for the successful adoption and continuation of MPAs, meaningful stakeholder engagement both prior to and post implementation is vital for the ongoing support of management initiatives (Crain et al. 2009; Pomeroy et al. 2004), as differences in beliefs, values and interests have been shown to hinder management and planning objectives (Mascia 2003).

The three regions under study have all experienced differences in beliefs, values and interests among fishers and other stakeholders before and after the implementation of the marine parks (Shaw et al. 2009). Specifically for the fishing industry, the introduction or

[8] Several comments were received about the impact of the (then) recently rezoned Moreton Bay Marine Park. However, as Fisheries Queensland does not manage local MPAs, the feedback was sent on to the Department of Environment and Resource Management, and as a result, it was not recorded in the summary document.

rezoning of MPAs has resulted in significant social and economic upheaval for commercial fishers and their families.

Importantly, the fishers in this study are supportive of marine parks as a way to sustain the health of the fishery and the marine environment. However, those fearing permanent closure of fishing grounds and drastic changes to their livelihoods, lifestyles and industry future, have expressed considerable unease over the way the differing marine park implementation processes have been handled. In particular, they are critical of the science used to establish marine park boundaries, the perceived disregard of their own expert knowledge of the fishery, and a lack of consideration about the legacy of structural adjustment schemes designed to compensate fishers affected by closures, especially in the Great Barrier Reef (GBR) and Moreton Bay regions.

3.7.1 Moreton Bay Region and Marine Park

Moreton Bay is located in the centre of the rapid residential and industrial development taking place in south-east Queensland. Due to the growth of the area, particularly over the last 50 years, the marine and coastal environment has come under increasing pressure. At risk are the internationally significant wetlands, seagrass meadows, reef systems, and a range of marine species. From the mid-1980s, as the degradation of the Bay became evident, community and environment groups, including fisheries organisations, raised awareness of the need for better management and care of Moreton Bay. They particularly noted emerging problems for some fisheries and a decline in water quality from pollution and nutrient and sediment runoff. To counter these effects, user groups called for the introduction of a marine park and disparate organisations formed alliances to safeguard the Bay.

Commercial fishers were among the first groups to raise concerns about the Bay's sustainability. Crab fishermen outlined their views in a Sunday Mail report in 1985 stating, 'every year it gets worse…in my view, there is not even five years left unless something is done…this Bay's had it and there's no two ways about it.' Another envisioned the future when he commented, 'I'd never vote to close the bay myself - I don't want to see that happen but I can see it coming' (da Costa-Roque 1985).

Commercial fishing grew slowly in the early years of settlement in Moreton Bay and the stock targeted was restricted to net species and prawns from the Brisbane River estuary. It was not until the 1950s that the commercial industry expanded. Prompted by the influx of Italian immigrants who were fishers in their home country, prawn trawling developed into a substantial industry.

In 1993 the first marine park was introduced in Moreton Bay. Covering only one percent of the Bay, with 0.5 percent set aside as a protected conservation area, its aim was to protect the Bay's abundant diversity. But by the late 2000s, the health of the Bay was considered increasingly threatened. In March 2009, the Queensland Government introduced legislation to extend park boundaries and conservation zones to include: (i) 'green' no-take zones to protect the ecological integrity of the Bay; (ii) 'yellow' conservation zones which allow recreational activities but restrict commercial fishing; and (iii) 'dark blue' habitat zones which allow sustainable activities but limit those considered potentially damaging.

Sixteen percent of the Bay was set aside for green zones. Other areas were designated: grey nurse shark areas; go slow areas to reduce boat strikes and protect natural habitats, turtles and dugong; and 'no anchoring' areas to prevent damage to coral reefs.

The aim of the MBMP was to protect the biodiversity of the Bay but the rezoning of park boundaries in 2008-2009 has also affected fishers' working lives and access to the places they fish. Of particular concern is the introduction of yellow zones which reduced the commercial operators' fishing areas but allowed recreational anglers to fish in these zones. This segregation has reinforced commercial fishers' opinion that the marine park zoning has been heavily influenced by the recreational fishing lobby (Shaw et al. 2009).

While most in the commercial sector recognise that a reduction in fishing effort was warranted to preserve the Bay's future, they were upset at the loss of their fishing grounds. To offset this loss and limit fishing effort in the Bay, the Queensland Government sought to reduce the number of licences through a licence buyback scheme. The scheme was designed to compensate fishers for the effect of the rezoning on their businesses. However, as this study details, the marine park and subsequent adjustment assistance have had unforeseen social and family impacts beyond the economic and ecological focus and design.

3.7.2 Hervey Bay Region and Marine Parks

Hervey Bay has a significant fishing heritage that continues in importance for Indigenous, commercial and recreational fisheries. Commercial fishing commenced in the 1850s with dugong hunting (Lewthwaite 2009a). As the industry grew in the early decades of the twentieth century, dugong harvesting became the basis for economic growth and development in several of Queensland's coastal communities. The net fishery also grew significantly, mainly due to a declining oyster industry and a growing demand for seafood.

Currently, trawling is the primary fishing activity, followed by line fishing, netting, and crabbing. Crab and net fishers generally do not mix their practices unless a season is difficult, in which case, some crabbers will engage in net fishing and some fishers will move to mud crabbing. More recently, issues arising from latent effort have impacted opportunities to switch and change when necessary. Fishing takes place at sea and around the islands of the Great Sandy Strait, as well as in the estuaries and rivers along Hervey Bay. The economic and cultural significance of seafood to the community is reflected in the continuing success of the Hervey Bay Seafood Festival, which has been running for more than ten years.

The area around Hervey Bay is a substantial population growth centre and tourist haven, especially for whale watching and recreational fishing. The sheltered waters are home to iconic species of turtles, dolphins, dugongs, giant shovelnose rays, and migrating humpback whales. It was the diversity and abundance of marine species and the region's natural capital that led to the environs surrounding Hervey Bay, including Fraser Island, being declared a World Heritage Area. The waters are also protected under the *Great Sandy Marine Park Act,* with the Great Sandy Strait designated a Ramsar wetland for migratory birds.

3.7.3 Great Sandy Marine Park

The *Marine Parks (Great Sandy) Zoning Plan 2006* commenced on 31 August 2006. As the foundation for the Great Sandy Marine Park (GSMP), it was designed to deliver on a number of 1998 and 2001 election commitments relating to marine parks. In 1990, in response to concerns raised by conservation groups and the community, a Queensland Government appointed Commission of Inquiry into the conservation, management and use of the Great Sandy region recommended the declaration of the marine park as a key action item to provide for the protection of the region's environmental values and resources.

However, the region's status as a growth corridor and major tourist centre has placed greater demands on marine resources, often resulting in increased conflicts between competing uses. The declaration and zoning of the GSMP was designed to provide a basis for managing these demands and conflicts, and ensuring that the region's environmental resources continue to be available for use by future generations. This aim is undertaken through the inclusion of the following zones: (a) general use zone; (b) habitat protection zone; (c) conservation park zone; (d) buffer zone; and (e) marine national park zone. The primary objective of the GSMP zoning plan is to protect and maintain the marine environment of the marine park while allowing for its ecologically sustainable use incorporating both commercial and recreational fishing.

The GSMP is managed by the Queensland Department of Environment and Resource Management (DERM) and is due for review in 2013. Local inshore fishers are already worried about what this review might bring, particularly in view of the effects of the rezoning in Moreton Bay. An additional fear relates to the federal government's bioregional proposal for a further marine park (under the NRSMPA) which would extend the protected areas off the Fraser coast (DEWHA 2010). This area is adjacent to the GSMP and connects coastal waters with deeper ocean environments. Of particular concern to the commercial sector is the proposal's call for bans on all reef fishing, trawling, crabbing and scalloping for areas up to 160 kilometres offshore (Gorrie 2010).

Those involved in the Tin Can Bay fishing community envisage the possible closure of the industry and the demise of a 60 year old trawl fishery. 'It's the end', they say, 'not just for commercial and recreational fishing, but for the whole economy of the Bay' (Gorrie 2010). Others comment on the continued need for commercial fishing as a major local employer, mentioning the significant value of the Spanner Crab fishery's export earnings (Ballard 2010). Nonetheless, fishers' recognition of the need for conservation and sustainability of the fishery is coupled with their proposal that fair compensation for any fishers displaced by the MPA is essential.

3.7.4 Burdekin Region and Marine Parks

From Hinchinbrook in the north to the Burdekin River in the south lie some of the best barramundi and estuary fishing on the east coast of Australia, due to the region's extensive wetlands and fish breeding habitats. Commercial fishing has a long history in this region, which began in the nineteenth century with five main products: beche-de-mer, tortoiseshell, turtles, pearls and mother of pearl. However, these resources were all but exhausted by the end of the nineteenth and the beginning of the twentieth centuries due to over-exploitation (Bowen and Bowen 2002).

Currently, the four major fishing sectors are: the trawl industry, reef line fishery, inshore net fishery, and the crab fishery, with the trawl sector valued most highly (DEEDI 2010a). To give an indication of the economic worth of the fisheries, a comprehensive study on commercial fishing in the region conducted by Fenton and Marshall (2001) for the Cooperative Research Centre (CRC) Reef Research Centre revealed a significantly higher percentage of businesses with production values between $200,000 and $300,000 per annum (33%) when compared to Queensland overall (16%). Specifically within the Townsville area,[9] the report estimated that the (then) 153 fishing businesses had a gross value of production (GVP) of approximately $35.5 million per annum, making up 11 percent of the total value of production of the whole of the Queensland commercial fishing industry.

The Cooperative Research Centre (CRC) Reef Research Centre maintains that fishing on the reef is carefully managed to ensure its sustainability into the future. It also recognises that many of the biggest threats to the GBR come from human activities on land, noting that sediments and nutrients, fertilisers, toxic and other damaging products, like heavy metals and oil run into rivers and out to the Great Barrier Reef lagoon, where they threaten plants and animals on the reef. Land users and government and non-government agencies are now working together to improve the quality of water flowing onto the reef as part of the Reef Water Quality Protection Plan (2009).

A more recent collaborative regional process has developed following the damage caused by Cyclone Yasi early in 2011. The government has employed 12 Industry Recovery Officers to work with the seafood industry and other primary producers, providing assistance with government support programs and acting as a liaison between the clean-up and recovery operations and those commercial operators affected by the natural disaster. The assistance also includes linking individuals with financial counsellors, and mental and health professionals (QSIA 2011b).

3.7.5 Great Barrier Reef Marine Park

The Great Barrier Reef Marine Park (GBRMP) was established in 1975 and covers 345,950 square kilometres. In 1981, the Great Barrier Reef was accepted for inclusion in the World Heritage List, meeting all four of the natural heritage criteria: geological phenomena, ecological and biological processes, aesthetics and natural beauty, and biological diversity, including threatened species. The Great Barrier Reef Marine Park Authority (GBRMPA) aims to provide for the long-term protection, ecologically sustainable use, understanding and enjoyment of the Great Barrier Reef through the care and development of the GBRMP. To this end, it enacted a 25 year Strategic Plan to outline strategies for managing and preserving the reef well into the future (GBRMPA 1994), and to support the continuation of commercial, recreational and Indigenous interests which contribute approximately $6 billion to the Australian economy (GBRMPA 2007).

The GBRMP is managed through zoning with most zones allowing for a wide range of uses such as fishing and boating - over 95 percent of the GBRMP is zoned for general use - although in certain zones, specific activities such as fishing are prohibited. Zoning also separates potentially conflicting activities such as commercial fishing and tourism, and allows areas that need ongoing conservation to be protected from potentially

[9] The report utilised the expression 'Townsville TRC' to signify the method of analysis used, i.e. Town Resource Cluster (TRC) Analysis.

threatening processes. This need was highlighted in the Draft Zoning Plan, which proposed that the rezoning of the GBRMP be extended into areas known as 'the RAP' or Representative Areas Program.

The aim of the RAP was to determine the major habitat types of the GBR and develop a new zoning plan based on the protection of the representative areas for each of the 70 habitat types. The RAP expanded areas, incorporating green no-take zones and other zones which restricted fishing, so as to further conserve biodiversity and act as 'an insurance policy against over-fishing' (Russ cited in GBRMPA 2002). The plan also took into account the potential social, economic, personal, familial and health effects of the changes. Overall, the no-take zones increased from about 4 percent to over 33 percent of the marine park.

To seek industry and community viewpoints over the RAP, GBRMPA conducted an extensive consultation program which included over 360 information meetings in coastal areas, widespread media campaigns, and wide-ranging surveys undertaken to gauge the opinions of stakeholders and the general public. In all, over 30,000 submissions were received during two community participation stages, with strong community support being offered (GBRMPA 2003; Innes et al. 2005; Jago et al. 2004: Osmond et al. 2010; Thompson et al. 2004). For instance, Thompson et al. (2004) discuss the lengths taken to ensure that all opinions were taken into consideration. They specifically mention how differing sectoral viewpoints were successfully incorporated into the consultation and negotiation process, in part due to the 'specialist expertise' and close working relationships GBRMPA staff had with various industrial sectors (e.g. fisheries, tourism, Indigenous communities). Importantly, Osmond et al. (2010:46), in a review of MPA participation processes including the GBRMPA consultation, state:

> Their [the staff's] intimate knowledge and familiarity with specific stakeholder concerns built trust between the [Great Barrier Reef Marine Park] Authority and interested members of the public, and enhanced the ability to collect detailed and spatially explicit information. This strategy increased the likelihood that affected members of the community provided constructive advice rather than vague collective frustration.

This position is confirmed by a 2010 study on the scientific, social and economic outcomes of the GBRMP, which states that the conservation values of the marine park have been widely supported within the community and fishing sectors, although some commercial fishers continue to be concerned about the after-effects of the zoning (McCook et al. 2010).[10] However, at the time of the RAP not all stakeholder groups reacted positively to the change (Agardy 2010), especially as it followed a sizable restructuring and effort/catch reduction in local fisheries undertaken under Queensland fisheries legislation (Dinesen 2006). In fact, McCook et al. (2010:7) state that a survey three years after the RAP's implementation found commercial fishers still critical of the rezoning saying: (i) it had not been necessary; (ii) it had negatively affected access to fishing, catch rates and profitability; (iii) it had not reduced fishing's impact on the

[10] A technical report on the effects of line fishing prepared by the CRC Reef Research Centre prior to the RAP (Mapstone et al. 2004) did not adequately address the extent of potential social impacts in its ecological and socio-economic analysis. However, the report alluded to possible problems in its assessment of management practices which are 'reactive' rather than 'proactive' or adaptive, commenting that in such circumstances, 'difficulties then arise in reconciling the social, economic, stock, conservation, individual and institutional objectives of different stakeholders in a fishery' (Mapstone et al. 2004:63).

GBR; and (iv) that they had not been adequately consulted – despite the extensive consultations that had been conducted (see also Pita et al. 2010).

At the time of the rezoning, fishers were concerned that the RAP's closures would affect the future viability of the industry, with one trawl operator observing that:

> 'Locking people out of areas is a very easy way to manage the fishery. There's no access, you can't take the fish. But it's not necessarily the best way of ensuring that we have a viable and a sustainable fishery in the future. It can be done, and still allow people to access those stocks' (ABC 2003).

Studies have documented a variety of alternative strategies to marine park closures such as seasonal bans, tighter effort control measures, and restricted fishing in nursery grounds instead of permanent spatial and temporal closures (Helvey 2004; Suuronen et al. 2010). Other research has displayed the need to incorporate fishers' knowledge and values into MPA decision-making as it directly affects the livelihoods of fishers and their way of life. For instance, in reviewing the British situation of no-take MPAs, Jones (2009:760) points to the need to consider the impacts of MPAs on the grounds of 'equity, justice and power', and singles out the 'more vulnerable inshore fishing sector'.

To mitigate or minimise the negative effects of change, Jones looks to the role of compensation to counter the increased costs associated with the new conditions as well as proposing the inclusion of fishers' expertise in scientific research and the design of marine parks. Likewise Suuronen et al. (2010:242), in examining the effectiveness of MPAs to preserve the threatened Baltic cod fishery, also raise the issue of equity saying that a significant challenge to MPAs is an 'induced inequality among fishermen which has further reduced incentives for rule compliance' (see also Lord 2011). Over the longer term, Suuronen et al. (2010:243) recommend, as do the fishers in this study, that 'better communication is needed…prior to the implementation of any major management action' such as the introduction of marine parks and rezoning, and any structural adjustment schemes designed to improve efficiency and remove effort.

3.8 The Effects of Structural Adjustment

Structural adjustment is usually applied to remove excess capacity in a fishery, provide financial assistance following the introduction of marine park closures and recreational fishing only zones, and improve economic efficiency (Curtis and Squires 2007; Squires et al. 2006).[11] McPhee (2008:209) lists the strategic yet 'practical challenges' that occur with adjustment assistance, especially the need to remove all fishing effort from an area, including any latent or re-entry possibilities, and the need to provide 'sufficient financial resources to remove enough fishing effort to make a worthwhile difference'. In the case of our study, two different restructuring programs were introduced: a structural adjustment package or 'the SAP' offered in the GBR region, and a licence buyback scheme implemented in Moreton Bay.

[11] For Commonwealth fisheries and an evaluation of the tender process, see Ernst and Young Australia (2008).

According to an ABARE[12] report released in 2004 on structural adjustment in Australian fisheries (Newby et al. 2004), a fishery should be able to adapt to change, and where market fluctuations are concerned, not rely on government schemes. The report argues that fishers 'should be exposed to the risks of the market, and adjust accordingly when conditions change' (Newby et al. 2004:12). In some respects in the three regions being investigated this adjustment is occurring, especially due to the introduction of MPAs and other regulatory measures designed to remove effort and licences from the industry. The ABARE report further states that 'the industry needs to display dynamic efficiency and respond to long term changes and be resilient to any short term fluctuations' (Newby et al. 2004:12). Such expectations are grounded in an ideology that fishers should respond as economic units rather than working from an integrated approach which would include a well-researched and managed assessment of the social impacts of significant structural change.

The report also notes that where action is taken to reduce fishing effort through the application of marine parks, government intervention through structural adjustment or licence buyback can be used to offset economic impacts. Once again, however, the report fails to incorporate the social costs involved with these or other processes associated with structural and economic change. A further social cost was raised by Willing (2007:9), who advised that not including 'non-fishery alternatives' in restructuring may lead 'to adverse impacts on those dependent on the fishery, or be practically unfeasible, as when there is no alternative, fishers will fish illegally to maintain their livelihood.' Importantly, however, the ABARE report recommended that to ensure an equitable outcome, schemes designed to produce structural change should not only be accompanied by the removal of latent effort, but also guard against the possibility that effort may otherwise be displaced into other fisheries or regions (Cadwaller et al. 2000; FERM 2004). This has been a critical factor for some fishers, especially following the licence buyback in Moreton Bay.

In view of potential problems of latent and displaced effort, in 2004 the federal Department of Environment and Heritage (DEH) developed a policy statement for Commonwealth MPAs and displaced fishing. It proposed that the Australian Government adopt a statutory requirement for the provision of funds for 'adjustment assistance for commercial fishers arising from MPAs/zones' (DEH 2004). More recently, a study commissioned by the Australian Government on displaced activities recognised that:

> Equity issues are often at the forefront of policy discussions about the provision of assistance to people who are impacted by biodiversity conservation measures. These deliberations are made difficult by the lack of any widely accepted norms regarding fairness and the provision of assistance to displaced interests (Macintosh and Bonhady 2009:32).

As there are no prescribed state legislative requirements for compensation for displaced fishing effort except in Western Australia (McPhee 2008:202), the result has meant that structural adjustment packages (SAPs) for MPAs are determined on a case-by-case basis. Thus, following the introduction of the Great Sandy Marine Park and the Great

[12] ABARE is an independent government economic research agency. A more recent study on buybacks associated with Commonwealth fisheries (Viera et al. 2010) has focused solely on the economic effects of structural adjustments.

Barrier Reef Coast Marine Park, no structural adjustment or compensation was offered to fishers excluded from fishing in these areas (Sen 2010).

The two prominent cases of structural adjustment surrounding MPAs in Queensland and of direct relevance to this study are the Great Barrier Reef Marine Park SAP, for which, by June 2007, $187 million had been paid to affected fishers (Minnegal and Dwyer 2008a:1069), and the Moreton Bay Marine Park, which allocated $15.1 million for a licence buyback scheme. By the end of 2009, some $12.8 million of the original $15.1 million had been allocated (QRAA 2009).

3.8.1 Moreton Bay Licence Buyback Scheme

The Moreton Bay compensation package was devised in response to the rezoning of the Moreton Bay Marine Park (MBMP), which came into effect on March 1 2009 (see McPhee et al. 2008; Robinson and Mangan 2008; Shaw et al. 2009). The Moreton Bay buyback is smaller in scope than the GBRMP-SAP and only encompasses licence buybacks. Unlike the GBRMP-SAP, it does not offer business restructuring assistance.

Both the MBMP and the buyback scheme have aroused considerable controversy (Heselwood 2008; ABC 2009). National Party Senator Ron Boswell, a prominent supporter of the Queensland commercial fishing industry, commented that:

> We have already seen the hundreds of millions of dollars that similar zoning has cost on the Great Barrier Reef as a result of fishing closures like those planned for Moreton Bay and we don't want to ever see that kind of unnecessary impact on our fishing industries again… We could expect state compensation for the Moreton Bay rezoning to be worth much more than this figure [$200 million, the figure cited as the current cost of the GBRMPSAP] (cited in Heselwood 2008:13).

Altogether 350 tenders were received and 119 licences were bought out. Twenty two licence holders who received compensation were no longer working in Moreton Bay. This left 524 active licences still operating in the bay. The buyout represented about 25 percent of the gross value of the Bay's commercial harvest, which at the time amounted to $24 million per year (Parnell 2009). Although the government hoped that a significant amount of effort would be removed through the assistance scheme, a pilot study on fishing effort since the buyback showed only limited change (Garcin 2009). In part, this was seen to be due to a rushed tendering process but also because there was no firm stipulation by the (then) Environment Protection Agency (EPA) that fishers whose tenders were successful had to remain out of the fishery for a specified length of time. The consequences of this decision have led to divisions in the fishery.

Through interviews with Moreton Bay fishers, this study has located six groups of fishers affected by the buyback. Members of these groups (apart from those who had left the industry) are now competing for resources and space. The six distinct groups impacted by the buyback in Moreton Bay include:

1. Those who received compensation and left the industry;
2. Those who received compensation and returned to fishing;
3. Those who submitted a tender but were unsuccessful;

4. Those who would have submitted a tender but were not aware of the opportunity to return if they were successful;
5. Those who did not want to leave the industry, so they did not submit a tender;
6. Those who were leasing licences and were not eligible for the buyback.

Other fishers who received compensation either held latent licences or leased licences to other, often younger, fishers. Thus, an initial social and economic consequence of the scheme strongly impacted the newer entrants who may not have been able to afford a licence but who sought nonetheless to gain a foothold in the industry. This group was not eligible to submit a tender and reported being disadvantaged by this limitation.

Further social and economic impacts related to the effects of the rezoning restrictions, in particular, the need to upgrade motors or vessels or to purchase new boats or engines to cope with the longer travel distances now involved. Some fishers have been forced to take out bank loans to cover the additional costs incurred by the changed conditions. One net fisher who lost fishing ground and was unsuccessful in the buyout, told us at the outset that he had no wages coming in for the foreseeable future, and was worried about his family and his options. Others described now having to work much longer hours to earn an equivalent level of income due to the extra distances and travel time required to move beyond zoning restrictions.

Not all fishers were unfavourably affected. Those who received compensation have invested in the industry, paid off bank loans, expanded their business, and introduced a variety of innovations to make their operations more sustainable. Others, whether they received the buyback or not, have employed inventive means to keep fishing profitably and productively: by adapting boats, modifying gear, shifting species or targeting particular niche species for the market, and becoming more sustainable. A number have formed cooperative working crews, for example, by leasing licences to mates, or joining with younger entrants who own or lease licences and who are seeking experience to build their careers. However, a by-product of these larger crews is a possible rift with single owner-operators, especially if both groups are competing for the same area and resource, and if the single operators are not able to maintain a profitable catch over time.[13]

Although individual fishers are now 'getting on with it', the repercussions of the rezoning and restructuring are still being felt by some of the interviewees. This was particularly the case for those who lost substantial fishing grounds in the rezoning, or have been unable, for various reasons, to adapt to the new conditions. Some have made the difficult decision to leave the profession and retire early; others have had to find alternative work at less pay and a lower skill level; a third group has shifted their operations and effort elsewhere. The overall perception by interviewees is that too little attention was paid to the social impacts of the rezoning, either during the MBMP consultation phase or later, during the licence buyback process (cf. Shaw and Conway 2007).

Importantly, neither those responsible for the marine park implementation nor the structural adjustment scheme conducted a thorough assessment of the social and economic impacts for affected stakeholders such as fishers and their families. As a

[13] To manage potential conflict among fishers and to promote an ethical approach to particular fisheries, the MBSIA is developing a Code of Conduct for Moreton Bay.

result, a number of fishers were initially angry and frustrated at what they perceived was a lack of forethought and planning. Some continue to be distressed, particularly when they are unfairly categorised as 'whingers'. Others report feeling 'let down', not only by what they regard as an inequitable compensation scheme, but also because they believe that the stakeholder consultation process did not take their social needs and their economic livelihoods into account (e.g. Scholz et al. 2004; see also Taylor-Moore 2006 re the GBR-RAP).

Fishers we have interviewed are supportive of MPAs and the need to set aside certain areas to allow fish stocks to replenish, but many remain critical of the MPA implementation process, the way that adjustment schemes were managed, and the validity of the scientific research that led to the closures. Their scepticism about the research and rezoning is demonstrated in a comment from a long-term Moreton Bay fisher cited in a study on stakeholder reactions following the introduction of the MBMP (Shaw et al. 2009). It snapshots the level of concern about the consultation process, the effort involved, and the initial anguish felt over the way the commercial sector was treated:

> 'The whole process was unfair. Fishing effort in Moreton Bay won't be reduced. I'll bet my life that the green zones won't make one iota of difference to the migratory fisheries though it might help a few species. Environmentally and socially it's a disaster. Families are feeling the brunt. Marriages are breaking down over stress. People are bitter and angry. I'd rather fish for 20 hours straight than go to any more meetings about the Bay. I feel mentally drained. It upsets you.' (Shaw et al. 2009: 36).

Similar reactions were recorded a few years earlier following the rezoning of the GBRMP (Taylor-Moore 2006). However, it must be acknowledged that these perceptions may change, and for some interviewees, have changed over time, as fishers adjust to the new conditions and begin to experience the benefits of the closures (Gleason et al. 2010; Guidetti and Claudet 2010; Suman et al. 1999).

3.8.2 Great Barrier Reef Marine Park Structural Adjustment Package

The GBRMPA did not initially include compensation for commercial fishers until pressured by the QSIA (Taylor-Moore 2006). Subsequently, restructuring aimed to assist those who were affected by the rezoning and to manage any potentially unsustainable displaced fishing effort (McPhee 2008). The development of the SAP, however, was marked by disagreement over the extent to which fishers would actually be affected. Another issue of concern was that it did not include commercial operators affected by complementary State marine park zoning (Dinesen 2006).

The GBRMPA's original study estimated that the cost of compensation for displaced fishing effort would range from $0.5 million to $2.59 million per annum; a later study estimated the cost of displaced fishing would be $23 million per annum. The SAP eventually included five types of compensation: Business Exit Assistance (licence buyback); Business Restructuring Assistance; Employee Assistance; Social and Community Assistance; and Business Advice Assistance.[14]

[14] See McPhee (2008:205-209) for detailed descriptions of these components.

Research by McCook et al. (2010) on the social and economic impacts of the SAP and the RAP estimates that the costs of the zoning change to fisheries were between $14-$23 million per annum in gross value of production (GVP).[15] However, in considering the social and economic impacts of what became a 'contentious and politically sensitive' process (FERM 2004:51), and despite the extensive consultation process undertaken and widespread community support received, the study by McCook et al. (2010:8-9) highlights the need for additional communication and information strategies. The authors point out that:

> Given the considerable final investment, more cost-effective environmental and socioeconomic outcomes might have been achieved if initial strategic planning had been able to formally incorporate social and economic information, the need for industry structural adjustment, and cross-jurisdictional coordination of economic impacts.

The emphasis in McCook et al.'s study on the RAP's impact stresses the ecological and economic outcomes and also touches on the social and economic implications for and impacts on the commercial industry. For example, the authors state that the social and economic costs of implementing the RAP were 'minor compared to the social and economic values of the Marine Park' (McCook et al. 2010:7). In particular, they outline the clear financial benefits of the marine park, noting that income from tourism is '36 times greater' than commercial fishing, while recreational fishing contributes 'marginally more' than the commercial sector (McCook et al. 2010:7). By way of support for this comment, recreational fishers also argue that theirs is a sustainable sector that brings greater economic benefits to coastal regions,[16] including the GBR, while, to counter such claims, commercial fishers point to studies such as those of McPhee et al. (2002), which recommend tighter regulations for the recreational sector.

With this distinction in mind, Tobin (2005) observes that although there may not be an actual resource-use conflict between the two sectors (commercial and recreational), both sides articulate a strong perception of a conflict, an issue that should be recognised as a factor in marine park planning and stakeholder negotiation.[17]

3.9 Summary

This section has described the major legislative and management processes for Queensland fisheries. It noted that the implementation of marine protected areas and the execution of structural adjustment schemes are largely driven by economic concerns, with an analysis of social and socio-economic impacts upon fishers and their families receiving a low priority or not being addressed at all. These issues are examined further in the following section, which reviews the scholarly literature on the social ramifications of fisheries regulatory frameworks, including fishing area closures.

---

[15] Prior to the introduction of the RAP, the Bureau of Rural Sciences (2003) conducted a rapid impact assessment of likely social outcomes but its limited timeframe meant that only minimal forecasting was possible. It focused on economic impacts, estimating that the RAP would result in a 10 percent loss in the GVP for the otter trawl, net, line and crab fisheries.

[16] See, for example, numerous posts on recreational fishing forums such as www.ausfish.com.au and other local recreational fisheries websites.

[17] A further study by Sutton and Tobin (2009) on the attitudes of recreational fishers to the GBR-RAP, showed that they too were critical of the rezoning consultation, perceiving it to be a 'predetermined' process. They reported feeling unfairly treated in relation to other stakeholder groups and the information they provided.

SECTION 4: SOCIAL IMPACTS OF REGULATION ON COMMERCIAL FISHERIES

4.1 Introduction

This section examines the consequences of economic and ecosystem-based approaches to fisheries management on fishers. Despite these putatively holistic approaches, it is noteworthy that social impact assessments (SIAs) and social and economic impact assessments (SEIAs) are increasingly being used in Australian commercial fisheries (e.g. Schirmer 2005; Schirmer et al. 2004; Schirmer and Casey 2005; Schirmer and Pickworth 2005; 2005b; Pickworth et al. 2006), and overseas (e.g. Pollnac et al. 2006; Delaney 2009).

Although many SIAs and SEIAs continue to stress the empirical, i.e. the quantifiable, economic or socio-economic impacts on fishers, rather than (or in addition to) the qualitative social, personal and familial effects (Tuler et al. 2008), these approaches are useful ways to evaluate the potential impacts of change including the reactions of individuals and communities likely to be affected (Lord 2011; Schirmer et al. 2004).

As this study argues, the non-economic and social aspects of fishing, are significant. Hence, any regulation of commercial fishing is likely to generate a range of impacts beyond the economic, producing crucial implications for structural adjustment regimes that often focus on the economic or financial aspects of remuneration. As a consequence, this section concentrates on the social aspects of commercial fishing, especially the effects of management decisions on fishers' working and family lives.

Broadly, there is noteworthy research into fisheries management approaches and outcomes. For example, studies on fisher attitudes over the last decade have concentrated on critical management issues such as: communications between fishers, scientists and managers (Baelde 2001; Harms and Sylvia 2001; Rosenberg and Glass 2007); potential conflicts between fishing sectors over increasing resource scarcity and fluctuating market conditions (Cooke and Cowx 2006; Hilborn 2007a, 2007b; Kearney 2001, 2002); and marine protected areas (Agardy et al. 2003; Christie et al. 2007; Stump and Kriwoken 2006).

Research has also addressed the differing approaches to management including co-management, which supports cooperation and builds understanding across sectors and actors, develops greater responsibility for resources and enhances communication (Kaplan and McCay 2004), and promotes social 'learning and rule compliance' (Jentoft 2000: 57; see also Berkes 2009; Carlsson and Berkes 2005; Jentoft 2005; Jentoft et al. 2010). In contrast, adaptive management strategies shift the 'zone of traditional management' to the 'zone of new consensus' (Hilborn 2007a: 157). Along with these changes in the way fisheries are managed and controlled, fisheries management in Australia and internationally has begun to acknowledge the consequences of policy decisions on local communities and fishers' lives (Pickworth et al. 2006; Schirmer et al. 2004; Tuler and Webler 2008).

Key issues arising from the literature can be summarised as:

1. the social dimensions of commercial fishing show how daily work practice relates to social life as well as the non-economic aspects of the job;
2. the non-economic aspects of commercial fishing are an important aspect of fishers' working lives and identity; and
3. fishers, families and fishing communities have responded and adapted to regulatory changes in diverse ways.

4.2 The Diversity of Social Impacts on Fishers, Families and Communities

The discussion continues with a review of research studies which document a variety of reactions to the impacts of change, including: (i) the non-monetary benefits of commercial fishing; (ii) the influence of family, kinship and cultural heritage; (iii) the effects on health and well-being; (iv) mental health issues; (v) the role of gender and family; and (vi) the use of adaptive strategies towards change.

Economic models of fishing behaviour, from Gordon's (1954) original depiction of inevitable resource decline in an open-access fishery to the modern vision of ITQs, typically tend to assume, or at least emphasise, the individualistic, profit-seeking aspects of fisher behaviour (also see Hardin 1968). They do so because such behaviour can be (and is) modelled on the behaviour that is the most obviously relevant for fisheries management. As a result, the dominant depiction of fishers is one of a relatively homogenous group that is defined with reference to their resource use. Such a 'macro' depiction is over-generalised and incomplete.

By contrast, local and international research studies aim to show how fishing behaviour is determined not only by the need for financial incentives, but is also influenced by a range of context-specific circumstances and social relationships (often at the 'micro' level). While not denying the reality of profit-seeking and utilitarian behaviours, this literature review emphasises the broader social and political relations in which such behaviour is always embedded.

A number of researchers have drawn attention to the sheer diversity of fishers in any given area (Mathieson 2004; Richardson et al. 2005; Clay and Olson 2008a, 2008b). This may seem a simple point but it has important implications when assumptions about the homogeneity of fishers converge into management policy. Mathieson (2004) asserts that an assumption of homogenous and 'economically rational' fishers is counterproductive for management in terms of legitimacy, as fishers will seek to resist regulations that are not suited to their particular circumstances (St Martin et al. 2007). Furthermore, not all fishers, especially those in different fisheries, using different gear or fishing in different locations, will necessarily hold similar views about fisheries or environmental management. This can create problems if management is not sufficiently aware of or responsive to the diversity of fishers and fisher communities, as the outcomes of policy decisions can affect different sectors in different ways (Clay and Olson 2008a; Richardson et al. 2005).

Also related to the diversity of fishing practices are the ways in which social scientists have emphasised the range of motivations regarding resource use, in particular, how these motivations do not always correspond to typically 'economically rational' choices. Researchers studying fisheries as diverse as the Mississippi (Durrenberger 1997), Gulf

of Mexico (Johnson et al. 1998) and the California Bight (Endter-Wada and Keenan 2005) have observed how fishers do not conform to the same corporate logic of firms, but 'instead operate in ways characteristic of household economies' (Endter-Wada and Keenan 2005:236). Specifically, these and other studies show that fishers' responses to changed regulations differ according to their particular individual circumstances.

(i) Non-Monetary Benefits of Commercial Fishing

Other researchers have examined the monetary and non-monetary aspects of job satisfaction among fishers, noting that the non-monetary attributes may help explain the reluctance of fishers to leave the industry even if it makes economically rational sense to do so (Gatewood and McCay 1988, 1990; McGoodwin 1990; Pollnac et al. 2001; Pollnac and Poggie 2006, 2008; Smith and Clay 2010). The view that fishing is not 'just a profession' but a 'lifestyle' is a commonly-held notion among many fishers (Minnegal et al. 2003:59; Momtaz and Gladstone 2008; Williams 2005). For instance, Gatewood and McCay (1990:24) report, with reference to New Jersey commercial fishing, that 'fishing is not merely a means to an end, it is intrinsically rewarding…Fishing is not only a livelihood, it is a way of life'.

This way of life can also be dangerous, a quality that fishers often find risky yet enticing. Various studies have shown that because of an attraction to high risk-taking behaviour (Davis 2011; Pollnac and Poggie 2006, 2008; Waitt and Hartig 2005), fishers may be unwilling to leave the industry or take up alternative work as it may not be as satisfying or exciting, or provide the same sense of freedom as their chosen profession. Pollnac and Poggie (2008:199) suggest that any 'alternative occupation programs must take fishermen's love of adventure and risk into account to attract fishermen from their attachment to commercial fishing.'

Similarly, Williams (2005) found that among fishers in Scotland, the increasing web of formal rules and regulations has greatly undermined their enjoyment of the job. According to Williams (2005), 'traditionally associated with freedom, independence and enjoyment of a challenging occupation, [the meaning of 'being a fisherman'] has now become entangled in regulation, suspicion and potentially criminal activities.' Comparable issues were documented by Minnegal et al. (2003), King (2006), Minnegal and Dwyer (2008a, 2008b), who observed a variety of social and personal impacts related to increasing levels of regulation in Commonwealth fisheries operating in Victoria.

(ii) Influence of Family, Kinship and Cultural Heritage

Fishers often emphasise the strong cultural heritage, identity and history associated with their profession (Binkley 2000a; Minnegal et al. 2003; Williams 2005), and lament their loss in the face of fisheries closures. This was clearly demonstrated in a study on the effects of commercial fishing bans on Lake Macquarie in New South Wales (Momtaz and Gladstone 2008). Fishers were upset over the closure and accompanying buyout. They believed the decision to close the fishery was made for economic reasons such as increased tourism and the possibility of attracting more recreational anglers to the area. Their age and limited educational background, as well as their strong sense of community and place, meant they were unlikely to seek retraining, start a new career, or move in search of work.

Other researchers have reported the strong links commercial fishing has with kinship and family, explaining that if access to a fishery is restricted, it may have implications for interactions between kin (Gersuny and Poggie 1973), and discourage younger people moving into the industry (Menzies 2003; Williams 2005). Additional studies have even analysed the ways in which commercial fishing is tied to religious expression (Brown 2008; Hinz and Bratton 2000; Paolisso 2002) and ethical behaviours (Bratton and Hinz. 2002; Coward et al. 2000). While non-economic aspects of fishing such as the historical significance of the oyster industry in Moreton Bay can be deemed as having 'emotive appeal' (Robinson and Mangan 2008:22), it is important to recognise that for commercial fishers, these non-economic dimensions are highly valued. In part, the findings from various studies on fishers' motivations and job satisfaction help to explain how a loss of work through closures can often have devastating effects, especially on health and well-being (e.g. Smith and Clay 2010).

(iii) Effects on Health and Well-being

Health and well-being impacts of change reported in a range of studies define a number of personal and community stressors and health problems, including issues on health and safety at work (Carawan 2004; Johnson et al. 1994; Murray 2007). They include: fishers' increased efforts to meet financial obligations; mental health outcomes such as depression; increasing alcoholism and family violence; anger and frustration at the lack of recognition of fishers' knowledge and experience; and family breakdowns. Smith et al. (2003), for example, outline in detail the stresses and anxieties experienced by net fishers and their families after the Florida net ban, highlighting subsequent and severe mental health impacts (cf. Williams 2005).

Similarly, in a Canadian study following fisheries' restructuring, poor health outcomes emerged as a direct result of the social and economic changes. Health concerns included higher rates of obesity, smoking, and family violence (Brannen et al. 2009; Dolan et al. 2002), while other research following fisheries closures in the U.S. revealed incidences of physical and mental ill health, including increased incidences of drug and alcohol abuse, morbidity and accident (Martin 2008).

In an Australian context, a study by Dwyer et al. (2008) following the introduction of ITQs in the Southern Shark Fishery in Victoria, found similar instances of personal and family hardship. The researchers examined the written submissions received by AFMA from shark fishers about the allocation of quota. They suggest that the submissions were not simply technical proposals but revealed the personal problems experienced by many, where 'tales of family breakdown, ill health, stress and exceptional financial difficulty were not uncommon and there was often the sense that the writer felt that he had been personally discriminated against' (Dwyer et al. 2008:266).

Similar outcomes were found in a report on the implementation of the Great Barrier Reef Representative Areas Program (GBR-RAP). Taylor-Moore (2006:5) documented an extensive range of economic and social impacts that included: 'loss of business, marriage breakdown, financial trauma, legal disputes, social and physical dislocation, reduction in school enrolments, and downturn in local businesses, mental and physical breakdown and local unemployment'. Early findings from Moreton Bay following the MBMP rezoning in 2009 also indicate similar tensions where fishers,

> specified that financial difficulties have caused these marital conflicts and that the rezoning may have impacted on the family income. Moreover, some of them also underlined that they have been subjected to mental health problems such as depression and alcohol abuse since governmental regulations restricted fisheries in the region (Garcin 2009:46).

(iv) Mental Health Issues

Importantly for Australian fisheries, many of the mental health impacts associated with restructuring have already been well-documented in the farming sector (Fraser et al. 2005). At a regulatory level, governments in Australia have acted to ensure there is some level of assistance for farming families requiring social support and assistance, such as the drought assistance program. However, while fishers and fishing families face similar sets of issues and challenges, the recognition of their problems, as well as the opportunities for support, is far more limited.

A significant issue outlined in research on Australian farmers has been the realisation that problems on the land among those seriously impacted have not only shown severe psychological distress, they have also revealed a serious level of suicide (Judd et al. 2006). Risk factors associated with mental health problems have been associated with a number of variables also relevant to the fishing industry in Queensland and other fisheries nationally and internationally (e.g. Szymańska et al. 2006). Such factors include:

> limited access to social and professional support in rural areas, together with risks associated with social isolation and distances from appropriate services (Brannen et al. 2009);
> a sense of powerlessness due to the changes over which fishers have little or no control (Lord 2011);
> the experience of resource loss, including the impact of natural disasters and related traumas (Arata et al. 2000; Mattock 2005; McCauley 2010; Picou 2009);
> the experience of stressful life events, including grief, despair and stress connected to loss of work associated with restructuring and change (Brannen et al. 2009; Gilden 1999);
> reduced ability to deal with problems among people usually self-reliant and independent, which may effect a feeling of shame or stigma about psychological ill health, and thus, may discourage help seeking rather than encouraging it (Brannen et al. 2009).

(v) The Role of Gender and Family

The extent of research on fishers' mental health problems show that the range of impacts is not confined to individual fishers but extends to families as well (Choo et al. 2008; Binkley 2000b, 2002; Nadel-Klein and Davis 1988). The insecurity of life at sea, together with the potential for loss of work through forced closures and tightened regulations, have placed added stress on families and family relationships. In many cases (from overseas research), the changing roles for fishers (mainly men) and their partners have taken a great toll on relationships but have also led to shifting family roles and household adaptation (Binkley 1996; 2002; Smith et al. 2003). The gendered nature of fishing (Aslin et al. 2000; Davis 2000; Neis 1999), its emphasis on masculinity (Hjelm 2006; Power 2005; Waitt and Hartig 2005), and the intergenerational involvement,

especially of sons entering the industry (Davis and Wagner, 2006), have meant that men carry a heavy burden when their status and social identity is threatened.

One U.S. study following the collapse of the groundfish fishery reported that while men mourned the loss of work and their fishing identity, women took on additional responsibility for financial planning and sustaining family cohesion and resilience (Mederer, 1999). Nonetheless, in much of the research on the management impacts of industry restructuring, the role of women as significant players in the industry, and the social impact on families of fisheries decline, have been overlooked (Bavington et al. 2004; Skaptadóttir 2000).

Women's roles, however, have been the focus of a small number of fishing family studies from the U.S. and Canada, which have documented the essential contribution women make in keeping the household and family business running while their husbands are working (Binkley 2002; Manoogian-O'Dell et al. 2002; Zvonkovic et al. 1996, 1997, 2002). In an uncertain fisheries environment, wives are seen to be the 'emotional anchor' who mitigate the negative effects of social and economic change (Smith et al 2003:14), as well as helping to financially support the family by working outside the home, especially if there is no alternative work for the men, who may be middle aged with limited formal education and mainly occupationally-specific skills (Bratton and Hinz 2002; Brookfield et al. 2005). In contrast, younger fishers working in large-scale operations tend to be more flexible, have more diverse business skills, higher education levels and are better able to deal with the effects of policy changes (Marshall and Marshall 2007).

(vi) Adaptive Strategies Towards Change

An important aspect of this study has been the recognition of the ways in which fishers and their families have responded and adapted to the challenge of increased regulation and MPAs. In a study of fishers in Queensland, Marshall and Marshall (2007) adopted a perspective informed by resilience theory to identify four key characteristics of individuals that determine their ability to deal with and adapt to change. The four characteristics are identified as:

- the perception of risk associated with change;
- the ability to plan, learn and reorganise;
- the perception of the ability to cope; and
- the level of interest in change.

Marshall and Marshall (2007) argue that these attributes resemble characteristics typically associated with social-ecological resilience, i.e. the ability to absorb disturbance, the ability to self-organise, and the ability to learn and adapt. In the fisheries context, they found increased resilience among fishers who were informed of the changes and active in stakeholder meetings.

Other studies have examined the varied strategies fishers employ to cope with and adapt to the modern challenges of fisheries decline. In Australia, Minnegal et al. (2003) have analysed the ways fishers deal with increasing levels of regulation. They show how fishers 'assert their identity as fishers' (Minnegal et al. 2003:54), stressing the traditional, place-based and historical aspects of this identity. In a further study on Victorian fishers, Dwyer and Minnegal (2008b) located another pattern of resistance to

uncertainty created by management decisions. They found fishers respond to change in proactive and dynamic ways by diversifying their livelihood and fishing strategies. Many adapt by switching gear or fisheries or activating latent licences, but are less likely to move location or take up a different occupation.

Community engagement has also been shown to build resilience and adaptive capacity. Martin (2008), for instance, commenting on fisheries downturn in Washington state in the U.S., outlines a series of resilience strategies undertaken by affected fishers (gillnetters). Strategies included: using financial compensation to invest in the industry; greater participation in fisheries and community activities such as offering educational 'hands on' fishing experiences for young people; getting involved in pro-environment work to protect local habitats; or taking part in the local festivals such as the 'Fisher Poets Gathering'. An adaptive capacity is also related to fishing's occupational qualities - courage, tolerance for risk, an egalitarian ethic, and the valued concepts of fishing as a way of life and 'community history' (see also Wiber et al. 2004). Martin (2008:23) concludes by summarising the level of resilience amongst the gillnetters, stating:

> First of all, fishermen are still here. They have refused to die. They maintain advocacy for fishermen and for fish. Because of the verbal/oral culture, fishermen will go to meetings and speak. They will also work on environmental issues and support organizations that have similar interests.

Elsewhere in North America, Endter-Wada and Keenan (2005) show that the adaptation of fishers to a range of environmental and social interventions varies widely according to individual family circumstances. Gender, too, is an important factor when understanding the responses of fishing families to change. Skaptadóttir (2000:311), for example, argues that in Iceland, '[t]he coping mechanisms adopted by women stress community and working together whereas men respond more on an individual level'. Gender-differentiated coping responses may be related to the well-documented social emphasis on masculinity in commercial fishing (e.g. King 2007), and this field is an important topic for further research.

4.3 Summary

This section has illustrated a broad range of research studies on health and well-being issues for fishers and families as a result of changes in the commercial industry. A review of the research into the social aspects of change in the fishing industry reveals the extent of personal, familial and community impacts that, in turn, suggests there is a crucial need to incorporate social impact assessments (SIAs) and social and economic impact assessments (SEIAs) into projects that affect the working lives of fishers and the quality of life of their families. Fisheries and environmental management planning and stakeholder consultation processes need to address the short and longer-term effects of change on the health and well-being of fishers and families. This is best achieved through detailed and well-administered social impact management plans that are designed, enacted and monitored through the active participation of fishers.

Importantly, the review of previous research studies has shown that fishers, families and communities display an ability to adapt and cope with change. This was demonstrated by applying the concept of social resilience, whereby an individual displays a positive attitude and psychological well-being in the face of adversity (Greenhill et al. 2009).

However, despite evidence locally and internationally that distressing social, individual and family impacts occur as a result of management actions, little attention has been paid to integrating such evidence into policy development and action that can be implemented as part of a more holistic approach to fisheries and marine management in Queensland. Potential actions include the development of skills training, the provision of retraining advice and career information, and the supply of programs such as personal and financial counselling for those negatively affected by the changes in the industry.

4.4 Review of Part 1: A Focus on the Commercial Fishing Industry

Part 1 of this report has introduced the study, provided an overview of the management practices involved in both Queensland and Australia, and reviewed the scholarly literature associated with fisheries change. It has outlined how current approaches to fisheries management in Australia are informed by a number of overlapping perspectives and objectives. Economic and ecosystem-based management are the two major directions through which managers frame their activities. A largely economic focus has been increasingly adopted through the implementation of exclusive use rights to fish, in particular using ITQs, whereas ecosystem-based approaches are emphasised through the development of MPAs and stricter regulations on environmental impact assessments.

Significantly, ecosystem-based approaches are linked to, and influenced by, broader perspectives that seek to more holistically manage and conserve the marine environment. In this context, Baelde (2005) explains that conservation and fisheries management agencies in Australia have different beliefs, legislative obligations and operational processes. Accordingly, she maintains that the governance of marine conservation and fisheries has not been well coordinated. This has resulted in the two groups sometimes competing with each other or developing different sets of management tools.

Combined with other factors – not least the perceived decline in fish populations, the ready availability of cheaper imported seafood and the rise in fuel and equipment costs – positive outcomes for and impacts upon commercial fishers in a heavily restricted environment are tenuous. As Minnegal et al. (2003) note, commercial fishers perceive themselves to be under threat from conflict with recreational fishers, environmentalists and scientists who seek to impose MPAs, managers who seek to introduce tougher regulations, and threats from globalisation which has increased levels of international competition. These factors have created an increasingly restricted environment for commercial fisheries which exposes those involved to a range of social and economic consequences that require a more comprehensive analysis.

The next part of this report presents a detailed discussion and analysis of the perceptions and experiences of the interviewees in relation to changes in fisheries and environmental management, including the rezoning of MPAs, the effect of restructuring, and the social and family impacts arising from these changes.

PART 2: A FOCUS ON FISHERS AND SOCIAL CHANGE

SECTION 5: FISHERIES AND FISHERS

5.1 Introduction

This section reviews the responses and reactions of the commercial fishers in the three regions: Moreton Bay, Hervey Bay, and the Burdekin. It is divided into two parts. Initially, it lists the major issues of concern raised in the interviews in each of the three study sites. It then takes a broad overview, outlining the impact of fisheries change across the three regions, and documenting the common themes and patterns that emerged through the interviews. The section begins with a description of the epistemological and methodological approaches adopted in this qualitative study.

The aim of this section is to document the views from the fishers, their partners and ancillary businesses. It intentionally takes a 'micro' qualitative perspective on the effect of fisheries change to provide a more detailed analysis of the situation and from the fishers' point of view. This is designed to balance the approach, generally taken in fisheries and resource management and other stakeholder research, which concentrates on providing a 'macro' quantitative analysis. These different emphases are sometimes referred to as the 'paradigm wars' (Hall-Arber et al. 2009:300).

The two paradigms, however, are complementary. Both have distinct advantages, with the prime advantage for numerically based data being its use in policy and political arenas where information often needs to be suitably presented in an 'easily digestible' form. In addition, fisheries management is committed by policy briefs to achieve outcomes that are commonly phrased in terms of biological and economic sustainability. As a consequence, the social impacts of management strategies may not always be appropriately formulated for these briefs, or developed in such a way that is relevant or meaningful for an affected community (Dwyer and Minnegal 2009).

Collecting detailed information on the lived experience of fishers provides a 'thicker' or more nuanced picture of the way fishers react to change and helps to avoid the assumption of rational choice homogeneity within the fishing community. In-depth interviews can also reveal underlying and interconnected concerns and effects which might not surface in strictly quantitative assessments. They also provide an opportunity for fishers to raise issues that might otherwise go unnoticed or unmentioned (Conway and Shaw 2008), e.g. in stakeholder negotiations and consultation meetings and workshops. For this reason, the research intentionally allows fishers to voice their opinions and points of view. This is designed to counter any sense of disempowerment, which may be experienced by groups undergoing any major social or environmental change. It also provides a comparison of interviewees' observations and perceptions in relation to overseas and Australian research studies.

What is significant in this study is the way fishers negotiate the 'macro-micro interface' between the 'system' and their working lives, between the global factors that affect their profession (fuel costs, interest and exchange rates, overseas imports) and their reactions to these shifts in an already risky and uncertain environment (sea conditions, weather, catch availability) (van Ginkel 2009). Some resist change; others are more resilient and

make adaptive and innovative responses to change (Marshall 2005). Across the three regions, fishers and their partners, including some former fishers and business owners, continue to be involved in fisheries 'politics', government committees and lobbying. Some fishers have upscaled their businesses and diversified, while others are collaborating on the development of regional marketing strategies to promote their wild-caught product. At least one fisher has designed a 'jet-ski' boat to cope with the longer distances to travel each day. However, the amalgam of changes such as revised regulations, marine park rezoning, fisheries reviews, licence buybacks, the effects of global economics and climate change, have influenced the ability of fishers and families to withstand these changes, personally, professionally, and financially. For some, it has triggered serious mental health concerns and family repercussions. The severity of these impacts is being felt by a number of fishers, business owners and families who were interviewed for this study. It is their perceptions, attitudes, experiences and subjective interpretations that are documented in our research.

5.2 The Interviewees

Interviewees in each site were initially contacted through the QSIA and the MBSIA. A snowball technique requesting the initial interviewees to identify further interested people was used to identify the remaining interviewees; not all were members of or associated with industry groups. Initially, twenty interviews were conducted at each site and comprised twelve fishers, five wives/partners, and three fishing-related businesses. Among the fishers and their partners, a cross-section of three groups was included: those who were managing well, those who were vulnerable and struggling, and those who had left the industry. At the end of the initial interviewing process, an additional fourteen interviewees (fishers, partners, former fishers, and business owners) were contacted to assess how they had adapted to change.

In each site, the study aimed to reach a variety of fishers from the trawl, beam trawl, net, line and crab fisheries. Interviews lasted a minimum of approximately one hour through to three hours. Some interviews moved into longer conversations as some interviewees articulated that, for the first time, someone was interested in their viewpoint, that they were being allowed to voice their concerns, and that their opinions were being taken seriously.

In each region, the majority of fishers interviewed (which also represents the situation in the rest of Queensland) are often multispecies licence holders, who have been in the industry on average from 15 to over 30 years. Most are family men in their mid 30s to mid 60s, the age range reflecting the limited recruitment of younger people into the fisheries sector. However, some newer entrants aged in their 20s were also interviewed along with retired fishers, some whose sons continue to work in the industry.

The majority of fisher interviewees are owner-operators working the trawl, net, line and crab fisheries or a combination of these sectors. A number not only come from multi-generational fishing families, but their relatives (brothers, sisters, cousins, children) may also be working in the industry. Most learnt their trade from their fathers and grandfathers and began fishing professionally in their mid to late teens. Family succession plays a significant role although not all interviewees are part of fishing families, some having taken up fishing often through social connections. Longer-term fishers may have moved location and fisheries over time, worked as crew and skippers in offshore fisheries in Australia and overseas, and made several transitions throughout

their working lives by upgrading their skill and knowledge base and their gear and operations as technology and regulations warranted and finances were available.

Wives are profoundly supportive of their husband's profession. Aged from their mid-30s to their mid-60s, they assist in the industry by often running the family business. Some help with sand crabbing, work on board trawlers for short periods, or help carry the catch ashore, and generally support their husband's at-sea operations. Some wives work full-time outside the home in various professions, have part-time jobs, or work from home. Some have set up online businesses which allow them to take care of the children and 'help make ends meet'.

Several wives are also active in industrial and environmental affairs or organise professional and community events like the annual Hervey Bay Seafood Festival and seafood business training courses (Lewthwaite 2009b). Their support is vital for the fishery, not only due to their involvement in the family business, but also through their promotion of local seafood events and cookery master classes, their organisation of fisheries-related workshops and conferences, and their activism via lobbying government officials and writing submissions on industry issues. As in other industries, much of women's work in fisheries occurs in the 'private sphere', is unpaid, informal, and may therefore go unrecognised by the 'public sector' (European Union 2003; Mattison 2009).

Business interviewees are both male and female aged in their 40s to 60s and work in wholesaling, distribution and export, commercial fish shops, manage fisheries-related training and consultation businesses, or run brokerage services. Some business owners continue to work as fishers at the same time, or they worked as fishers in the past and were looking for a shore-based means by which to remain active in the industry. Some are also part of longstanding fishing families and regard their business as an important adjunct to the efficient operations of the industry.

This on-going connection was also a common experience amongst former and retired fishers who continue to be involved in fisheries-related activities, often through their family relationships, or are working in government and non-government agencies connected to fisheries and marine-related pursuits, e.g. in research, training, and conservation. Most lament having to leave the industry for various reasons, e.g. age, financial limitations or health issues but they also state they would return to fishing, and the sea, if they could.

Interviews were transcribed and later analysed to highlight the major issues seen to affect fishers' working and family lives. The research approach and analysis used are based on 'grounded theory', a process designed to elicit wide-ranging information from interviewees in the form of attitudes, perceptions, observations and experiences (Charmaz 2007, Morse et al. 2009). Grounded theory provides a method for progressive interpretation and comparative analysis, and acts as a foundation for establishing an emergent theory implicit in the data. Using this process, interviews were thematically analysed to locate the major issues of concern. The main themes were then reviewed to elicit additional significant issues that emerged from the initial analysis.

One of the foundational views held, especially among the long-term inshore sector, is a pervasive sadness over the potential loss of livelihood and lifestyle. Over the past 20 years, the industry has changed substantially, losing much of its freedom and

independence as regulations and controls began to limit the open access view of the sea's bounty. More recently, as economic and ecological imperatives gained prominence, fishers have found themselves having to navigate new terrain. For some it has been overwhelming. As van Ginkel (2009:300) explains:

> New management regimes often impede time-honoured fishing strategies, adaptive performance, flexibility and switching behaviour…[F]ishermen are often suspicious of and resent interference from fisheries policymakers and regulators, especially if measures are believed to be flawed or unjust.

For example, expansion of marine park boundaries increases time at sea travelling to and from fishing grounds, and impinges on safety by placing fishers in potentially adverse conditions for longer periods. Extra travel also means extra fuel costs, extra maintenance on boats and engines, and extra hours at work. Further, the operation of buyback schemes is likely to lower the value of licences up for sale, as licences may no longer be valued in an MPA-affected fishery where access to fishing is restricted (Schirmer et al. 2004). These issues are further explored in the ensuing discussion.

5.3 Major Issues in the Three Regions

The following sub-sections examine in more detail the impact of fisheries change from the interviewees' perspectives. Beginning with a brief overview of the main issues emerging in each region, the predominant themes that are common to interviewees are subsequently identified and analysed.

5.3.1 Moreton Bay Region

With the rezoning of the marine park in 2009, commercial fishers in Moreton Bay calculated they would lose up to 30 to 40 percent of their prime fishing grounds. They were especially perturbed about the extent and placement of green and yellow zones which they believe were established without sufficient scientifically-backed evidence, and in certain areas, favoured the recreational over the commercial sector. They were also bewildered that recommendations from an extensive research study commissioned by the Moreton Bay Access Alliance (MBAA), a coalition of commercial, recreational and marine industry sectors, had not been accepted by the then Environment Protection Agency (EPA), the authority responsible for the marine park. The lack of recognition of local fishers' expert knowledge of Moreton Bay reinforced their perception that the rezoning plan was the result of political manoeuvring. Later, the way the buyback scheme was applied and its consequent effect on fishing effort reduction and fishing operations, left some in the industry perplexed and questioning their future in the fishery.

5.3.2 Hervey Bay Region

Interviews indicate that the rezoning process for the Great Sandy Marine Park has been less divisive than the same process in Moreton Bay, although net fishers argue that they have been unfairly regulated by the go slow zones in particular. They explain that the go slow zones are located in the areas where commercial operators work, while none are located where the recreational sector prefer to fish. This is an example of what they see as the recreational fishing sector politicising what should be an objective and scientific process of MPA zoning. The impact these issues have on the personal lives of fishers is

clear; individuals have spoken of increasing levels of depression, of frequently breaking down in tears, and of attempted suicide. There is a feeling of persecution and a recognition that their livelihood is threatened by fishers from the recreational sector which, commercial fishers argue, has a similar level of environmental impact (McPhee et al. 2002).

In order to mitigate the level of concern, at least in relation to the go slow zones, QSIA is working with DERM to review the go slow areas in the Great Sandy Marine Park. This has involved a number of community meetings with stakeholders and aims to identify the impacts of the go slow zones on commercial fishing as well as maintain the conservation outcomes critical to the ongoing protection of the marine ecosystem in the marine park.

In contrast to the issues affecting inshore operations, concerns amongst some fishers in the trawl sector have centred on what is perceived to be a growing gap between small scale and larger scale operations. As a result, small-scale 'lifestyle' fishers perceive they are being 'punished' by a management system that is increasingly designed to accommodate large-scale and economically efficient trawling operations. As one fisher reflected, 'fishing is less of a lifestyle now, it's more about being a business'. But some in Hervey Bay fear the possible loss of the 'business' due to the East Coast Trawl review and the proposed introduction of the bioregional MPA. The new marine park has already been seen as a threat to trawl and inshore fisheries in relation to effort migration and reduced areas for fishing.

5.3.3 The Burdekin Region

Many fishers and families experienced social and economic upheaval during the Great Barrier Reef Marine Park Representative Areas Program (GBRMP-RAP) and the ensuing structural adjustment package (SAP). For some, the impacts are still apparent. An emerging issue is the role of part-time fishers seen to be 'cashing in' on the lucrative barramundi fishery. This group combines fishing with working in the mines, the sugar industry or driving trucks in slow periods. However, this part-time arrangement has riled full-time operators, who view the part-timers as competing for the same limited resources and proceeds.[18]

Some interviewees left fishing after accepting the buyout and worked in other jobs for a while but have since returned to fishing or fishing-connected occupations saying they could not stay away from the industry or the marine environment. However, the number of returnees, coupled with the arrival of fishers from interstate and other regions, has caused consternation over fishing effort and resources. Local fishers display a strong sense of self-sufficiency from their commercial activities and all have a strong attachment to place and profession. Their partners also display a strong sense of independence and accomplishment from caring for family members, working alongside their husbands, and/or working for pay in land-based employment.

[18] See Ota and Just (2008) for a UK based examination of the relationship between what are referred to as 'proper fishermen' compared to those working part-time. Proper fishermen are those whose income is solely derived from fishing.

Table 5: Summary: Perceptions of Interviewees in the Three Queensland Regions under Study

Generic	**Moreton Bay**	**Hervey Bay**	**Burdekin Region**
Effects of MPA Zoning and Rezoning: Short and Long-Term Effects	- Limited reduction of fishing effort following the rezoning. - Concentration and competition of fishers in reduced areas. -View this was worsened by allowing bought-out fishers to return.	- Concerns over: (i) the forthcoming review of the Great Sandy Marine Park; (ii) the proposed Commonwealth MPA, especially following the experience in Moreton Bay; and (iii) the East Coast Trawl review.	- Impact of the RAP, financially and with regard to fishing access. - Increased numbers of fishers leading to lower returns, effort concentration and greater pressure on resource.
Communication, Consultation and Participation.	- Frustration and anger over a consultation process that gave limited recognition to local knowledge gained from years of observation and lived experience.	- Effect of the go slow zones on commercial fishing operations, including temporal and safety issues.	- Differences between fishers' perceptions of limited recognition of their local knowledge and expertise.
Perceptions of the Recreational and Tourism Sectors.	- Increased competition between the commercial and recreational sectors.	- Ongoing conflict between commercial and recreational fishers.	- Competition from the recreational sector, part-time fishers and illegal poaching.
Increased Costs In Doing Business, including Latent and Displaced Effort	- Concern over latent effort, including licences purchased by fishers being taken from them without any compensation being provided. - Initial angry reactions to MPA rezoning being channelled into a variety of working arrangements.	- Latent Effort. Concern over licences with a range of endorsements being removed without any compensation. - Displaced effort. Negative social impacts due to displaced fishers from NSW moving to Hervey Bay.	- Competition from local fish farms producing barramundi that has lowered the price of the wild caught product. - Negative impacts and competition from displaced and part-time fishers. - Legacy of the RAP.
Social and Environmental Impacts	- Lack of a holistic view about the state of the Bay's health. -Concerns about upstream pollution, nutrients and sediments, marine degradation, lyngbya blooms, and the spread of inappropriate industrial and residential development.	- Apprehension about the future of the industry and commercial fishers' way of life and cultural heritage. - Differing attitudes of 'entrepreneur' and 'lifestyle' fishers. - Differing attitudes of larger-scale trawl and smaller-scale inshore sectors.	- Recommendations for increased policing to counter the black market on barramundi and illegal poaching, including threats from illegal fishers. - Pollution effects from agriculture and other damaging environmental perturbations.
Health and Wellbeing Effects	- Distress about business and family finances, family relationships and physical and mental health problems including stress, depression, increasing alcohol abuse, marriage break-ups, and suicide.	- Health, well-being and quality of life impacts including disillusionment, depression and stress. - Concern over fishers' deaths at sea, rising ill health and suicide.	- Continuing financial and mental health concerns perceived to be linked to the RAP and SAP. - Physical health issues related to long-term involvement in commercial industry.
Opportunity for Recruitment	- Lack of opportunity for younger fishers to enter the industry.	- Lack of opportunity for younger fishers to enter the industry.	- Lack of opportunity for younger fishers to enter the industry.

5.4 Commercial Fishers and Social Impacts: Major Themes of the Study

This section of the report discusses the main issues raised by the interviewees in the three field sites. The discussion is based on the major themes and sub-themes that surfaced through the thematic or content analysis of the interviews and highlights the way fishers and their families are reacting and adapting to change. In each location, fishers express similar concerns about the ways in which the implementation of the MPAs, policy changes and fisheries' reviews have been, and are still being, conducted. They detail a range of economic, social and family impacts to provide an overview of the effects of perceived changes in the industry. The key themes that arose across the three regions are outlined in brief in Table 5.

As similar observations were made by many of the interviewees in each area, the specific instances and quotations cited in this report are typical of the views expressed. Location and fishing sector specific issues such as the GBR-RAP, the effects of rezoning in the MBMP, or differences between trawl, inshore and estuary fishers are also noted.

Throughout the discussion, we also cite relevant scholarly studies to show that fishers' experiences revealed through this study are comparable to the reactions and experiences of fishers in other areas in both Australia and overseas. Also interspersed in this section are three case studies profiling viable and successful fishers and those who have left the industry.

The following discussion is divided into two main parts:

> Part A: Industrial and Sectoral Issues - reviews the effects relating to structural, sectoral and industry concerns.
>
> Part B: Personal and Family Effects of Change - covers the personal health and well-being concerns affecting fishers and their families.

However, both parts are strongly interconnected, with industrial-related effects overlapping with health and well-being concerns, and vice-versa. In each part, particular themes and sub-themes are highlighted showing the perceived impacts of change as expressed by the interviewees.

5.5 Part A: Industrial and Sectoral Issues

Major themes identified through the content analysis of the interviews are:

> Theme 1 - Consultation and participation
> Theme 2 - Perceptions of the recreational and tourism sectors
> Theme 3 - Buyout and effort issues
> Theme 4 - Increased costs in doing business
> Theme 5 - Social relationships and perceptions

Within each themed section, there is a further discussion organised into a series of sub-themes which were raised as major issues of concern by the interviewees.

5.5.1 Theme 1 – Consultation and Participation

An important observation that emerged from the interviews relates to the level of scepticism, even cynicism, about the consultation and participation involved during the planning of the marine parks. This perspective is highlighted in the following discussion.

(i) Respect for Fishers' Knowledge and Experience

In each area, fishers were disillusioned about the lack of consideration given to their local ecological knowledge (LEK) and experience. They contend their knowledge was disregarded in consultations; they were not taken seriously, and felt denigrated by politicians. These perceptions were highlighted by Moreton Bay fishers involved in the Moreton Bay Access Alliance (MBAA) research study which was funded by the Fisheries Research and Development Corporation (McPhee et al. 2006). Titled, *A participatory and coordinated fishing industry solution to the rezoning of the Moreton Bay Marine Park*, the MBAA report proposed a range of alternative conservation zones and other measures, which it advised would safeguard commercial and recreational fishing as well as ecological parameters. However, that report and its findings were rejected by the EPA (later DERM).

Fishers mention the considerable amount of work they undertook on the report on top of their daily workload and the lack of recognition of their efforts. One fisher stated: 'We came up with other alternatives through the MBAA and they didn't listen to that. All they gave us was lip service.' Another commented:

> 'We all put so much effort into fighting the government but in the end we got burned. Going to all the meetings cost us too. We lost income for the day we were at the meetings and were never reimbursed for all the time we put in. They took no notice of us.'

Fishers challenged the government's scientific evidence, alleging that the no-take zones are of limited conservation value if effort is not also reduced. They maintain that the zones proposed in the MBAA report would have done a better job of protecting nursery areas for particular types of fish. Some stated that as their recommendations were ignored in the final rezoning plan, they are now forced to fish in these nursery areas. Most consider that the stakeholder meetings were 'just for show' and that the location and types of zones would have been made regardless of consultation as a way of catching the 'green' vote in, what was then, the upcoming State election held in March 2009.

Fishers from north Queensland agree with the assessment from Moreton Bay that rezoning in that area was a political decision that ignored their expertise and experience. Concerns over the RAP not only relate to the perceived lack of genuine consultation, but also to the way fishers' knowledge and working arrangements were believed to have been used against them. In particular, fishers emphasise that information derived from their logbooks was specifically used to target their fishing area: 'They said they won't use the log books against us…[but] wherever they said they won't put the green zones, that's where they put them.'

Attempts to overcome inter-sector miscommunication and build understanding between fishers, scientists and managers may be thwarted by such perceptions, as well as by the

differing knowledge systems held by each group. However, research comparing scientific studies' results and fishers' understandings has shown similar findings, in particular, across the effects of temporal, spatial and seasonal resource changes (Haggan et al. 2007; Rochet et al. 2008). Several fishers in this study work with scientists and collect data for scientific research, but when it came to the MPA policy decisions, they believe the significance of these collaborative working arrangements was discounted.

'What is at stake,' maintains van Ginkel (2009:220),

> is a feeling of self-esteem and an awareness of the value of the fishermen's own knowledge and expertise concerning fishing and the seascape…Fishermen are out to sea most of the week and work around the clock. They live and breathe fishing and consider themselves to be experts par excellence in fishing matters. It is precisely in the domain of knowledge and expertise that some of the occupation's core values are situated.

Over the past 15 to 20 years, local and traditional ecological knowledge has been prominent in scholarly research and management plans, especially for small-scale artisanal and customary fisheries (Christie and White 2007; Davis 2003). However, there has been less emphasis on commercial fishers' knowledge and expertise gained over years in the industry, which is often handed down from father to son (Delaney et al. 2007; Maurstad 2002). Fishers have a 'feel for the sea' and often 'know the catch will go well'. However, these intuitive 'knowings' may be unlikely to mesh with scientifically-structured processes, so perhaps for this reason, fishers may be more likely to question the science, and to judge scientists as having only a limited appreciation of conditions and places the fishers know intimately (Griffin 2009).

Such knowledge of which spots and species to target or which areas to leave fallow, plus the knack of how to harvest the best quality product, are essential for maintaining a successful and sustainable business as familiarity with fishing areas and species' movements will give some fishers a competitive advantage over others. But oral, anecdotal or 'folk' knowledge acquired through experience and longevity is not regarded as sufficient for making policy decisions, even though it can inform them. Another contributing factor noted by one of the net fishers interviewed is the difference in educational and literacy levels - between university-educated scientists and managers and relatively poorly educated but highly knowledgeable individuals in practical fishing matters (see also van Ginkel 2009).

(ii) Communications between Sectors

Research in Australia and overseas has pointed to a gap in communications between and among the different sectors (Baelde 2001; Harms and Sylvia 2001; Hartley and Robertson 2009; Van Densen and McCay 2007). Other studies have evidenced the benefits of incorporating both scientific and fisher knowledges into management plans and have documented a range of approaches designed to build understanding across the different knowledge systems. Benefits include: mitigating conflicts over changed regulatory conditions; engaging fishers more effectively in decision-making; enhancing communications and relationships across sectors through knowledge transfer; promoting the resilience of fishers affected by policy changes, in addition to sustaining ecological resilience (Griffin 2009; Johnson and van Densen 2007; Olsson and Folke 2001); and improving rule compliance (Maguire et al. 1995). Further studies advise that such

beneficial processes need to be integrated into management strategies (Dengbol et al 2003; Kearney et al. 2007; Wilson, 2002). Indeed, Johannes and Neis (2007) propose that including fishers' knowledge may be crucial over the long-term to ensure sustainable fisheries (see also Neis et al. 1999). Despite this awareness, some fishers in each of the three regions report feeling left out of the knowledge process.

However, as Maurstad (2002) advises, fisher knowledge about species' behaviour and their experience of currents, tides and weather patterns may be deemed 'secret' and sacrosanct, to be shielded not shared, not only among managers and scientists, but also amongst other fishers. For this reason, fishers may not wish to reveal closely-guarded information or may be sceptical about how their information will be used (Williams and Bax 2003). Thus, including fishers' local knowledge in scientific research and management plans may require a carefully designed and shared protocol covering issues such as transparency in communications, respect for differing viewpoints, and approaches to working collaboratively. In cases of MPA closures, care must also be taken to avoid rule violations related to perceptions about the legitimacy of fisheries science and management decisions (Gleason et al. 2010; Mathiesen 2004).

To avoid or reduce such problems arising, Ebbin (2009) recommends that researchers develop a system of triangulation when undertaking scientific research, in which fishers' expertise becomes one of the arms of the data triangle. Interdisciplinary and collaborative research would assist in reducing conflict across sectors, build cooperation, understanding and trust towards more effective management operations, and encourage greater compliance in the process (Glaser 2006; Rochet et al. 2008; Wendt and Starr 2009). These issues are summarised well by Crean (2001:255 in Wiber et al. 2004:461) who states:

> Progress…will depend to a great extent on unraveling the communication and collaborative processes that affect fisheries management. Deciding who participates, how information bases are used, how conflicts are resolved and how agreement is reached are the critical issues that must be taken forward to the next millennium.

Overseas studies on the benefits of collaborative research have shown that although it is not a panacea to solve all communication problems in a fishery, it goes some way towards bridging different discourses, integrating different knowledge systems, and building communication, trust, understanding, and capacity across sectors (Feeney et al. 2010; Goodwin et al. 2000; Hartley and Robertson 2006a, 2006b). In addition to the social impacts, Feeney et al. (2010:205) report clear economic benefits such as 'enhanced gear efficiency, new fishery opportunities, and help in sustaining fishing operations in times of more restrictive fisheries management'.

(iii) Fishers as Environmentally Aware Citizens

Fishers are proud of the sustainability of their industry and have directed significant efforts towards developing Environmental Management Systems (EMS) as 'a way of readily demonstrating commitment to sustainable fishing practices and stewardship of the marine environment' (Lewthwaite 2010:20). These issues are outlined in the following profile (Case Study 1) of a successful fisher. He discusses the work he is doing to promote environmental sustainability, outlines his view on the industry and his constructive attitude towards marine parks.

Case Study 1: *'Life does not stop if you have a passion for the industry.'*

Bob is a third generation fisher who is continuing the family tradition, passing down his skills to his son, who now works full-time in the business. Bob has been fishing for over 35 years and always had a dream to grow the business. He explains that to make a good living these days, a fisher must be prepared to innovate and change, to work in distinct sectors of the industry, managing the different seasons and the different species using different styles of fishing.

Over the years he has also diversified into wholesaling and distribution. This ensures the catch is less than 24 hours old when it reaches the markets down south. But it is not as easy as he first thought: 'It's pretty hard sometimes but we stay loyal to the local fishers and have a good reputation. We always aim to have good quality fish.'

He laughs when it was suggested that he was seen as a 'success story'. 'Success', for him, is 'bloody hard work and having a great son who works with you'. He also states that he is fortunate because MPA green zones, as yet, have not greatly impacted on his business. But the future does concern him, in the way that it does all commercial fishers: 'Our profession, our industry, and our future are under question.'

Bob states that 'fishers are fools if they are not supportive of marine parks. We need them so fish can rest but we also have to cop the yellow zones.' He views commercial fishers as a group have been persecuted and, at the same time, the government has not assisted them to adapt. He notes that some fishers want to leave the industry but they are blocked in, and their licences are worthless. Bob has great sympathy for them but has been able to meet challenges in his own life with an individualistic spirit. He stated that he asks himself, 'Where's the next hill? I can climb it. And the great part of human life is diversification.'

Bob does not see his success as causing divisions with other operators. While he attends all the meetings relevant to the industry, he does not reveal his level of success. When asked about his attitude compared with other fishers, he replies that a lot of them could do far better and earn more, but they also need to improve the marketing of their product. He takes the view that some fishers are not sufficiently self-motivated but also acknowledges that fishing can often be difficult and challenging. 'You've got to get up at 3 or 4 every morning and some days there's pouring rain and there's wind and it's cold, but the driven fisherman will go to work and will make money. But you've got to be driven. And I can tell you it takes some doing.'

Bob asserts that fishers have always been 'greenies in their own right'. He emphasises the industry is environmentally responsible, with fishers continually adapting to make their operations more sustainable. Like others in the industry, he has collaborated with scientists to reduce bycatch and protect turtles and dugong by redesigning gear. He has also installed the latest and most sustainable equipment on his boat including a low emission motor. 'We want to make sure there are fish there for the future, so we try to be responsible. We have already developed an EMS but we are not recognised for our effort.'

When asked about the role of MPAs and the future of the commercial industry, Bob maintains that marine parks are good when located in a sensible place. He believes it would be naive to say 'no' to marine parks as they are a vital part of fishing, but it is the way in which they are placed that is problematic, 'when they're placed so they don't take the effort out, [and] there are the same amount of licences there. It's just not good management practice.'

What keeps him going is his passion for the industry. Bob comments that he has worked in the fishing industry all his life and understands that fishers are 'the hardest guys to change'. He recognises they are adapting but points out that it is often under difficult conditions.

Despite this, Bob optimistic for the future, explaining: 'I just love to think that my son will have the perfect business. In two generations everything will be sustainable - our methods will be good, the public will respect us, and the industry will be easy to manage for the government. We don't have a choice, and I hope we're successful. That is the legacy I would like to leave.'

Fishers stress that they have consistently advocated for ecosystem health - by protecting seagrass beds and wetlands, undertaking research on bycatch reduction and invasive species like lyngbya blooms, initiating environmental cleanups, and working to halt impacts of land-based developments that damage fish stocks and habitats through involvement in local environmental campaigns (ABC 2008; Ahearn et al. 2009; Burnett Mary Regional Group 2010; Courtney and Campbell 2010). They are also assisting in research to mitigate the effects of climate change notably in the GBR (QSIA 2010b), and working with GBRMPA to assist in protecting the reef through developing 'best environmental practices' through the 'Reef Guardian Fisher program' (GBRMPA 2011). Such collaborations can help counter the oft-drawn conclusion about a lack of communication between fishers, scientists and managers (Ebbin 2009), and promote active participation and overall sustainability (Salas and Gaertner 2004).

To assist in overcoming the differences in perception between fisheries sectors, approaches such as 'bottom-up' co-management regimes are being proposed in some Queensland regions. This innovation has received strong support from fishers (McPhee 2009), with Burdekin operators seeing it as 'the way of the future', while a Moreton Bay crabber explains: 'We've never had true co-management here in Queensland. The idea is for fishermen to work much more closely with regulators in deciding when the best time to fish is.' For example, in the Burdekin, fishers have begun working cooperatively with GBRMPA and environmentalists in reviewing what commercial activities can take place inside the yellow marine park zones. There is a realisation among the fishers that change is not only possible, it will also be beneficial to the region.

> 'I certainly had a lot of reservations about how we would work together but I've been surprised at the way GBRMPA has valued what commercial fishers are doing. There's been a complete change in attitude. They've really come around. We've already taken their staff out on the water to show them how we work and take care of the environment. We showed them the dugong net we've developed to cut bycatch and GBRMPA's picked it up. It's been great.'

In March 2011, Fisheries Queensland held a public meeting in the Burdekin region to hear the concerns of the local community regarding possible changes to fisheries management in the area, especially regarding commercial netting closures. A result of the meeting was the establishment of the Burdekin Sustainable Fisheries Alliance (formerly the Burdekin Regional Fisheries Management Committee). The Alliance will work on developing 'solutions that ensure a fair and equitable outcome for recreational and commercial fishers and the environment' (Fisheries Queensland 2011). This project, as well as the work fishers are doing with various agencies and government departments, and their involvement in climate change and sustainability initiatives, represent a willingness to take on new challenges for the benefit of the industry, the community and the marine environment (cf. Hall-Arber 2005).

Key issues emerging from Theme 1:

> The need for more effective communication between scientists, managers and fishers.
> Greater opportunities for collaborative research, especially on decisions affecting the sustainability of the fishery and fishers' livelihoods.
> Support for initiatives in co-management and collaborative working arrangements as well as improvements in environmental sustainability.

5.5.2 Theme 2 – Perceptions of Inequity and Conflict

This theme reviews the attitude of fishers towards issues they consider contentious: a perceived conflict with the recreational sector, and a concern about political expediency.

(i) Recreational Fishers – A Conflict of Perception

In all three field sites, closely linked to the cynicism and disappointment surrounding the consultation and participation processes, was the perceived role of a hostile recreational fishing sector. This sector is regarded as the 'aggressor' in an increasingly tense and broad-ranging conflict over access to fish and fishing areas. In Hervey Bay, for example, amateur fishers were also involved in the MPA consultation process, but their input, the commercial fishers insist, was an opportunity to 'pressure out' the commercial sector. As fishers allege, much of the hostility was directed at them not by the everyday angler but by particular 'hardline' individuals and organisations within the recreational sector (cf. Cooke and Cowx 2006).

Hervey Bay fishers describe being criticised by the local media, while in Townsville, fishers report being regularly abused by amateurs who blame them for a lack of fish. A number of fishers in Moreton Bay share a similar feeling of persecution from both the recreational sector and the general public: 'The resource is there to be harvested in a sustainable way - to be shared by amateurs and professionals. But people have a go at you for being a professional fisher.' Correspondingly, Hervey Bay fishers stated that greater limitations should apply to the recreational sector. To support their view, they cite research conducted by McPhee et al. (2002) that explains the need for increased regulation of the recreational sector to ensure habitat and fisheries remain sustainable.

The upshot of these experiences is that commercial operators maintain that the creation of marine parks and the distribution of the green and yellow zones were strongly driven by the recreational sector. That the recreational sector was perceived to have 'won' the issue reflects the inshore fishers' view that the amateurs have greater access to resources. This 'conflict of perception', however, is not supported by scientific evidence, which suggests that details of impacts need to be more widely publicised and that better education and communication be undertaken to improve cross-sector relations (Tobin 2005).

In contrast, trawler operators take a more pragmatic view of the recreational sector due to their vessel size. They acknowledge that conflict with recreational fishers is an issue for inshore, river and estuary fishers, but say 'in trawling you don't get too much of it. You're in a bigger boat than they are and they'd have to be pretty brave to come alongside and try and get on board.'

(ii) Perceived Political Expediency

In Moreton Bay, due to the MBMP rezoning and buyback, fishers argue that their livelihoods were auctioned for political expediency. Some suggest that it was the political influence of the recreational lobby that helped garner government support for the rezoning outcome, especially in relation to the establishment of the yellow 'recreational' zones. Most agree that the green zones were introduced to secure the Greens vote at the 2009 state government election, with one fisher commenting: 'Green zones I can live with, if it's a no-take for everybody I'd accept it. But when they take from one and give to the other I just don't get it.'

The perception that political expediency takes precedence over ecological relevancy and social impacts is included in a number of protected area studies on land and sea environments (e.g. Game et al. 2008). In Moreton Bay, fishers initially feared that the rezoning decision would have a negative effect on the marine environment: 'Now the green zones are locked in and the rest of the Bay has been kicked in the teeth. Turtles, dugong and dolphins have been consigned the death penalty.' In contrast, follow up interviews undertaken in 2010 and 2011 showed that much of the fishers' initial anger and anguish had subsided although they still maintained that the Queensland government was not targeting the real problem – the water quality in the Bay, especially related to upstream perturbations.

Politics also frame fishers' perceptions about the future of the fishery. They claim the government is intent on closing commercial fishing operations along Queensland's coast to make way for recreational fishing and tourism. Around the GBRMP, commercial operators are conscious that their livelihoods have been under threat, while amateur anglers seem 'protected'. At the time of the GBR-RAP, however, the commercial industry also feared that the tourism sector would be a major competitor for resource allocation. This led the QSIA to term the rezoning 'an unwarranted piece of 'social engineering'' (QSIA 2005, cited in Dinesen 2006:6).

This understanding has led to the assumption that, over time, the government and the regulations have favoured the recreational and tourism sectors. Fishers particularly emphasise that the conflict between the recreational and commercial sectors could 'squeeze out' the commercials from the industry altogether. Some are pessimistic about the future saying: 'People won't be fishing in ten years time. It will only be the recreational fishers. They [GBRMPA] only want the tourist dollars and the dive boats. It's so hard for us now.' This fisher's viewpoint is also reflected in the study from McCook et al. (2010) on the effect of the RAP and the SAP in the GBR region which drew attention to the value of tourism and recreational fishing when compared with commercial sector operations.

Key issues emerging from Theme 2:

> Greater understanding and mediation among different sectors to mitigate potential conflict arising from perceptions of inequity within and between fisheries and other competing sectors.
> Concerns for the future of the industry where inter-sectoral misunderstandings might occur.
> Support for marine parks, but concern that water quality issues from upstream runoff is not being adequately dealt with.

5.5.3 Theme 3 – Buyout and Effort Issues

The issues raised in this section cover the implementation and following impact of structural adjustment schemes and other regulatory changes in the industry.

(i) The Impact of the Structural Adjustment Packages

As a consequence of the marine park rezoning in Moreton Bay, several fishers lost their fishing grounds and were forced to move elsewhere in the Bay for their daily catch. Some shifted out of the Bay when the competition for space and resource became too great. Others found alternative work. At the end of 2008, a licence buyback scheme was

proposed to remove fishing effort from the fishery and 'minimise environmental, social and economic impacts associated with displaced commercial fishing effort' (DERM, 2010). Fishers were asked to submit tenders for the buyback but were given only a few short weeks to assess the value of their fishing business, licences and endorsements, and decide whether they could relinquish their lifelong commitment to the profession.

Concerns were expressed about the perceived inadequacy of the scheme, especially that the $15.1 million allocated could not deliver value for money. In particular, fishers criticised the scheme for failing to cover onshore businesses, remove fishing effort, or acknowledge the need for job and skill retraining, particularly among middle-aged men. To help fishers submit a well-developed tender, the EPA recommended fishers should seek independent financial advice. Financial counsellors were engaged by the fishers' associations to assist fishers in preparing applications for the buyout. When we contacted the counsellors involved, they said they were not given sufficient time or enough information to adequately help fishers during this period. 'It was stressful for everyone involved,' they disclosed.[19]

The effect of this process, and the limited time for submitting tenders, caused stress and anger amongst those seeking compensation or trying to make an effective decision about their futures. They were disappointed not only by what they viewed was an inequitable buyback scheme but also because the rezoning consultation process, and the subsequent restructuring information meetings, did not take their needs and their livelihoods, and that of their families, into consideration. 'It's a lottery not a buyout,' said one fisher confused about the process. 'I've got a young family and no idea what to do. That's why we're panicking... If I lose my work I'm stuffed. It's all there is.' Another stated: 'No one has given enough time to assess the future, our fishery or our families, and everything else.'

Similar statements were made by gillnetters in Oregon and Washington following the decline in salmon populations and the provision of 'disaster relief' (Gilden and Smith 1996). The study documented the fishers' adaptation to change, finding high levels of stress, confusion and frustration. One respondent lamented: 'It's like having a death in the family.' (Gilden and Smith 1996:5). Most thought they were being unfairly treated; they worried about the future of the fishery and their own financial futures, were critical of the buyout and corresponding inequities, and needed advice on what to do and how to cope.

In Moreton Bay, at one of the structural adjustment information meetings held by the EPA in December 2008, fishers expressed strong opposition to the proposed scheme, fearing it would force them out of the industry. Many fishers have been working the Bay since they were teenagers and could not imagine working in any other profession or place (cf. Momtaz and Gladstone 2008; Smith et al. 2003). At the meeting, fishers questioned officials about how the industry was going to be protected. They called on the EPA to ensure that once a buyout had been accepted, that a moratorium would be declared on fishers returning to the industry for at least three to five years: 'We told the EPA to have the no re-entry clause watertight.' Fishers wanted a guarantee that their jobs and the industry's future would be secure. Anger tinged with the anxiety over an uncertain outcome was a familiar response.

[19] A study on financial counsellors working in rural and remote areas, and dealing with farming and fisheries concerns, confirmed the issues found in this study which act to prevent fishers from seeking adequate and timely advice and information (Fuller and Broadbent 2006).

> ‘We’ll just go broke. I’m a third generation fisher and fishing’s all we’ve ever done, you don’t know anything else. If you’re leasing a licence and in your thirties like I am, then we won’t get anything. It’s like the government doesn’t want to support any younger generation fishers.’

Many worried about their future, saying: ‘We want to be able to leave with dignity.’ They were critical of the tender process saying it was unjust and the amount of compensation offered too little. A common perception was that: ‘The buyback is a complete failure. It won’t take out any effort from the fishery. The DPI has let it get out rezoning. ‘The actual nuts and bolts of it were quite good. They spent the right amount of money and bought out some of the bigger licences.’

In contrast, in Hervey Bay, although there was no adjustment assistance related to the Great Sandy Marine Park, the impact of displaced effort has affected local fishers due to the influx of New South Wales fishers displaced from Lake Macquarie moving north and increasing effort in their patch.

Displaced effort also became a controversial issue during the GBR-RAP, with FERM (2004:52) reporting that the success of the buyout was marred by the ‘potential return of ‘removed’ effort using underutilised net and/or crab licences.’ In an attempt to remove or reduce displaced effort further, and to counter displaced fishers from interstate or intra-state moving into other areas, fishers from the Burdekin are supporting the adoption of ‘regionalisation’. This is intended to specifically link licences to particular regions and species. At present, fishing licences can be used along the whole Queensland coast, which means that a displaced fisher from one area can re-locate to a new area without changing licences. The outcome being experienced is an increase in fisher numbers and intensified competition.

(ii) The Vexed Question of Veracity and Logbooks

In Moreton Bay, when the licence buyback was announced, all the fishers wanted to know was how the buyout was going to be assessed. The EPA explained that it would be calculated on the tender submitted and on catch data contained in fishers’ logbooks. However, not all logbook information reflects a true record of the catch. This allows some operators to exaggerate the value of their business by falsifying logbooks and thus receive more in compensation (cf. FERM 2004). In comparison, those noting the correct information in their logbooks perceive they have been disadvantaged.

Distorting logbook data may give fishers a financial edge when tendering for compensation as higher figures may lead to higher payouts. However, this study has observed that misrepresenting logbook figures, or not complying with the marine park closures or the go slow zones (e.g. in Hervey Bay), may be enacted as a way fishers can retain or reclaim control over their working lives. Nonetheless, wrongly entered information, whether intentional or not, can lead to additional environmental pressures. Management uses fishers’ records to set quotas and determine marine park boundaries, thus overestimating or underestimating the catch may have potentially harmful longer-term effects on the resource and access to fishing areas (Gezelius 2006; Pollnac and Littlefield 1983).

The problem with the logbooks, fishers say, is that they are often unreliable. Several have told us that they, and others, have sometimes misrepresented their catch figures. At

one meeting with the then DPI&F (Department of Primary Industries and Fisheries, now Fisheries Queensland), fishers reported that they were asked to raise their hands if they had lied on their logbooks. Every fisher in the room raised his hand. As a consequence, there were concerns that compensation was being assessed based on falsified information, and especially that this would benefit some operators over others. One fisher was forthright:

> 'They lied on their logbooks to generate the value of their license. They then sold their license and went out and bought another to keep fishing. The government doesn't want to know about it, in fact the government says they planned it that way...Talking to these guys, these nameless bureaucrats, it's infuriating, it's impotent rage. And it has completely eroded any faith I had in the government.'

Fishers' lack of faith in the authorities, coupled with the view that logbooks are another management imposition on their working day, are possible reasons for the fabrication of logbook data. The underlying issue, as Dwyer and Minnegal (2009) argue, is the question of whose concept of veracity is paramount. Managers and scientists may be seen by fishers to fabricate information in order to impose their worldview on fishers. Fishers may be seen by managers and scientists to falsify information in order to be paid greater compensation. In light of these different perceptions, any analysis of the social effects of policy decisions needs to recognise that humans 'have multiple motives for any action, and that the social outcomes of two seemingly similar actions may differ', depending on a person's underlying motives (Lehtonen 2004:11).

Fishers are aggrieved that others may have 'doctored' logbooks for financial gain and stipulate that they are honest when recording their own logbook data: 'I used to write down to the kilo on my logbooks, now I estimate a bit more, but I was shocked how badly some blokes doctored their log books. I think I was the only one that I know of whose logbooks were right'. Those who missed out on compensation in Moreton Bay suggest that perhaps their scrupulous approach to filling out logbooks was a reason they were overlooked during the buyout: 'We weren't a threat so they didn't buy us out.'

(iii) Perceptions of Equity

In Moreton Bay and the Burdekin, not all fishers who received compensation or had license(s) bought out, were from the areas affected by the rezoning, while others may not have been actively fishing for some time. Through the rezoning and adjustment assistance process, individual fishers lost area, became disillusioned, and grieved for the loss of work and the commitment they had made to the local industry, while others benefitted from the process. How the process was managed rankled many in the local fishing communities – at least at the outset.

In contrast, fishers affected by the Great Sandy Marine Park and the Great Barrier Reef Coast Marine Park changes in 2006, especially net and line fishers, received no adjustment assistance due to the particular quirks of Queensland legislation which applies compensation on a case-by-case basis. One of the fishers spoke about this time as a 'real learning experience' as he started out in a new fishery and had to 'learn the ropes'. But what upset him is the time and money it took to discover the location of 'the good shots' and what techniques to use in the new area. Some level of compensation would have helped during this period of lost income.

Those in Moreton Bay initially asserted that the buyback was 'unfair' and 'a complete failure'. They had warned the EPA that if the process was not equitable, there would be no real reduction in fishing effort - the stated aim of the buyout. They were well aware, following the experience of the GBR-RAP, that when multi-licence holders relinquish one or more licences, some may then use any remaining licences to re-enter the fishery and continue to fish (FERM 2004). Common sentiments were: 'They gave them money to leave. But to maintain fish stocks you have to cut effort. All they've done is maintained the effort…The whole thing was laughable. The money they spent would have made the Bay sustainable'. Despite those views, not all fishers have such a critical attitude of the process. Some of the fishers who received compensation in Moreton Bay and the GBR have used the funds to expand their businesses by value adding in various ways, e.g. by purchasing new equipment, establishing related wholesaling and distribution operations, and putting the money back into the fishery.

(iv) Lack of Consistency in the Buyback

A major concern was the lack of consistency in the buyout due to unverified logbook information and because some of the compensated fishers returned to work, claiming they needed a continuous income and 'nest egg' for their future, rather than leaving the industry for good. 'A lot of fishers have no super. Their super is in the licence.'

Similar issues were raised in a 2007 Senate committee of inquiry into Australia's land and marine-based national parks (Commonwealth of Australia 2007). The resulting report highlighted the problem of displaced effort related to marine parks, particularly the need to minimise the impact on fisheries. Submissions to the inquiry noted in the report, proposed the development of 'adequate exit strategies…not strategies where you to go out of one piece of the industry and then come back in again' (Kenchington, in Commonwealth of Australia 2007:61).

Additionally, further research studies question the benefits of buyback assistance noting, much like the interviewees in this study have, that the buyback did not reduce sufficient effort, partly because the 'additional capacity may gradually seep back into the fishery' (Clark et al. 2005:48).

In contrast to concerns about increasing competition at sea, a noteworthy outcome of the buyback has been a change in working arrangements towards more 'entrepreneurial' business approaches. Some fishers who received compensation have established new business concerns and at least two operators have formed or joined teams of fishers who share the catch and distribution, and operate like a cooperative, 'cartel' or 'cluster'. For example, fishers participating in these new arrangements report financial benefits and a sense of egalitarianism (Pollnac 1988), as one Moreton Bay fisher explains:

> 'I had no choice, I had nothing to fall back on. I needed to pay bills and pay the house off and get ahead. If we weren't working together, we'd still be competing and putting more pressure on the ground. Now we can spell bits of ground… I love working in Moreton Bay. It's a beautiful place.'

A cartel might comprise a group of fishers who all own licences or who lease licences from one of their colleagues. For example, the cartel structure may have its own wholesale and processing facility or control its own marketing and distribution operations. A cluster is more of a collaborative arrangement between licence holders in a particular area, who work together and sell their product through a local wholesaler.

However, single owner operators warn that these working arrangements may lead to increases in catch size and fishing effort, and more pressure on the environment. They also fear it will place them at a disadvantage as they may be unable to compete with the larger operation for space and resource.

Fishing-related businesses have also been affected by the different restructuring schemes. One of the brokers, a fourth generation fisher whose grandfather was one of the early trawlermen in the south-east in the 1950s, said he has experienced a downturn in his business with too few boat and licence buyers, and limited opportunities for sellers in the restricted market. His view was that 'confidence in the industry is the lowest it has ever been.' He had entered the business after the previous owner had been successful in the GBR-SAP, but was finding conditions difficult. Another broker, by contrast, was doing well. He had joined the industry over a decade ago and had benefitted initially from the GBR-SAP and later, with the licence buyback in Moreton Bay.

(v) Controls in the Industry

Importantly for our study, there was widespread support for controls in the industry around ESD and effort reduction. A common view was that: 'If we don't bring in good management, and don't have good regulations, and we don't have MPAs and closed areas, how do we protect our future?' However, it was often not the management changes themselves but the approach taken by management that was challenging.

In studies of job satisfaction among fishers, researchers found that dealing with officials was considered one of the worst aspects of the job (e.g. Gatewood and McKay 1988; Pollnac and Poggie 2008). With this in mind, fishers in the three regions have found themselves now dealing with three agencies controlling their working lives and the marine environment - DERM, GBRMPA and Fisheries Queensland.[20] In conversation with fishers, there was apparent confusion over the roles and responsibilities of the three agencies. This was noticeable in the way they would interchange agency names and acronyms, often using the generic 'DPI' (Department of Primary Industries) or 'the government' when discussing officialdom. Fishers are familiar with the way Fisheries Queensland operates but are less familiar with EPA/DERM and, as a result, may be more sceptical of the science used to define marine park boundaries and no-take areas. The confusion may also be a result of the differing motives for MPAs - to manage fisheries and reduce capacity, or to protect biodiversity (Baelde 2005). Fishers report being caught between these two perspectives.

Some also remark on the way the sea and fishing zones are being over-regulated and over-controlled. In studies on what fishers value about their work, these aspects are generally reported as being in the outdoors, being challenged by the conditions, the adventure and the catch process, and importantly, being autonomous and independent (Bavnick and Monnereau 2007; Pollnac and Poggie 2006). Thus the involvement of different agencies may lead some fishers to flaunt regulations (Lord 2011), such as those involving, for example, MPA closures and go slow zone compliance; the need to carry a

[20] Notably these are not the only government departments involved in regulating fishers' working lives but the example of the three agencies is used to exemplify the difficulties that arise from multiple management agencies operating in the same areas. This often produces a sense of confusion among fishers, perhaps because the government agencies may not take the time to explain the differences between them or might have what seems to the fishers to be conflicting aims and different policy strategies. All of these issues can be seen to heighten both fishers' discomfort when dealing with officials and the potential suspicion about the government motivations for increasing controls over the industry.

vessel monitoring system (VMS) in certain trawl fisheries; and the requirement to fill in logbooks. Regulations are also seen to limit fishers' freedom to fish, their ability to make their own decisions, to effectively manage their own affairs, and to retain control over their working lives (Johnson et al. 1998).

Processors in Hervey Bay and the Burdekin also report being over-governed. They comment on the extent of legislation controlling their operations and the amounts they have to pay for fees, courses and licensing. Another concern, in Hervey Bay particularly, relates to the seasonal closures for prawns and scallops. Processors suggest that scientists should work with fishers to develop a more flexible approach to determining closure dates and to do this on an annual basis.

However, despite a comprehensive consultation process, they say that no changes, especially to improve the sustainability of the scallop catch, have been implemented. They worry too about the quality of seafood and cite upstream pollution and poor land practices as increasing pollution in estuaries and downstream, and they call for better land management. Overall, most are optimistic about the future of the industry, and to ensure it remains so, they recommend stronger government support to act on the environmental sustainability of imported prawns and the growth of aquaculture.

Although many interviewees object to being over-controlled, at the same time, they agree that controls are essential for maintaining the industry's future. With sustainability in mind, they call for greater controls on recreational fishers, while a group of barramundi fishers in the Burdekin, already competing with the farmed variety, has recommended increased enforcement to curb the numbers of illegal fishers in the estuaries and the growing black market for high priced 'barra'. This is a particular concern for those barramundi fishers who have been accosted by illegal operators. They are aware of the lack of resources and the number of personnel needed to patrol such a large area, and recommend increased funding to help eliminate the illegal practices.

Key issues emerging from Theme 3:

Critical need for social impact assessments to be operationalised for major projects affecting the fisheries and fishers' working lives.
Concerns about the verification of logbook information, equity and fairness.
The need for greater communication and consultation on contentious issues regarding perceptions of equity during and following policy change.
Additional controls on the recreational fishing sector.
Improved enforcement to curb illegal fishing.

5.5.4 Theme 4 – Increased Costs In Doing Business

In this section, fishers speak about the various factors affecting their business operations.

(i) Changed Conditions

In reflecting on the changed conditions, one of the Moreton Bay inshore fishers affected by the MBMP spoke about the increased fuel costs since the rezoning. Previously he used 100 litres of fuel per week but since the rezoning, and with further to travel each day, he now uses 1000 litres per week. Others recounted similar circumstances and cost increases, including the need to retool, upgrade engines or use bigger boats. For those without compensation, it has meant taking out loans, which has added to their financial pressures.

> ‘It all sounded so good and it all looked so good. I went and spent a lot of money on a bigger boat to get myself to where I need to go. So not only have I missed out on any kind of compensation, now I owe the bank money.’

With a family to support, this fisher now needs to ‘catch more product to cover the costs’, but this goal is thwarted to some extent by increased competition on the water. He is also worried, as many fishers are, about planning for retirement. Several fishers we interviewed are 50 or 60 years of age, and many do not have superannuation as they have invested everything in the business. They had hoped to sell their boat and any licences before retirement, but are now uncertain of that happening. To boost income, some have diversified, shifted target species, modified gear, or added a new business to their fishing repertoire (Hall-Arber 2005), for example, by setting up a home delivery service like this trawl fisher from Moreton Bay:

> ‘I’m trying to add to the business and diversify. I’ve set up a home delivery operation and try to sell my own product but that’s difficult too. With the mortgage to pay, even trying to value-add means you have to borrow money. Marketing the product is hard. Wholesalers want to pay the lowest price…The problem is there’s not enough money to promote your produce. We need a patron as a figurehead to help promote the industry.’

Other trawler operators have devised a range of alternative strategies to improve quality, efficiency, and profitability. As one family-heritage skipper remarked: ‘You’ve got to be committed to growing or trying something different, otherwise you’ll go backwards.’ Innovations from the state sector, and the federally-administered South East Trawl Fishery, include targeting high-value species, upgrading onboard handling and processing to maintain quality, selling the catch directly to retailers and fish markets, and establishing marketing and distribution outlets (FERM 2004). Not all fishers, however, have been able to take such a proactive direction or financial risk. Economic uncertainties, physical and mental health issues, and a fisher’s personal and family situation, may have hindered this development for some. Competition from farmed prawns and cheaper overseas imports are also a concern.

For trawler operators, whether working to AFMA or Fisheries Queensland regulations, rising fuel prices and a fluctuating Australian dollar are their two biggest challenges, although over the last few years, and despite these challenges, fishing has become highly productive. The recent years of good harvest, however, have been offset by continually-rising fuel costs. For example, one trawl business owner explained he uses 900 litres of fuel each night. With five boats and seven sets of crew who work five weeks on and two weeks off, and with boats working all-year round, each boat uses over 30,000 litres of fuel per week. To expand the business and cover the upkeep and fuel costs, he ‘took out a big loan and a big risk’.

The price of fuel is an issue for every fisher. Most now use more fuel than prior to the zoning changes due to the extended travel distances. Whereas in the past, operators would pay for fuel at a discounted rate, now they must pay the bowser price and apply to the Australian Taxation Office for their fuel rebate. This means a greater outlay initially and a waiting period before the fuel rebates arrive. It can lead to potential cash flow problems and other business-associated difficulties.

(ii) Promoting the Industry

Across all regions, fishers struggle to promote the industry in light of a community perception that Queensland fisheries are unsustainable and that fishing practices are 'rapacious'. Most recommend the need for government assistance to help market the local wild-caught product and provide community education and school-based programs to help shift the community's perception from scepticism to support (Murphy 2009). A number of Hervey Bay and Moreton Bay fishers recount instances of abuse from the public. In the Burdekin, one fisher said his children are criticised at school for being from a fishing family; another described the same thing happening at church. As a consequence of these criticisms from the general public, rather than speaking of pride in their industry, some talk of shame.

> 'I can't understand why people hate us so much. Sometimes I feel like a fringe dweller and I get a sense from the community that we are second class citizens. It hurts. It's degrading.'

The lack of community support for the Australian fishing industry was documented in the 2003 report, *Community perceptions of fishing: implications for industry image, marketing and sustainability* (Aslin and Byron 2003). The report noted that many in the community hold a negative attitude about the industry, particularly regarding the issue of overfishing and a perceived lack of care for the marine environment. The majority of the study's survey participants thought there should be more controls on fishing and greater areas of marine protection should be set aside to enhance sustainability and reduce incidences of marine mammal bycatch. As over 40 percent of respondents said they knew little about the industry, the report recommended the industry take 'a more proactive media stance…to achieve better coverage of 'good news' stories' (Aslin and Byron 2003:67).

For example, to help promote the industry in NSW, the Sydney Fish Market has mounted a campaign *Aussie Seafood: Brought to You by Our Fishermen*, which was spearheaded by the commercial fishers themselves. Advertising posters and brochures depicting images of fishers talking about their work highlighted the health of the catch and the healthy lifestyle of the fisher, while advancing the idea that commercial fishing is responsible and sustainable (Sydney Fish Market 2008). The Sydney Fish Market website includes profiles of fishing families and video interviews with fishers featuring profiles of their working lives, their experiences at sea and their philosophy and practice of sustainability. As one of the fishers states: 'We're all 110% committed to making sure people keep getting fresh, top quality local seafood on their plates today, tomorrow and in the future,'; while other stresses: We've got the best seafood in the world right here in Australia and we're making sure it stays that way.' (Sydney Fish Market 2010).

A Burdekin fisher tells another 'good news' story of how he learnt sustainable practices from his father. In seeking a rotation of closed areas to account for migrating species, he spoke about the philosophy handed down from his father. 'It was a cycle of fish, rest and rotation. I've been fishing that way for over 20 years. If you don't rotate the fishing area you can end up with overfishing…Without sustainability we don't have a future.' Other pro-environmental stories about the marine environment are related by fishers who have left the industry to work in marine protection. But even though they have left fishing, some still hold a high level of concern about their earlier profession as Case Study 2 shows.

Case Study 2: *'Being at sea is something quite special.'*

Gary gave up fishing when the amalgam of costs became too high and the pressures too great. He began fishing in his late teens partly because he loved the sea, and pragmatically because he wanted to travel and needed a profession that provided seasonal work. He was not from a fishing family and apart from childhood holidays at the seaside, he had no other fishing experience. But from the moment he started working as a deckhand, he was 'hooked on it'.

> 'There's something about the sea that's quite special. Being at sea for six weeks at a time, and being totally isolated on the ocean, watching beautiful sunrises and sunsets and having access to the most incredible coastlines and rivers, and having the opportunity to get to out of the way places – I loved being out at sea.'

In those days, Gary recalls, 'you could do whatever you liked. There were no restrictions.' He worked in the inshore industry for a while, then decided to join the offshore sector. But he soon realised he had to make a choice – to give up fishing altogether or buy his own boat. He eventually bought the boat and became an owner operator.

But later, as the price of fuel rose, the price of seafood plummeted, and crew became harder to attract due to the greater financial incentives being offered by the oil and gas industry, Gary could no longer maintain a steady income. He decided to sell the boat and leave the industry. 'It was hard. Very sad. I loved that boat. Someone told me that the two happiest days fishing are the day you buy the boat and the day you sell it, and I agree. But it was hard to give it up.'

He has great empathy for fishers who are still working. He mentioned particularly the role of fisheries managers who he regards 'do not have a stake in the industry.' He sees a substantial gap in understanding between fishers and managers, specifically because 'managers work to protect the fish and not the fishers or the industry'.

What also rankles is the division between fisheries management, fishers and environmentalists who, he suggests, should all be working together to ensure a sustainable future for fisheries and the fishers. The possibility for such collaboration is hampered to some extent by an observed lack of communication between fisheries management and environmental management at both state and federal levels. He contends that although both government departments are working in the same areas, they often seem poles apart.

He sees uncertainty as a major problem. It leads to a lack of investment and a reduction in the numbers of young people attracted to the industry. He is also concerned about competition from 'fly-by-night' fishers who work in lucrative seasonal jobs, as well as the gap between licences used and those held in any one year. On one hand, he says, there are licences with no effort on them and thus no fish being caught – 'latent effort is a real problem' - while on the other, there are young fishers wanting a start in the industry and not being able to afford a licence. Given these concerns, when asked if he would return to the industry, he replied he would go back tomorrow but thinks he would never survive and would lose the house. 'There's too much uncertainty. In my opinion there's not a problem with the fish stocks, but the problem is the industry and the way it's managed.'

Despite leaving the industry, Gary is still passionate about preserving it. He is gratified by the changes fishers are making to protect the environment but would like to see the government supporting these initiatives. 'We need a government that stands behind the industry.' Although he regards MPAs as an important preservation measure, he sees the effect on local fisheries will continue to be a problem. With fishers being concentrated into smaller and smaller areas, he envisages there will be more conflict and more competition between fishers, which in his view, will only add to the pressure on the marine environment and onto the individual fisher. '

His passion for the sea and the industry are still the focus of his working life. He works in a marine-related career where he is able to talk to the general public and school children about the ocean environment, marine parks and the fishing industry, and share his skills, knowledge and experience. 'People are hungry for that information.'

(iii) Intergenerational Heritage and Gentrification

Not everyone wants to see their children enter the industry. When we asked a fisher if he had encouraged his children to become fishers his reply was: 'You've gotta be joking.' The lack of young people entering the industry is seen as a disadvantage (cf. Menzies 2003). Another despaired that fishers attending industry meetings these days have an average age of around 50 years, with little representation of fishers under 30. He was one of the youngest at 39. On the other hand, some younger fishers have found resistance from a few of the older fishers, perhaps fearing effort repercussions.

Others are keen for their sons and daughters to work in the industry but first they ensure their children get an apprenticeship or degree to shore up a profession other than fishing as an 'insurance policy'. Younger fishers interviewed were trained in teaching, science and engineering and trade skills, but in various ways they have managed to work in the industry, some with their fathers, a number with the cartel or cluster arrangements. A third group is working independently, although this group of new entrants has found the cost of the licence a hurdle.

For example, a Moreton Bay fisher with strong family links to the industry and who missed out on the buyback has since joined a working crew with other fishers. Another fisher, also from a multi-generational fishing family, works outside the industry and fishes part-time. He says all he wants to do is 'write Fisherman on his CV' and fish for his living. The difficulty for younger fishers starting out, especially those with young families and mortgages, are the high costs involved in both running the business and the home (see also Pickworth et al. 2006).

However, the lack of new entrants led one of the business owners to comment:

> 'There are not enough fishers in the fishing fleet. There is no one coming through to buy the boats, buy the licences or any of the equipment. The fleet is aging…Fuel was 30 cents and now is $1.30. All the costs are outweighing what the product is worth.'

(iv) The Price of Fish

Not all fishers agree with this statement but many continue to suffer substantial financial stresses and difficulties due to the different circumstances of individual operators. For example, prawn trawl operators in the Burdekin are affected by what they perceive as the poor price of product coupled with the high costs of fuel, wages and machinery costs. They say they are receiving less in 2010 for prawns and bugs than at the same time in 2009, and are getting around the same price as they were paid 20 years ago. They have observed that price fluctuations are related to the impact of the farmed and imported product, the recent financial crisis limiting the spending power of the general public, and in certain areas, the lack of competition between buyers.

In contrast, one of the buyers finds it difficult to maintain a steady flow of product and loyal suppliers. He stated that fishers are willing to supply good product when market conditions are tight, but in better times, he recognised that the fishers would rather sell it themselves. The buyer maintains that this seasonal variation is one of the main reasons for the drop in the price of seafood over recent years. However, fishers disagree. They contend that buyers are not concerned about fishers' livelihoods as they are interested in obtaining the cheapest price possible. Some are envious of larger operators who have the facilities to be able to store and market their own product. Yet, for more than one trawl

operator, and across the different regions, it may be cheaper to leave the boat tied up and not fish.

Key issues arising from Theme 4:

> Support and information to assist fishers in value-adding and expanding business opportunities.
> Information on retraining opportunities to support fisher initiatives.
> Encouragement and information directed at new recruits entering the industry.
> Promotion of Queensland's healthy and sustainable wild-caught product and the sustainability and stewardship practices of the fishers.

5.5.5 Theme 5 – Social Relationships and Perceptions

This section discusses the effect of change on social relationships in the industry.

(i) Fractured Communities

The result of the GBR-RAP restructure as well as the MBMP licence buyback has caused divisions in the fishery over what are regarded as unethical actions of 'double dipping' fishers, i.e. those who re-entered the industry after receiving compensation. 'If you take the money, then the onus is on you to remove yourself from the industry'. However, a number of others in Moreton Bay regret not submitting a tender, saying if they had known they could gain financial assistance then return to work, they too would have opted to apply. Initial research on the effect of the rezoning has shown a limited reduction in effort (Garcin 2009), but increased competition. A number of fishers were resentful of those who returned. 'If they had stayed out,' one said, 'the rest of us would have made a good living.' Those who were successful take a different tack. They took a risk in submitting a tender, have returned legitimately, and are turning their good fortune into expanding their business.

Some hold a grudge that their friends were bought out and then returned; they no longer want to see or talk to them socially. Trust and loyalty, important attributes of a fisher's identity and character, and the 'unwritten code of conduct', are now being questioned within the fishing community. Resentment also arises due to practice of 'blowflying', that is, waiting until another boat finds a good catch and then buzzing in like a blowfly and taking a shot near them. Increased competition also means 'fighting' for the best shot or place to fish. A net fisher's wife puts it plainly: 'This is an industry where you've got to really stick up for yourself...You'll be sitting on a shot and they'll just come and moor beside you and say, 'We're doing this shot.' What are you going to do then?'

This concern is reflected in the following comment from a net fisher who was successful in receiving compensation due to the restructuring: 'There's a lot of ego and competition among fishermen.' He stresses the need for greater understanding across different fisheries, and between fishers and management, as all are working for a sustainable future, but he points out a difficulty that (he sees) needs to be considered when change is likely.

> 'Most fishermen by nature are solitary individuals. This is a problem because rather than confronting reality and try and understand what is going to happen, or talk to managers, they try to run away from the problem and pretend it doesn't happen.'

(ii) Lifestyle and Entrepreneurial Fishing

Lifestyle fishers are content with their working lives and incomes and see no need or lack the funds to invest their income in risky ventures or expand their businesses as 'entrepreneur fishers' are doing. These two groups are sometimes referred to as 'small wheels' and 'big wheels'. This distinction is apparent between the trawl and smaller-scale inshore sectors, but on a sectoral scale, the difference lies, in part, between those who 'fish to catch fish, not to earn money' (van Ginkel 2009:221), compared to those holding multiple licences and endorsements, and/or who seek to build business acumen, for example, such as fishers setting up their own distribution operations to ensure that the targeted high quality catch receives the highest prices at the markets in Sydney and Melbourne.

Changes in the trawl sector, which has seen a vast reduction in the number of vessels since the 1980s, have sharpened the distinction between lifestyle and entrepreneurial fishers. As one trawler operator put it: 'It's probably gone from being a bit of a lifestyle thing where a bloke might go around selling to the community to being a business you know, upscale or pretty well go under…There's definitely a push towards the bigger boats and economy of scale.' This shift to a more capital intensive business orientation is seen to override the interests of the smaller operators. It has also led to increased resentment among those who consider management has unfairly favoured the larger operators. Those feeling disadvantaged hold the view that: 'Smaller operators shouldn't be judged for their small-scale, family lifestyle'. The wife of one of the disaffected operators blames management changes for making it harder for her husband to continue to fish, pointing out that 'bigger boats can work deeper water, work year-round and have greater crew stability'.

This view contrasts with the attitude from one of the more successful operators who regards the change as 'the cream rising to the surface', and 'the survival of the fittest'. Those still in the industry are seen as efficient operators, while those who were squeezed out are referred to as 'cowboys', or as inept and unprofessional. Additionally, some younger fishers are critical about the older fishers still in the game, describing them as 'pensioners' who just 'play fish'. These comments indicate a segmentation of the fishing community which appears as a division between 'the haves and the have nots' (Dolan et al. 2002:201), or between the entrepreneurs and lifestyle fishers (see also Murray et al. 2010). It also shows that the experience of social change and stress, accompanied by perceptions of the 'big wheels' being favoured over the 'small wheels', can act to divide a community rather than create social cohesion in the face of adverse conditions.

Entrepreneur fishers are seen to be more resilient in difficult times due to their more effective planning and adaptation strategies, as Case Study 3 highlights, while lifestyle fishers who are 'excessively attached' to the profession, may find it harder to adapt to change (Marshall et al. 2007:378). This group loves fishing and despite all the hardship, does not want to give up the lifestyle and the work they enjoy. Their strong attachment to the job has been described as 'one of their greatest weaknesses' which can influence a fisher's resilience and resistance to change (Marshall et al. 2007:384). In this case, any dislocation to their working lives may be devastating (see also Murray 2007; Tuler et al. 2008).

Case Study 3: *A dream to promote the industry*

Ben started fishing in the family business when he was 14 years old. Over his lengthy career, he has worked in almost every area of the industry and he still loves it. When he started fishing, he used to sell his catch from a refrigerated van and he has recently noticed that local fishers have begun to sell their product from the pier or from home. This not only value adds to their business, Ben suspects that their interest in marketing their own seafood is a way of by-passing the wholesalers to ensure they get the best price for their catch. As a result, he predicts that increasing numbers of fishers will begin to establish on board or home-based retail outlets.

Ben's business runs a number of trawlers which target both prawns and scallops. It employs over 20 crew as well as supporting onshore staff, drivers and net makers. Despite his success, Ben views the major problem for the trawl industry in the current climate is the low returns on prawns, with fishers receiving the same price for prawns as they did in the 1980s. Since then, although costs have risen substantially, especially the cost of fuel, Ben has managed to stay ahead by diversifying and expanding the business, upgrading his skills and knowledge through training, and by being actively involved in industry issues.

He is grateful for his good fortune and credits this to a lifetime of hard work and always being ready to change and adapt. But he recognises that not all fishers are willing or able to change and he comments: 'They may be good workers, but they don't like change.' For this reason, he surmises, some fishers are likely to be sceptical about the science used to establish marine park boundaries.

In contrast to fishers critical of MPAs, Ben is optimistic about the fishery and the potentially protective effects of the marine park. He accepts that MPAs will be beneficial over the long term as stocks replenish within the no-take zones then eventually disperse into the sea. However, he is less enthusiastic about the possible impact of the bioregional marine park near Fraser Island and the future of the Tin Can Bay trawl fishery and the incursion of fishing effort from outside the region. He describes receiving phone calls from fishers fearful about the future. 'They're worried about their boats and their families. They talk about stress, concern and a mate's suicide and wonder if they could have done more.' He is also uneasy about the influx of fishers who have lost work in NSW coming north and increasing effort and competition in Queensland. 'There's always something,' he reflects.

Ben points to one area needing urgent attention, the public's lack of awareness and education about the industry and the role of MPAs. He has recently fitted out a trawler which he refers to as his 'pleasure boat', but has thought about transforming it into a charter boat operation for educating the public, including school children, about the industry. He cites an American fisher who has turned his trawler into an educational vessel and Ben dreams about launching a similar business along the coast. He wonders if he could get a grant to explore its tourism potential.

He reports that the public's lack of awareness about the fishery is matched by the limited outlets for buying local seafood in Brisbane and other areas, and he laments the fact that consumers can easily buy imported fish but not the local catch. He recommends that an effective marketing strategy be developed, tagging the catch as fresh regional seafood, giving the date of the catch and information about the fishery. Without regional marketing plans, local fishers will continue to be hampered by the increasing competition from overseas imports and the relatively low prices they receive for their catch.

Over the years Ben has invested money, time and effort into the industry and has encouraged other fishers who are doing well to financially support the seafood industry organisations. Ben notes that QSIA does their best with limited resources. He says they struggle hard financially but try their best to lobby on behalf of fishermen. He notes the limited number of working or part-time fishers interested joining the QSIA and is concerned about the recent emergence of a number of 'splinter groups' and wonders why they are not banding together to have a stronger voice in fisheries decision-making.

As a result of these effects, not all those we interviewed want to remain in the industry with some indicating they would get out if they could, or if they could afford it. A further group wishes to leave but lacks appropriate training for alternative employment or does not know where to go for career counselling or retraining advice and information. In contrast, a former fisher now fisheries consultant and trainer, argues that the majority of the fishers who have been in the industry over the long-term, and who have the social disposition of independent and hardworking people, may be 'too proud' to be reskilled, or may lack the necessary educational background to retrain successfully, or to reskill in a different trade, even if it is connected with the marine industry. But he is also critical of management which, in his view, has not undertaken sufficient research or consultation on the drivers and impacts of the industry's restructuring.

This issue of training or transitioning into new careers is especially relevant in view of the attitude from several interviewees that the only skill they have is fishing and they cannot imagine doing any other occupation. A similar finding was raised in a study of fishers in Louisiana affected by the 'Deepwater Horizon oil spill disaster' (Stone 2010). It found that fishers have a toolbox of skills and knowledges applicable to other industries, but that one barrier to taking up retraining is a lack of resources in the training sector, while another is a lack of awareness amongst the fishers themselves of the value of the skills they have and their transferability.

In 2006, the chair of the OECD's 'Expert Meeting on the Human Side of Fisheries Adjustment', Jane Willing from the Ministry of Fisheries in New Zealand, observed that few opportunities for alternative employment or training and retraining opportunities are available in many fishing-connected areas (Willing 2006). Willing alludes to the significance of fisheries to coastal, state and national economies, and essentially to the delivery of sustainable practices ecologically, economically and socially. She also points out that an ecologically-predominant focus has often led to 'social effects not being fully anticipated' (Willing 2006:8). Different fisheries groups and individuals react to these social effects in different ways. Some find change difficult, both personally and financially, and may become more vulnerable and isolated (Binkley 2000b). Others are more resilient, displaying a capacity to adapt to change through optimism and innovation (Kofinas and Stuart Chapin III 2009).

However, clinging to the old ways or remembering how it used to be is no longer an option in a rapidly changing environment. In such cases, the reality of not dealing with the economic imperatives associated with industrial change, and/or of not accepting the ecological imperatives linked to MPAs, can become individually overwhelming. These differing reactions have also given rise to an observed difference in perceptions about the industry's future, especially between the entrepreneurial and traditional lifestyle fishers. Although research studies have shown that changes in the industry as well as the growth of tourism and recreational fishing are beneficial for coastal rural communities (e.g. McCook et al. 2010), not all those interviewed for our study are supportive of the extent and effect of these developments.

Key issues arising from this section and Theme 5:

The role of ethics and equity in the fishery.
Awareness of problems associated with increased costs and competition, coupled with perceptions of a reduction in earnings over time.
The need for greater cooperation within the industry and, where necessary, mediation to counter segmentation and build understanding between different fisheries.
Support and information for those fishers wishing to expand their business, build new opportunities and undertake ongoing training or retraining.
Greater promotion of Queensland fisheries and local seafood products.
Acknowledgement of the relatively small fishing population compared to the numbers of recreational anglers (estimated at 750,000 in Queensland).

5.6 Part B: Personal and Family Effects of Change

In this section, the focus shifts to the individual and family effects of fisheries change. It explores the effects on health and well-being, and highlights the role of women and the impact on family relations. Fishers and partners report that they had and most still have a good quality of life and are relatively well off. However, the amalgam of pressures over recent years has led to a perception that their general satisfaction with fishing work and their social and family well-being and quality of life have been declining. Of particular concern amongst some fishers is the effect on income stability, although many interviewees are financially comfortable and others continue to do well.

The major themes included in this section are:

Theme 1 – Impacts on fishers' wives and families
Theme 2 – Impacts on health and well-being

5.6.1 Theme 1 – Family Impacts

This section outlines the effect of change on fishing families and family relationships.

(i) Impacts on Fishers' Wives and Families

Fishers' wives have also been subject to social impacts, even if they are not directly involved in the industry themselves (Binkley 1996; 2002; Davis 2000; Manoogian-O'Dell et al. 2002; Skaptadóttir, 2000). They mention continued stress and associated health effects due to financial instability, and their changing roles due to fisheries changes. Increasingly they are acting as a supportive influence for their husbands who may be angry, aggressive and short-tempered. One stated her anxiety affected her sleep and she would lie in bed at night writing imaginary letters to politicians. She reported feeling powerless: 'As far as I'm concerned it's wrecking our lives and our kids' lives. They [the government] don't have a right to do this to people.'

Fishers and families are feeling the strain from the many changes to which they have worked to adapt. This is clearly shown in this response from one of the wives concerned about her husband's health, the family's financial position, and criticism from the community.

> ‘Fishers are not recognised as doing a valuable job, as though they are providing for the community. Their job and position and person are devalued. A lot are depressed and angry which affects them and their families. And they feel they are being more squashed and that their life is being squashed out of them. There is a great sense of injustice because they are not trying to destroy anything, they are just supporting their families. They want to be left alone to provide a food source. We’re a legitimate business; we have mortgages; we have kids who need to be brought up.’

Financial insecurity has meant that some wives are working longer hours, while others have taken over more of a breadwinner role with their income being directed to keeping the house running and putting the children through school and university. This allows the husbands to continue as ‘lifestyle fishers’, although some have taken up extra work to improve their economic situation. In times of financial difficulty, women play multiple roles in the fishery and family, working at home taking care of the business and also outside the home supporting the family income (Pahlke et al. 2001). However, the burden of two jobs, as well as providing emotional support for the family and the marriage, has added to their stress. This is further exacerbated because they often also find themselves still having to do most of the household chores (Binkley 2002; Zvonkovic et al. 1996, 2002; cf. Smith 1995).

In Moreton Bay, a small number of wives have returned to work specifically because of the rezoning to augment their husbands’ income. Fishers’ earnings have been affected by weekend closures and increased competition over space and resources from other commercial operators as well as from recreational fishers and boating leisure seekers.

A number of wives told us how much they enjoy the industry in spite of the problems. They love fishing and being out on the boat, ‘it’s relaxing and peaceful’ But the continued financial vulnerability, and especially in Moreton Bay, the increasing traffic on the water, has meant that at least one of the families we spoke with is relocating to start a fishing concern up north. In addition to the family involved, such an impact will lead to an increase in effort and competition in the new area. For others, even if it were possible to move elsewhere and find alternative employment, fishers and families are reluctant to leave ‘home’ because of their attachment to place and community (Davis 2000; Marshall et al. 2007; Minnegal et al. 2003).

Women describe the cumulative effects of different government policies which can act to divide members of the fishing community. Several wives mention feeling a sense of isolation and helplessness about the industry. They comment that there is a lack of information about services which could assist them, and a lack of supportive assistance from policymakers about how to sustain their quality of life and family coherence (Maritime Centre of Excellence for Women’s Health 2001; Pahlke et al. 2001). Those who are aware of the effects of stress on their marriage and their relationship, and who are familiar with available sources of help, are sometimes seen to be pestering their husbands when they suggest the men need help. One of the wives, concerned about her marriage and her husband’s well-being, described the hurdle she has tried to overcome: ‘And you try to get them to Relationships Australia to deal with some of the issues, you just try and get them there… [rueful laugh].’

Another particular area of concern for women is the lack of opportunity to develop their own careers:

> 'Women are undervalued in all aspects of the fishing industry – we're treated as Cinderellas – good enough to clean up around the place. Our industry could become far more productive for regional Queensland with upskilling, developing wider skills and business opportunities to change their product lines. Companies don't see fit to progress [women] through to another level, to market the product, or give them small to medium enterprise business skills. But we do not give [women] opportunities. There are no career paths, and no career paths on the boats either but that's a whole different discussion. So women are an untapped resource in the industry.'

Such themes around career and skills development and business training are incorporated into the goals of the Women's Industry Network Seafood Committee (WINSC). Formed in 1998, WINSC seeks to promote the role of 'seafood women' including researching training needs, providing support and mentoring, and encouraging younger women to access leadership and development opportunities (Whalley 2009:18-19). The role of women in Australian fisheries was also the focus of a study conducted in 2000, *Fishing for women: Understanding women's roles in the fishing industry* (Aslin et al. 2000). When survey respondents were asked what roles they envisioned for women in the future, some predicted that women would play 'a far greater role in representing the industry at higher levels to government…moving from a 'behind-the-scenes' support role to a more overt 'up-front' managerial role' (Aslin et al 2000:61). Sadly, it is likely that many of the women in this Queensland study might see that prediction as unachievable.

(ii) Negative Social Impacts on Marriages and Families

Across each region, fishers, wives and business owners talk about the financial stress brought about by changes to the industry. 'I really feel for people because it's destroyed their souls – it's taken strong resilient men and turned them into whingers.' Wives report an increase in tension and arguments, not only about the changed conditions but also due to a rise in financial instability. When the rezoning occurred in Moreton Bay, as one of the wives recollected, it was not only the closures that were the main issue, it was also the lack of money.

> 'The closure is not the real problem. We agreed it had to happen…But sometimes they come home cursing and swearing [because of competition for space on the water]. We listen and try to have a calming role but the money side of it is hard…and it's tough on them. We've got to find the money to fix the nets and repair the engine, but when we get paid finally, it goes on loan repayments. It's a vicious cycle.'

Likewise, fishers acknowledge a rise in personal, financial and family hardships and physical and mental health problems. Family and marital relationships are described as often exploding into anger or dissolving into discussions that seem to have no solution. Communications within families, and importantly between partners, appear to evaporate.

> ‘I couldn’t speak to my family. I used to drink. I was running on adrenalin. I thought I’d be able to work it out for myself but… I’m still on medication. I knew I was in trouble but didn’t know what to do. I would say that without my kids I would have suicided. I thought my wife would have been OK; she would have been all right, maybe found someone else and that would have been OK. It was my kids that kept me going.’

Marriage breakups and threatened and actual suicides are serious concerns, and fishers admit they are worried, even desperate in some cases. ‘My marriage is in pieces. It puts stress on you. Times are tough but what else am I going to do? I hate what’s happening to my family.’ In a similar vein, another divulges: ‘I’m fully stressed, I’m under stress every day. My wife and I have come close to...[breaking up]. It would be easy for her to sell up, sell the house. The bills would be paid then.’ While a third responds: ‘Money is tight. I’ve got child support from my first marriage, and I’ve still got a business debt on the boat. I’ve just done a refit and had to borrow money. Had to take the boat to the slipway for maintenance. That costs $80 an hour. It hasn’t been easy.’

Most fishers describe their unwillingness to take their worries and stresses home with them. At least one interviewee stated he had lost one marriage to the fishing industry. Another stated that he talked about his work problems with other fishers but did not want to bother his wife, who was studying. In another case, the wife has banned all discussion on fishing as it causes too much heartache. As much as the men tried to leave their stress at work, they mentioned that sometimes it was inevitable that they took the issues home, and this caused arguments, tension and more worry.

In contrast, one skipper said that the family side of things was never much of a problem. They were an older couple. The wife had worked on prawn trawlers for several years but was now content to run the business. Because she had direct experience in the industry, both agreed this was a major factor in having a harmonious relationship where industry matters are concerned.

The above discussion has shown that the social impacts of ongoing structural change to the fishing industry have placed considerable strain on the health, well-being and quality of life of fishers and their families.

Key issues emerging from Theme 1:

> Recognition of the crucial role women play in the industry.
> Continued promotion and support for opportunities for women in the industry.
> Mentoring for women and support for special training programs for women, as well as support for organisations designed to promote opportunities for women in the commercial sector.
> The need for social impact assessments to incorporate impacts on families and local communities.
> Provision of information and services to be made available for those experiencing family and marriage problems.

5.6.2 Theme 2 – Impacts on Health and Well-being

(i) Health Implications - Depression, Anger and Failing Strength

Physical and mental health problems for both fishers and their families have included stress, anxiety, depression, high blood pressure, cancer, and general ill health due to increased stress levels. Fishers are known to have seriously contemplated suicide; a small number have also committed suicide. There is a mixture of anger, sorrow and grief about their lack of power to change a situation they regard as both unfair and unjust. One wife observed that: 'The men have a feeling of inadequacy about how they are going to survive - it's not just about making money.' These situations can affect individuals and families in different ways and such health outcomes may manifest as psychological distress including an emerging alcoholism (Conway and Shaw 2008; Lawrie et al. 2004), as well as the prevalence of drug and gambling addiction as mentioned by some of the interviewees.

In addition to mental health concerns, many of the older fishers also have physical health issues such as muscular, shoulder and back problems due to the heavy physical labour required by the industry. Many of these men are aged in their mid 50s and 60s have realised they are becoming too physically weak to cope with the continuous demands the industry places on their bodies. Nonetheless, due to their financial situation and the changing conditions in the fishery, some stated that although they want to retire they may have to work into their late 60s and 70s. A trawler operator explained his situation:

> 'I don't enjoy it as much as I used to. I tried to grow my business and took on more of a shore-based management role. I have boats to manage and keep functioning and keep my family happy and provide for my wife and kids. But I'm back in the position where I still have to go to sea. But I worry about the work. When the boys are out at sea, and the phone rings, I feel sick in the stomach because the boys don't ring unless there's an issue, and normally it is a serious issue. The stress doesn't leave you when they're out there; it's with you all the time.'

Men are often unwilling to talk about their problems, especially issues of mental health, depression or despair. One interviewee who suffered severe depression and was told to leave the industry for the good of his health stated that he could not leave: 'It's my life and all I know.' Others find their health problems difficult to discuss. A retired fisher could only explain, 'I'm that depressed…' Their silences and unfinished sentences accentuated the common feeling of stress and unhappiness, and their reluctance to discuss such matters.

An older fisher who has sons in the industry said he could not bring himself to talk about industry issues with them as he was so miserable about what he sees happening. His memories of the 'old days', the ecological damage he has witnessed over time, and his determined activism in promoting sustainable fishing and environmental stewardship, are buried in his sadness over the recent changes. To help cope with these pressures, other interviewees seek solace out on the boat or at the water's edge as a way of working out their problems.

> ‘I used to live on the beach when all the consultation was going on. I would lie on the beach at 2 a.m. with my head full of stuff. Am I going to stay in? Am I going to get out? Will the bank lend me the money to stay in? It was beyond stress, it was depressing.’

(ii) Effects on Quality of Life

The severity of the health concerns mentioned by fishers and their wives are allied to expressions of grief, usually more associated with death and bereavement. However, grief may occur for other life changing reasons such as: loss of work, financial insecurity, relationship breakdown, and loss of identity and autonomy, all issues which have been raised throughout this study. Our findings indicate that some interviewees are suffering multiple dimensions of grief – grief over their fishing futures and the future of the industry, over the decline of coastal cultural heritage and family succession, over fisher mates’ deaths at sea and through suicide, and over losing access to valuable fishing grounds.

In their research on fishing communities, Clay and Olson (2008a:152) note that the importance of issues of space, place and social relations such as kinship and gender relations, as well as levels of community support, can individually and collectively affect ‘understandings and experiences of vulnerability’. Similar findings were located by Smith and Clay (2010:165) who analysed over twenty years of studies of fishers’ job satisfaction and socio-economic well-being and found that professional fishers generally have a ‘higher than average perceptual well-being as measured by ladder of life, self-actualization, and job satisfaction measures’. However, they maintain that,

> less control over choices among activities, increased management associated with resource decline, competition from farmed fish, powerlessness stemming from being managed or having less control, and being blamed for the condition of the fishery are factors in the decline of subjective well-being (Smith and Clay 2010:165; see also Smith and Gilden 2000).

Other factors influencing well-being and quality of life include the type of fishing practices involved, conceptions of identity, the range and interaction of cultural-political-economic and geographic processes, and the commitment to fishing as a way of life (see also Blount and Pitchon 2007; Miller and Van Maanen 1982). Similar issues can be seen in the way the interviewees have responded to the challenge of change. In Moreton Bay, for example, at first fishers were angry about the rezoning. Almost two years later there is a range of feelings being reported – a resigned acceptance, a continuing sense of sadness and bitterness, and a determination to adapt to the new situation. These stages from loss to adaptation correspond to the ‘cycle of grief’ defined by Kübler-Ross and Keller (2005). Feelings of denial, anger, bargaining, depression and acceptance make up the five stages of grief and comparable feelings have been apparent in our study.

Interviewees experiencing grief and despair over the effect of the industry changes have described a range of different emotions: frustration and anger, sadness and resignation, and acceptance and adaptation. ‘If you don’t adapt you die,’ says one interviewee who has changed his fishing methods since the rezoning and is now ‘better off financially than before, and much happier’. In fact, he explained he loves it more now than when he started fishing as a teenager. He was surprised at this change and how his earlier feelings

of anger and fear had since evaporated. He has adjusted well to the new conditions, but in the process, has had to change his gear, target species, and upgrade his engine.

> 'When the marine park came in I was forced to look outside the box. My entire life I had worked the same area in the same way. But fishing is like any business and when the writing is on the wall, you've got to evolve. Having to change expands your experience. It gave me so many more options about where I can go in the Bay. But it was all trial and error. This is how fishers work anyway, by trial and error. Over a lifetime you have tried so many different things and it was always important to log everything - so I caught these fish here on this phase of the moon, at this place and at this time. Once I started experimenting I found some areas were highly productive and I was able to expand my fishing portfolio. I gained a lot more knowledge and I'm a better fisherman for it. I learned a huge amount. Once you've got something that works, you've got it for life.'

Such positive reactions are not uncommon amongst the interviewees, although their initial responses to change might indicate otherwise. They reveal a passion about the work and a dedication to adapt even in difficult circumstances. Perhaps, as one wife explains, it is the love of the job and the sea, a central feature of fishers' identities, that allows them to persevere.

> 'They have a connection to the water, they really do. I don't know how to put it into words, they never tire of it; if they're talking about it, they're out there fishing. They love what they are doing, there's a passion. They really have the water in their veins.'

A number of interviewees told us that being out on the water was one of the ways they try to cope with their feelings about what they see is happening to the industry. Some say it is a place they never feel alone. However, the different ways in which individuals react to change can also depend on personal circumstances and individual coping mechanisms.

Fishers and families, especially from a close-knit rural area, or those with intergenerational heritage, may be more able to deal with stress as they have strong community capital or family linkages to provide support. However, this group may also feel their loss more strongly as they are also losing the area fished by their fathers and grandfathers. New or younger entrants may lack these intergenerational links, and may be more interested in the entrepreneurial side of fishing, and so the effect of losing a traditional family fishing area may not be as likely to have the same significance. As a result of this factor, as well as their educational or trade backgrounds, and their different motivations for taking up fishing, they may be able to adapt more quickly (Pickworth et al. 2006).

Some fishers take their problems home and worry about angering their wives, while another group of fishers turns inward, not knowing how to cope. One response may be to deny the impacts or to not admit to having problems, because if they do, it may be seen as a sign of weakness, especially in what is regarded as a tough masculine-oriented occupation (Waitt and Hartig 2005).

In cases of extreme stress, fishers have been on the verge of suicide. Anecdotal evidence obtained during this study has revealed instances of actual suicides in fishing families.

These events have greatly saddened local fishing communities. While it cannot be argued that these deaths are directly related to the stresses in the industry generally, those reporting these incidences have no doubt that they are connected.

Research on health problems among Australia's primary producers has also found widespread stress, depression, anxiety and suicide amongst farmers and families affected by the drought and financial worries. The study by Judd et al. (2006) reported that a variety of factors is linked to the potential for suicidal behaviour. Risk factors often relate to the social conditions of farming work and living in a rural community which may involve a degree of loneliness and social isolation, physical and mental health concerns, and marriage breakdown, in addition to the weather and economic insecurities. Despite the accumulation of problems, the tendency amongst Judd et al.'s sample of male farmers is to 'get on with the job' and 'keep going' rather than dwelling on negative thoughts and feelings (Judd et al. 2006:5). They also found that women deal with their problems in a similar way, concentrating on positive events, even when the situation seems unbearable.

However, the results of this and other studies show that men are often reticent to seek medical or psychological help in times of need (Judd et al. 2006; O'Brien et al. 2005). This is due in part to a lack of recognition of the severity of their problems, in part due to the demands of the business, and in part due to the stigma they may attach about mental illness. A further reason for not seeking help relates to living in a rural district. For example, a fisher or business owner living in a small country town might be unwilling to visit a local doctor or counsellor in case others find out. Besides, there may be no appropriate service available in the local community, or the costs could be prohibitive. Importantly, research on the continuing impacts of the kinds of health issues this study has located – stress, anxiety, anger, depression, powerlessness, and contemplated and actual suicide – indicates that prolonged and compounded psychological stressors affect the ability of people to cope, including the ability to work and manage their daily affairs. Another side-effect is an increase in the risk of injury for those working in 'hazardous and isolated' conditions such as fishers and farmers (Fragar et al. 2008a; Hall-Arber and Mrakrovcich 2008).[21]

For instance, a Moreton Bay fisher spoke about a recent event when he thought he might not make it home. There was no warning. Two big waves suddenly appeared and his boat was swamped. He lost gear and part of his catch overboard, but managed to make it to safer ground. Later he realised how shaken he was and how close this experience had been: 'I'd had enough that day to last a lifetime and decided to take the next day off.' But the following day came, and, in his words, he 'had to get back on the bike.'

> 'So I went out, it was a beautiful day, and caught a heap of fish. You've always got to look to the future, to the next day and start afresh and not worry about what happened yesterday…or the day before that.'

This example of the dangers of the profession is not isolated. This study has heard several accounts of fishers being caught in similar circumstances where their lives have been on the line. Fishers have also spoken with sadness about the death of their friends

[21] Fragar et al.'s (2008a) research was conducted on the farming community. An outcome of this research is the online publication by the NSW Farmers Federation of a 'Blueprint for Mental Health', a guide for farmers on health, welfare, management and training agencies. See also: Fragar et al. (2008b).

at sea.[22] Perhaps the potential dangers that fishers experience as part of their everyday working lives might also help explain the different epistemologies of fishers and those scientists and managers who may not have worked in such a risky occupation (Hartley and Robinson 2006b; Stineman 2009). On the other hand, fishers may not experience their work as dangerous but instead see the risks as an accepted part of the job or as second nature (Davis 2011; Pollnac and Poggie 2006, 2008; Waitt and Hartig 2005).

This attitude was aptly demonstrated in an American study of risks in the industry. Davis (2011:5) reports a common perception of 'risk denial' among fishers, particularly middle aged and less educated fishers, and those with a family background in fishing. Most regarded their own operations as being of low risk in comparison with others. They tended to overlook the hazards associated with changes in the weather and sea conditions despite many of them having experienced life-threatening situations. The study noted that 'there was a general failure to understand the larger role that accidents play, along with the importance of safety equipment and training in mitigating these risks.' (Davis 2011:5). Other research on safety at sea found that certain regulations can place fishers in more vulnerable or adverse conditions (Kaplan and Kite-Powell 2000). For example, the need to travel longer distances in all weather conditions to reach fishing areas beyond marine park boundaries, or the need to work longer hours over shorter time-frames to earn a living especially when the length of fishing seasons are reduced. Similar observations have also been made by the fisher interviewees.

(iii) Adapting to Change

In Australia, the majority of primary producer research on physical and mental health, well-being issues and safety at work has been conducted amongst farmers (Caldwell and Boyd 2009; Sartore et al. 2008), and in rural communities (Fraser et al. 2005), both areas directly relevant to this project. A number of parallels are apparent between the two primary producer groups, which in normal circumstances, are adaptive to continually changing environmental conditions and market fluctuations. However, increasing pressures from a range of stressors have affected farmers and fishers and their families alike. Their strong attachments to profession and place mean that neither group wants to surrender their income, their lifestyle, nor their home, and both worry about the future sustainability of the industry and their own futures. To help cope with the situation, Caldwell and Boyd (2009) recommend that 'psychosocial interventions' are needed to circumvent potentially damaging health outcomes.

Within the fishing industry, a pilot study on the effects of fisheries change has developed such a strategy. Initiated by Cathy Keppie, the wife of a New South Wales fisher, the study employed the services of a clinical psychologist to run counselling sessions for affected families. His assessment was that fishing families were 'very frustrated, feeling helpless in the face of the odds and looking for a way to resolve issues that are important to them' (FRDC 2007). It noted that families tended to 'bottle up' the accumulated stressors 'caused by low prices, high charges, reduced access, fisheries

[22] Information about marine mortality and other incidences at sea are collected by Maritime Safety Queensland. Data gathered by MSQ shows that 2009 had the highest number of fatalities recorded in Queensland, but the published figures online do not clearly distinguish the recreational and boating sector from the commercial sector. However, the publication 'Marine incidences in Queensland – 2009' states: 'Fishing, or being on a fishing trip, was by far the most common activity at the time of the incident with twelve fatalities (60%). While four of those involved a commercial fishing operation, just two occurred while actually fishing.' (MSQ 2010).

management policy and actions'. Similar findings were described in Jentoft's (1993) study of Norwegian operators during the fishing crisis of 1989-1990.

In the Norwegian study, Jentoft consulted with a psychiatrist who advised fishers to follow 'the eight commandments for the preservation of mental health in a crisis period'. Most of these points also have direct relevance for the interviewees in this study.

> Don't be ashamed.
> Don't isolate yourself.
> Keep the family together.
> Seek out others; agree to meet at the work place if possible.
> Keep up the daily routine.
> Be careful with alcohol.
> Talk about your troubles – others have similar ones.
> Look for help if the worries are getting too bad (Jentoft 1993:12).

This advice is pertinent for those whose problems, at times, seem insurmountable, and who, according to the psychiatrist who devised these commandments, 'risk losing faith in themselves as fishermen' (Jentoft 1993:12). As social connections are deemed important, the earlier comments from fishers about feelings of increasing isolation are disturbing. Mutually enhancing social capital within and across fisheries sectors might assist in maintaining a sense of collective identity as fishers, and a sense of belonging and 'collective esteem' (Baker 2006:13; see also Berns 1999; Brooks 2010). As rural and coastal centres shift to tourism, residential development and 'sea-changing', the fishing community's shared history, heritage, resistance and resilience over time may begin to unravel or disengage. However, seafood festivals, cooking master classes, environmental clean-ups, and other events such as the 'Blessing of the Fleet', may help promote a sense of community identity and pride in the industry's heritage (Martin 2008; Wiber et al. 2004).

Similar issues were documented in a report by the Bureau of Rural Science on 'the social fabric' of the marine scale fishery in South Australia (Pickworth et al. 2006). The report found that fishers' work and life satisfaction and their perceptions of social well-being were related to the quality of social networks, social capital and levels of family support. Overseas studies on job satisfaction and happiness amongst different fishing groups show that what fishers value about their work are the challenges of the job and conditions at sea, being in the outdoors, a sense of adventure, and working in a meaningful and 'worthwhile' occupation (Pollnac and Poggie 2006:332; see also Gatewood and McCay 1988, 1990; McGoodwin 1990; Pollnac et al. 2001; Pollnac and Poggie 2008; Smith and Clay 2010). In contrast, low levels of satisfaction and well-being about the job and life in general were generally associated with experiences of ill-health and financial insecurity (Smith and Clay 2010). This issue is highlighted further in the following discussion.

(iv) Being on the Edge

Across each site, certain sections of the fishery have been more affected than others, and certain fishers have felt the impacts more than others. In the Burdekin area, when recounting the time of the GBR-RAP, several interviewees (fishers, business owners and wives/partners), described it as one of the worst or most difficult periods of their lives, especially the effect on their finances and their mental health. At least one interviewee

has undertaken a substantial period of counselling to help deal with the anxiety of the RAP and the aftermath of his intense involvement in stakeholder negotiations. Another stated that he had no time for counselling, but at the same time, reported feeling increasingly isolated: 'I had no one to talk to. I felt if I shot myself I'd be better off. I still don't sleep well.' There was often no one with whom fishers could share their personal problems, including those related to marital and financial stress.

Both during and since the implementation of the RAP, interviewees have suffered a mix of anxiety about the future of their businesses, concern for their families, and worry over their fishing mates' futures and their own financial situation. All of these components, especially financial insecurity, have affected their ability to endure change. As a consequence, they may become more susceptible to the effects of policy decisions that curb fishing in certain areas (Tuler et al. 2008), or be less able to adapt effectively to change.

In the early days of the RAP, some fishers and business owners recalled worrying that there was no foreseeable solution to their financial plight. Combined with the loss of fishing areas, the disregard of their expertise, and problems experienced as a result of the GBR-SAP, a number of interviewees stated they were on 'an emotional roller coaster'.

For example, one fisher turned business owner observed that the rezoning impacted on people's sense of identity. He also stated that if the marine company, which was started by his grandfather, had not received compensation, it would not be in existence now. Although the family company eventually benefitted from the SAP, the business owner explained that access to the package was a long and drawn out process. It took about one and a half years and was a costly exercise. He thought this was primarily due to 'a lack of understanding from the people accepting the applications. The amount of detail required was substantial. It was really the closest I've come to having to write a thesis; the application was two inches thick. We had to be thorough.' Because the application process took so long, the business had to obtain an emergency payment to keep it going. It was a stressful time. 'The lengthy and complex process hurt me because it took me away from my business. Our sales and my role in driving the business forward just stopped for that time.' In the end, the business has not only remained successful but has continued to grow. 'I might cop a bit of grief from other operators with our success,' he said, 'but I use that term loosely as this is a work-in-progress and we still have a long way to go.'

However, for another business owner, who also received financial assistance from the SAP, the process was 'harrowing', especially the effect on health and well-being, the marriage, and the financial situation.

> 'We just went to pieces. There was depression. Nerve tablets. And we almost split up. I thought about suicide but I wasn't prepared to walk away from the industry. But we had to put our house on the market to keep from losing the business.'

Deep unhappiness and distress amongst some interviewees were significant side-effects of the RAP and SAP negotiations. A number had seriously contemplated suicide. The following interviewee explains the circumstances of planning suicide when there seems to be no other alternative.

> ‘Fishing is my passion, so the thought of leaving it made me very sad. When my kids heard about the impact of the green zones, they started crying because we might have to shift. Seeing this I thought: ‘What have we done to these people?’ It really starts eating away at you. You feel really angry inside. And stressed. You think there is an easy way out. Your life isn’t worth living.’
>
> *How did you deal with it?*
>
> ‘I didn’t think I needed any help. But counselling was the best thing I’ve ever done. I feel like a new person. I’ve got a smile on my face. I can see the light. It stems back to having a sense of freedom. The RAP took my freedom away from me, and now I’m back fishing, I’ve found that freedom again.’

While this fisher found counselling was ‘the best thing’ to help him cope, others replied that counselling would be of no help, they just have to persevere. A number of interviewees across each region have begun counselling and/or continue to take anti-depressant medication. A few say they were prescribed ‘nerve tablets’ and took them for a while but stopped as they ‘did not need that kind of help.’ The answer, they saw, was to return to fishing.

Within each region, some interviewees are vulnerable, while others are doing moderately or very well financially. This is due to the seasonal variations, the local fishing conditions, how some have fared in the GBRMP and the MBMP rezoning, and how well they have coped and continue to cope with, and adapt to, the changes in the industry. Some interviewees state that it is the continuing uncertainty that brings the most stress: ‘It would be OK if the government just told us the commercial fishing was finished – at least we would know where we stand.’ Yet there is a tenacity and mental toughness amongst the interviewees across the three regions; they keep going because fishing is what they have worked for all their lives.

Key issues emerging from Theme 2:

> Critical need to research the extent of physical and mental health and well-being concerns among fishers and fishing families.
> Urgent need for social impact assessments that document the likely effects on health, well-being and quality of life.
> Research on men’s health and the effect of attitudes about masculinity in the fishery (as a parallel to the studies on farmers).
> Research on the health and well-being of women in the industry, as fishers and wives.
> Research on grief, trauma and threatened and actual suicide amongst commercial operators and families.

5.7 A Review of the Case Studies: Some Positive Perceptions

The case studies interspersed in this study suggest that all fishers receive positive benefits from their work as fishers both as a way of life and a means to make a living. This point is highlighted by Van Ginkel (2009:220) who states that fishing ‘permeates all aspects of life…It is an existential matter, an important marker of identity and a cherished lifestyle to be continued by successors.’

The case studies show that a number of fishers have received positive benefits from the restructuring of the fishing industry and the new responsibilities that accompany the establishment of marine parks. Those with established businesses have been able to pay off loans with monies received from adjustment packages and to reinvest in their business. Others have been able to upgrade and repair boats and equipment, develop new businesses and become increasingly environmentally sustainable. Some had already demonstrated the characteristics that define resilience and were adapting well to the new conditions; others carried through with a personal belief in hard work and their social identity as a fisher, or met the new challenges with a determination to succeed.

The case studies and interviews with viable fishers show that their businesses often benefited when a younger man, usually the son, was supporting a male parent who had commenced the business and was able to use many generations of local knowledge and expertise to sustain the business. These fishers seem more able to adapt to continually changing conditions even if their operations have to move beyond the geographic limitations of coastal fishing and the marine parks to deep water fishing further off the coast.

Those who have left the industry still remain closely linked to fishing and the marine environment through their work in conservation, consultation and training, and other industry-related businesses or working for government and non-government agencies. Most say they would like to return to fishing but they also enjoy their new profession while continuing to work in various ways to promote the industry, its longevity and sustainability.

Overall, the case studies demonstrate that fishers become successful when they are able to develop good ideas, they have some capital to assist them to operationalise their ideas, they are adaptable and innovative, they feel competent to fight back against 'the system', and they can develop resilience, toughness, and a never-give-up attitude.

The case studies also outline the ambiguous nature of 'success', as those seen from the outside as successful stated that the concept was difficult to define, that they were working very hard to keep their heads 'above water' financially, and had great empathy for the difficulties that less educated and less entrepreneurial fishers were enduring. Success was also gauged by knowledge and being involved in industry affairs, and several of the more entrepreneurial operators actively participate in industrial and professional associations and are represented on government committees and boards. However, they emphasise the need for hard work while working within what they regard as potentially unsupportive socio-political and management structures. They also note a lack of understanding from government agencies of the socio-cultural characteristics of commercial fishers and the communities in which they are anchored. Becoming and being successful is seen a continuous and ongoing process.

Overall, all the interviewees, regardless of their success, demonstrate a deep love of fishing as an industry, a way of being, and a lived experience that suggests that managers and policy-makers need to acknowledge the social and emotional dimensions of fishing as well as the ideological and practical aspects of being a fisher.

5.8 In Summary

The fishers we have met are proud of their profession and the contribution they make to the community, and they derive a high level of satisfaction from their work. Their attachment to the occupation, their ability to withstand the vagaries of the weather, the marine environment and resources, and their love/hate relationship with the dangers at sea mean they are already resilient and adaptive to change (e.g. Hinz and Bratton 2000). Fishers might say they fish for opportunity and financial gain, but many keep working, even in difficult circumstances, as it creates profound meaning in their lives (Mederer and Barker 2000).

The passion they evince *for* the job is comparable to the level of passion displayed *against* the regulatory framework. Place, profession and a strong work ethic are all important attributes of a fisher's identity and fishers value these qualities. However, the collective effects of rapid policy, economic and environmental change have combined to destabilise the fishers' self-reliance, independence and identity, their economic resilience, and their quality of life at home and on the water. These factors have been highlighted through the responses and reactions of the interviewees across the three regions. At the heart of the study is the realisation that fishing is not just a job, it is the fishers' life. This view is summed up clearly by the following quotation:

> [B]eing a fisherman is not a job (i.e. labor is not fungible) but an occupation and mode of labor which is inseparably tied to a person's identity. A fishermen's self-image, his presentation of self in the public arena, the resources he uses to define his place in the community, his kin relations and village friends, and the trajectory of his family are intrinsically bound to fishing. It is this network of relations and meanings, determined by life in the fisheries, which defines the ground in terms of which people construct their subjectivity (LiPuma 1992, in van Ginkel 2001:178).

This quote encapsulates much of what we have located in our research. The fishers' identity and their sense of well-being are intimately connected to their occupation and lifestyle. Threats to the industry are seen as threats to their identity. Fishers are embedded in community and place and they relish the particular qualities that are central to the fishing way of life. The longevity of fishing history, the intergenerational family linkages, and the enjoyment of life at sea, are all important attributes of life in the Queensland fisheries. Similarly, the contribution fishers make to the community and the economy, and the work they do in promoting sustainable practices need greater recognition

5.9 Review of Part 2: A Focus on Fishers and Social Change

The capacity to adapt to change depends on levels of social and family cohesion, income stability, environmental quality, fisheries' sustainability, regulatory and enforcement structures, community support, including individual reactions and coping mechanisms in the face of industrial disturbance (Charles 2006). The challenge for fishers and management alike is how to deal with the effects of change in an equitable and sustainable way that meets the needs of ESD – *socially* as well as economically and ecologically.

Part 2 of the report has documented a significant number of industrial and social concerns in fisheries across the three regions. Although the instances cited here do not

necessarily represent the views of all fishers in Queensland, the commonalities in the responses, viewpoints and experiences, and the similarities in their reactions to the changes are clear. The effects of social and regulatory change, as outlined in Part 2, are cumulative. They have been shown, from a personal perspective, to affect a fisher's identity, level of job satisfaction, health and well-being, and family relationships. From an industrial perspective, the impacts have led to increased operating costs, distance travelled and time at sea; reduced catch profitability; rising tensions among fishers competing for resource and space; and a lack of confidence in the regulatory and consultation process. Despite the severity of these impacts, there is change occurring along the coast, especially in the Burdekin region, where fishers are working closely with GBRMPA on gear innovation, species protection and environmental sustainability (GBRMPA 2011).

5.9.1 Major Issues Identified in Part 2 of the Report

Urgent attention for the introduction of social impact assessments during stakeholder consultation phases of major decisions such as the proposed introduction of marine parks and rezoning, restructuring assistance schemes and fisheries reviews.

Greater awareness of, and action to mitigate, the dynamic and cumulative effects of regulatory change including marine park implementation and structural adjustment.

Greater communication provided to those likely to be affected by fisheries change, including better communication and understanding among and between scientists, managers and fishers.

Greater opportunities supported by government funding for developing collaborative research studies, building communication, trust and networks.

Support and funding to be provided for co-management initiatives.

Support for the promotion of regionalisation as one initiative to mitigate displaced effort effects.

Support and information on training opportunities related to upgrading skills and business-related knowledge as well as information provided to fishers who need retraining following closure of their fishery, or who seek to leave the industry.

Assistance for new recruits to enter the industry, such as a mentoring program with older fishers.

Critical need to further research the health, well-being and quality of life concerns amongst fishers, their families and fishing-related business owners.

The need for health, welfare and counselling professionals in fishing-centred locations to be aware of the particular issues likely to affect fishers and families during and following periods of major change.

Recognition and support for women in the industry in relation to assistance with information and advice on professional and family matters.

The availability of training programs to assist women to take on leadership roles in the industry.

Attention given by fisheries and environmental management and policymakers on the potentially serious health and well-being outcomes during and following implementation of decisions that affect Queensland fisheries.

Provision of mediation and conflict negotiations or conflict management training when discussions reach an impasse often due to perceptions and assumption of different sectors, whether within the industry itself, between fishers, managers and scientists, or between professional and amateur fishing sectors. All participants want a sustainable future for fisheries in Queensland.

PART 3: BENEFITS, RECOMMENDATIONS, OUTCOMES AND CONCLUSION

SECTION 6: DISCUSSION AND RECOMMENDATIONS

6.1 Benefits

A key benefit noted by this research is the resilience to be found in the fishers involved in the Queensland fishing industry. Despite the putative success of some fishers, the extent of fishers' concerns and the problems outlined in this report, commercial fishers continue to provide healthy and sustainable food to communities in Australia and internationally. However, it must be noted that the costs to the fishers, their families and their communities are impossible to quantify. The current focus on the need for a productive and economically efficient output has tended to overshadow the potential and actual social impacts outlined in this study and, from the perspective of several interviewees, has led to a reduction in their health, well-being and quality of life, and that of their families.

In spite of, or perhaps because of, the changes, those involved in this study, the commercial fishers, their spouses and business owners are fully committed to and working towards the maintenance into the future of a sustainable fishing industry. Benefits also accrue through the training and support of a new generation of fishers, while the unpaid labour of wives who offer economic, familial and emotional support has meant that such 'invisible' benefits of fishers' work and their working lives has no baseline from which present damage or benefits can be measured.

6.1.1 Sectors of Industry and Community to Benefit from the Research

(i) Fisheries Management and Public Sector Agencies

The detailed information collected in this study has revealed a number of serious, negative and cumulative social, personal and family impacts related to management decisions and other interventions over time, including the introduction of marine parks. The study's findings can assist fisheries and environmental policymakers to develop different and more holistic ways that encompass the empirical, practical, social and philosophical aspects of what it means to be a fisher, in order to more effectively engage commercial fishers in decision-making initiatives like co-management and in collaborative research projects.

(ii) Marine Park Management

The research data presented here may assist marine park management in future planning and in addressing the environmental, social, economic and health impacts of any major marine park plans on the fishing sector and local communities who live and work in the environs of the MPA. The benefit of our study is underlined by a need for greater attention to social and socio-economic impacts. Importantly, our findings may be useful to help understand the reasons for fishers' anguish over changed conditions, and as a result, may help reduce any misconceptions about the science used to determine MPA boundaries, and any misunderstanding between fishers, scientists and managers.

(iii) Industry Representative Bodies

The research data provides the 'ground-truthing' that is necessary to assist organisations that have been created to represent their members in the seafood industry. Such representation and assistance may incorporate the design and implementation of 'action plans', including local area management plans that provide ongoing consultation, support, further industry training (e.g. management, business, marketing and seafood-related skills, and negotiation and conflict resolution), alternative job skilling and training, and physical and mental health counselling information and advice.

An *Information Guide for Fishers and Families in the Moreton Bay, Hervey Bay, the Burdekin and Townsville Regions* listing the range of financial, training and retraining, health, counselling and relationship services in the three regions examined has been prepared as an adjunct to this study. It will be distributed to fishers and families in the three regions by the QSIA.

(iv) Commercial Fishers

The research data can be used to enable members of fisher communities to adapt to the structural changes that have so potently impacted their work, their relationships and their families. They can be assured that the problems that they are enduring are not solely their own fault and that strategies and action plans should be put in place to assist them. They can be further assured that the planning for the implementation of marine parks and structural adaptation, which has focussed predominantly on environmental and economic outcomes, will, in future, address the potential and actual social, economic and health impacts being experienced.

The data can also assist in identifying particular social outcomes that need to be addressed and treated as industrial rather than welfare issues. For instance, health and well-being issues such as mental health problems, including suicide among Australian farmers, are well-recognised as significant concerns associated with that industry. The same recognition is required in planning for and working with commercial fishers.

Information about regulatory and policy changes needs to be communicated in a way that benefits the identified needs and concerns in the different regions. Involving local fishers, their partners and relevant business owners in identifying regional needs and concerns, will assist in co-developing solutions that foster the recognition of local differences as well as communicating shared knowledges and understandings, engaging in collaborative research, and promoting the stewardship and sustainability of local resources.

6.2 Recommendations

The following section outlines a series of recommendations arising from this research in three categories: research, management and government.

6.2.1 Research

(i) Research Collaborations

This study has located widespread concern over the future of the industry across the three regions. It has documented a critical lack of communication and understanding between the fisheries' actors – fishers, scientists and managers, and the need for greater incorporation of fishers' expertise, knowledge, experience and values in the design and implementation of policies, management actions and research studies that directly affect the industry and fishers' working lives, and indirectly impact their financial situation, and their health, well-being and quality of life, and that of their families.

To help counter the gap in policy formation and action, further research is needed on the views of fisheries managers and scientists about their ontology, epistemology, ways of working, attitudes to ESD, climate change and other challenges facing the fishing industry, and their perceptions of commercial, customary and recreational fishers.

As a parallel to this study, additional research needs to be undertaken on the situation for offshore fishers under federal jurisdiction, and comparisons need to be made between the various roles on board, from skipper to crew, and between this study and the perceptions and experiences of offshore fishers.

The role of women in the offshore industry (and generally as commercial fishers either inshore or offshore), and the impact of offshore operations on marriage, home and family life, also needs further research.

(ii) Women's Involvement

Women interviewed for this study have shown a significant level of involvement in the industry, both formally and informally. The study has also outlined their important role in the household in supporting the industry, and their significant emotional labour in holding the family together in difficult times. An updated research study from that conducted by Aslin et al. (2000) on the role of women in the industry, and their multiple roles professionally as fishers, as wives and mothers, as active participants in fisheries organisations, as business owners and employees in management and science, is needed.

Allied to this research, an additional study should be undertaken on women's health and well-being associated with the economic and social changes in the fisheries, and the impacts upon them of the actual and threatened suicides that have taken place especially in coastal and fishing communities.

(iii) Alternative Employment and Retraining

In each region, there has been a decline in the numbers of fishers working, while the average age of current fishers is increasing. Fishers wishing to leave the industry, or those who have left voluntarily, may need information on what future options are available. Research is therefore needed on retraining opportunities and alternative career possibilities.

Transferability: Fishers have transferable skills applicable to a range of professions but they need information on what options are available and what financial assistance is provided while they are retraining. Individuals may need assistance with mapping a career path, and with access to 'entry level' courses as well as ongoing industry-related professional training, e.g. through agencies such as the Australian Maritime College (UTAS), DEEDI and other vocational training organisations providing courses on seafood processing, marketing, compliance, aquaculture, environmental sustainability in fisheries, and other outdoors and nature-related industries such as resource management, conservation, national and marine parks, or advising on sustainability and environmental protection. Courses or workshops on solution-focused conflict management should also be supported.

Training and Retraining Opportunities: In light of the findings from our study, specifically the interviewees' concern about the future of the industry and their own futures, information needs to be made available on possible avenues for alternative employment, training and retraining, both on campus and online programs, and needs to be backed by government investment in such programs. However, online training opportunities may be limited because of fishers' lack of computer literacy or lack of literacy skills. Where restructuring (or natural disaster) may prompt career change, information about and financial assistance for retraining should be made available.

Strategies for retraining can be developed with the QSIA, MBSIA and organisations such as Skilling Solutions Queensland, with funding provided for programs to upskill key industry personnel with Assessor Trainer and other qualifications relevant to fisheries vocational and professional training.

Fishers in Academic and Industry Courses: At the academic level, funding should be made available for the inclusion in fisheries administration, marine environment and fisheries science research and degree courses for the employment of a fisher, perhaps a retired fisher, to mentor and work with students and staff on the practical application of the theoretical skills students are developing in the academy. This would also assist in building relationship among budding scientists, managers and fishers.

Government Training Programs: Training in relation to the fishing industry needs to be more explicitly targeted by DAFF at a federal level, and relevant agencies at the state level. For example, courses listed on the DAFF website under the FarmReady program do not clearly refer to fisheries, although the fishing industry can fall under that rubric. In addition, DAFF training programs for women seem, from the website, to be directed mainly to the farming sector. Thus fishers and partners seeking information from the DAFF site may find the lack of fisheries-specific information a barrier to taking up possible training and development opportunities. State government agencies responsible for fisheries and education should work with DAFF and seafood industry organisations to develop relevant training and information packages for the local industry, and funding should be made available for this development.

(iv) Marine Park Research

Additional research needs to be undertaken to assess the changing practices of fishers in the three regions in relation to the MPA zones and provide baseline data. The research should involve the construction of local maps on which fishers would record salient

information about fishing area targeted, gear type used, fish species caught, seasonal variations, and annual migratory cycles. Financial support for this research is essential.

6.2.2 Management

(i) Inclusion of 'the Social'

A significant need exists to incorporate the social component of ESD into policy outcomes. This study has highlighted the necessity for management to include social impact assessments (SIA) and social and economic impact assessments (SEIAs) in the planning and execution of management initiatives. Research on social issues and impacts focused both on quantitative and qualitative methodologies, and at both macro (community) and micro (individual fishers, business owners, and families) scales, must be undertaken before major policy decisions are enacted. This is especially important where the industry is likely to lose area and personnel, and where structural adjustment schemes are likely to be implemented.

(ii) Research Collaborations

From the results of this study, it is clear there needs to be greater incorporation of fishers' knowledge and experience, and greater involvement of the commercial industry in scientific research and management decisions which affect each fishery. These processes should be directed to improving dialogue between management, scientists and fishers. Integrating local knowledge with credible science can result in a more informed and empowered fishing sector, greater stability in decision-making, the promotion of social learning and better understanding of the needs, motivations and experiences of the different sectors.

(iii) Equity, Trust and Co-management

An important consideration among the interviewees is the notion of equity within the fishery and policymaking frameworks. To build trust between fishers, scientists and managers, greater attention needs to be paid to the creation of participatory co-management approaches and collaborative research undertakings. Both aspects need to be financially supported as a way of building capacity and overcoming barriers to communication between and within sectors.

Fishers' knowledge, expertise and experience are already being utilised in research collaborations on bycatch reduction (McPhee and Stone 2008), lyngbya blooms (DERM 2004), and the protection of vulnerable species like dugong and turtle (OceanWatch Australia 2010). These and other projects such as research on climate change mitigation can be promoted as part of a marketing campaign on the work fishers do for the community and for the sustainability of the environment.

(iv) Training and Workshops

Workshops organised through Fisheries Queensland, the Department of Environment and Resource Management and other interested government agencies such as the Department of Communities, will be useful to educate officials, managers and scientists about the serious social implications of their research decisions and policy recommendations.

Additional workshops could cover the most appropriate strategies to ensure the active involvement of fishers in decision-making processes, for example, by implementing the effective co-management approaches already outlined in the Fisheries Queensland's *Fisheries Management Strategy 2009-2014*. These processes should be cognisant of the need to recognise the expertise, knowledge and experience of members of the fishing industry.

(v) Data Collection

There needs to be much greater emphasis on data collection in Queensland fisheries. There is a distinct lack of relevant information available publicly about each fishery and the people who work in it. Relying on logbook data is seen by fishers to be flawed, so a series of alternative measures should be researched in relation to fisheries' data collection.

Social data: Additionally, Fisheries Queensland should be encouraged to collect social as well as fisheries data. Information about how many fishers work in Queensland, in which fisheries, and which regions, as well as demographic data, would be immensely helpful in studies such as this, and in providing baseline figures which could be used to compare changes in the industry over time. This will be a useful foundation for the implementation of social and socio-economic impact assessments. The work done by Fenton and Marshall in 2001 on developing a social profile of Queensland fisheries, is in urgent need of updating. Funding is needed for a new project to be conducted, and information should then be updated annually.

Baseline SIAs: A broader study engaging social scientists in different locations in Queensland (and across Australia) would deepen the empirical data from social profiles through qualitative, narrative-style interviews. Information obtained from such a study should be incorporated as part of the baseline data for SIAs and SEIAs. It could also be added to the oral history project (see 6.2.3 (iii)) and other documentation on the history, background and current orientations of commercial fisheries in Queensland (and further afield where required). Funding should be made available for both these projects.

(vi) Awareness of Computer Literacy and Literacy Issues

This study notes that a key problem, which can present a barrier to data and survey collection, is the reliance by government departments on the distribution of written surveys and requests for information via computer technology. Several fishers interviewed are not computer literate, only have access to old technology, or still rely on dial-up. Some lack literacy skills. Others, in light of their perceptions on the way their information has been used against them in the past, may not wish to comply with survey requests. Despite such significant obstacles, this study notes, based on personal communication with fisheries managers, that some surprise was expressed about the lack of fishers' participation in written or online surveys. Thus it is recommended that surveys be conducted by phone and by agencies not related to government authorities.

6.2.3 Government Action

(i) Understanding and Incorporation of Social Impacts into Decisions and Policies

Government departments, both federal and state, whose policy decisions are likely to impact fishers, need to be informed about the implications of their policy decisions on affected individuals and communities. There needs to be a range of government attention to concerns raised by commercial operators in the different regions and fisheries. Fishers in our study focused on:

- the gap in communication, knowledge and understanding between commercial operators and decision makers;
- too little attention paid to social concerns in the development and implementation of policy and strategies affecting fisheries and environmental change;
- the lack of information and time given on how to prepare relevant paperwork affecting their futures and livelihoods;
- the lack of information about how to plan for and deal with any potential social and personal ramifications; and
- a lack of respect demonstrated towards them by some government personnel.

These issues can be addressed via workshops with fisheries and environmental management, the welfare sector and other relevant professionals, such as social workers, psychologists and counsellors, and financial counsellors.

(ii) Social Impact Assessments and Management Plans

Comprehensive social, economic, health and gender impact assessments should be conducted as part of any future planning for structural, environmental and economic change to align Australian practice with international standards and guidelines such as those required by the World Bank and International Finance Corporation (see Appendix 4), and those developed specifically for Australian fisheries (Schirmer and Casey 2005).

The assessment of social, individual, family and community impacts can, as a baseline foundation, utilise the information arising from the development and maintenance of social profiles for fishing regions in Queensland.

Funding also needs to be made available for counselling (both financial and personal) when major policy changes are mooted, e.g. related to marine parks, restructuring or fisheries' reviews.

(iii) Promotion of Commercial Fishing and Fishers

Marketing and promotion: Fishers in this study have called for greater attention by governments to promote the role of commercial fishing in Queensland. Interviewees raised the issue of criticism towards commercial operations held by the wider community and the recreational sector. As a result, the state government, through its relevant departments, should invest in marketing and promotional campaigns to advance Queensland's quality seafood, to communicate the sustainability of the commercial industry to the wider public, and to recognise the valuable contribution commercial operators make to both the community and the economy. Information on where to buy

locally caught and sustainable seafood is vital, as many supermarkets sell only imported and/or farmed fish, when they should or could be promoting the quality wild-caught local product.

Oral history project: An aspect of the marketing and communications strategy can be the development of a project to document the history of fishing in Queensland and to collect oral histories from fishers and fishing families in order to provide a detailed archive of the contribution of the fishing industry to the communities and economies of Queensland. This information can assist by providing baseline data about fisheries in the past which can be used to compare commercial operations in present times.

6.3 Planned Outcomes

(i) The Research Report

The initial planning objectives have been met through:

the conduct of the research study across the three regions
regular reports and magazine articles prepared for the QSIA;
the presentation by Dr Sylvie Shaw of the report's findings to the QSIA's Annual General Meeting in Townsville in October 2010;
presentations of the findings by Dr Sylvie Shaw at local and international conferences, workshops and seminars, including local seminars organised by DERM and CSIRO;
the delivery of the draft research report to the FRDC and QSIA;
the delivery of the final report and deliverables to the FRDC and QSIA.

Through these activities, we have offered:

timely substantive information on the social effects of fisheries closures on fishers, families and communities;
information on social resilience and adjustments that fisher households are making in light of industry restructuring;
identification of the impacts on the health and well-being and associated risks among those affected; and
relevant information on social impact assessment and participatory engagement that provides practical advice on reducing these industry risks into the future.

(ii) Training Sessions and Workshops

Following the adoption of our report by the QSIA Board, workshops and training sessions will be organised in the three regions to provide feedback for the fishers, families and ancillary businesses.

We will also seek to hold workshops for fisheries scientists, fisheries managers and other interested personnel working for the relevant government agencies during 2011. These will be organised with the QSIA, and in Moreton Bay, together with the MBSIA. We have spoken about our research at seminars organised by DERM on the scientific, economic and social changes to Moreton Bay since the implementation of the marine park. The research has also been presented to a workshop on fisheries and the social sciences organised by the CSIRO in Queensland. In Hervey Bay, a workshop will be

conducted in 2011 as part of the annual seafood festival, run in conjunction with local members of the QSIA and the local community.

(iii) Self-help Guidebook

A self-help guide for fishers and families in the three regions has been prepared and will be distributed in 2011. The material will also be incorporated into the QSIA website. It is attached as an adjunct to this report.

The *Information Guide for Fishers and Families in the Moreton Bay, Hervey Bay and the Burdekin and Townsville Regions* contains information relevant to the results of this study. The information is designed to provide contacts with a range of government and community organisations which can assist fishers and their families in relation to:

financial advice and counselling
the provision of emergency financial and family support
information on training and retraining opportunities
physical and mental health concerns
advice on men's particular health issues
information on substance abuse services and gambling addiction
advice on relationship and family issues, including domestic violence
welfare services
relevant local council services.

(iv) Executive Summary

The executive summary of the report is a brief description of the study and its major findings. This will be incorporated in the Media Kit (see 6.3.vi), and may also be included on the QSIA website as a significant portal for fishers seeking access to information. The Executive Summary is attached as an adjunct to this report.

(v) Background Information Fact Sheet

A fact sheet outlining the major findings of this study will be provided to relevant government and non-government agencies and distributed in training sessions and workshops. It may also be included in official and industry websites as portals for wider information dissemination. The usefulness of this information will be assessed through the feedback evaluation in workshops. The Fact Sheet is attached as an adjunct to this report.

(vi) Media Kit

Upon acceptance of our report by the QSIA and the FRDC, media releases will be prepared for local and regional newspapers, and the QSIA website and magazine, and will include an Executive Summary, the background information Fact Sheet, and the non-technical summary of the report. The draft media release is attached as an adjunct to this report.

(vii) Academic Journals

From 2011, scholarly articles will be written on our findings and distributed to academic journals.

(viii) Evaluation

In each of the workshops and training sessions, a program evaluation will be conducted consisting of feedback from participants. To determine whether the original research has produced knowledge of value to policymakers, the study's findings will be published in peer-reviewed academic journals (as outlined above). The evaluation form is attached as an adjunct to this report.

6.4 Conclusion

This report has outlined a number of significant social consequences of fisheries and environmental management decisions which in various ways have impacted people in and associated with the commercial industry. It has documented the reactions of those most affected, the fishers, their partners and fishing-related businesses, by the effects of social and industrial change. The change includes the effects of policy decisions, which are perceived to have limited fishing operations, and impacted on fishers' and their families' quality of life, both at work on the water and at home.

Quality of life is defined by Stuart Chapin III et al. (2009:153) for a person who has 'the basic material needs for a good life, freedom and choice, good social relations, and personal security'. Some interviewees perceive their quality of life to be at risk. Many fear the demise of the industry and their way of life. While this fear may be unfounded in light of tighter regulatory controls which act to promote sustainability and preserve the fishery and the environment over the long term, it is a commonly held perception. As a result, a majority of interviewees initially responded to the introduction of marine parks, adjustment assistance and other management measures with frustration, anger and stress. Over time, most have adapted to the changed conditions. Some are now more viable, and even happier, as a result of the changes and accompanying challenges.

Our study has examined the values, attitudes and concerns of fishers and families and found a balance between the pessimism associated with the long-term view of Queensland fisheries and the optimism and resilience shown in the face of change. Despite the severity in some instances of health and well-being outcomes, fishers and families are finding innovative ways to stay afloat and stay ahead. Although challenged by the impacts of change, adaptive, entrepreneurial, and resilient fishers are 'growing' their business, upgrading their skills, or developing individual and joint marketing and other strategies to promote the local healthy and sustainable resource, to ensure a supply of fresh seafood is available all year round, and to preserve the fishing environment (economically, socially and ecologically) into the future. In the process though, some interviewees report feeling let down by a management regime which they regard has overlooked the serious social, personal and family effects of change.

Despite this perspective, our study is not intended as a critique of management in opposition to the commercial fishing sector, but rather, it aims to provide an analysis of the perceived impacts of change on the industry as noted by the interviewees, specifically on their health, well-being and quality of life. Fishing has been a means to a

good living and quality of life over time, but recent developments have combined to test that strongly held notion. Adjusting to the new conditions and adapting to change have not been consistently easy. Health and family relationships have been negatively affected. Some fishers, families and business owners have suffered in various ways.

To highlight these issues and the effects of change, we gathered the views and experiences from the fishing community and analysed the data using qualitative and narrative methodologies. Through the study, we have documented information about the attitudes, perceptions and experiences particularly of commercial fishers, which may have been known anecdotally and referred to in other research, but have not been explicitly covered, or in such depth, in other Queensland fisheries' studies. In undertaking detailed interviews with inshore fishers, their partners and business owners, we have revealed a profound level of concern and serious health and well-being issues that have hitherto not been sufficiently recognised in Queensland.

The study set out to examine the attitudes, values and experiences of fishers and their families and identify the social and cultural impacts surrounding well-being, quality of life, and social resilience and adaptations as a result of fishing closures, fishing effort rationalisation and social, economic and ecological change. The study did not introduce broader concepts such as globalisation or climate change that are also affecting the fishery, rather, the focus remained on the social impacts of local regulatory frameworks on the commercial industry. These other issues, however, are important to incorporate into future research.

Another important area for further study is research on the attitudes, values and experiences of those in managerial and scientific positions who work with the fishing industry. Understanding their motivations, backgrounds and experiences is also crucial.

At a structural level, the approach adopted by management has not sufficiently scrutinised the social impacts of its policymaking to date. Instead, it has tended to relegate the serious impacts on personal and family health to the welfare sector, rather than incorporating the social implications of management decisions within current fisheries and environment and resource management structures. Information and guidelines on the operation of social impact assessments in Australian fisheries is readily available, so in the future, thorough SIAs and SEIAs need to be conducted for any major policy intervention likely to affect the commercial industry in Queensland.

A significant outcome of changes over recent years has been a shift in the industry towards corporatisation and entrepreneurship. We have found changes operating in a range of structures, in addition to single owner-operators, including:

- corporate or large efficient family-owned operations, e.g. in the trawl sector (Hervey Bay and the Burdekin);
- smaller trawl operations;
- cartel and cooperative structures emerging in Moreton Bay;
- cluster arrangement of netters and crabbers in the Burdekin; and
- part-time fishers.

These changes are reflected in the differing experiences between fishers having intergenerational links and support networks within the community and/or industry in the three regions. Documenting the extent of social cohesion (social capital) and community understanding is an important area for further research. Attitudes on social and fisheries cohesion are also reflected in the experiences of some of the younger fishers who have found less acceptance among the longer-term operators, perhaps reflecting the difference between the traditional lifestyle fishers and the younger more entrepreneurial-oriented fishers. However, this is not the experience of all, especially those following in their family's footsteps. How fishing skills and knowledge are passed on to newer entrants, how non-family heritage fishers learn their craft, and how community and intra- and cross-fishery links reflect the health of local fishing operations, including the health of local ecosystems, are all relevant areas for further study.

Many fishers enjoy being their own boss, having autonomy and an independent lifestyle. They dislike what they see as fisheries' and other authorities' encroaching demands on their time for detailed administrative information. It is suggested that more effective communication from management, as well as collaborative working arrangements such as the spread of co-management and regional management structures, will enable fishers to become more understanding of management's requirements, and also assist managers to become more aware of the demands of fishers' working lives and their needs. Science and management personnel are both actively engaged, as are fishers, in preserving the aquatic environment and promoting the efficiency and profitability of fishing operations. However, as detailed throughout this report, the social, cultural, economic and psychological needs and reactions of those affected by policy goals need to be incorporated into research, stakeholder consultation and negotiation processes.

The resultant impacts revealed in our study suggest that it is imperative to incorporate the social ramifications of policies into management practices and to effectively deal with problems should they arise. In the farming sector, health, well-being and quality of life outcomes are treated as industrial issues. A similar approach must be taken in fisheries.

APPENDIX 1

Intellectual Property

There are no intellectual property issues emerging from the study and no material that will be commercialised.

APPENDIX 2

Personnel Involved in the Study

Chief Investigators

Dr Wolfram Dressler, School of Social Sciences, The University of Queensland

Dr Helen Johnson, School of Social Sciences, The University of Queensland

Dr Sylvie Shaw, School of History, Philosophy, Religion and Classics, The University of Queensland.

Researchers

Ms Lucy Campbell, School of History, Philosophy, Religion and Classics, The University of Queensland

Dr Michael Fabinyi, School of Social Sciences, The University of Queensland and ARC Centre of Excellence for Coral Reef Studies at James Cook University

Dr Mark Schubert, School of Social Sciences, The University of Queensland.

APPENDIX 3

Interview Schedule

This appendix includes the range and kinds of questions that were asked during interviews with fishers, wives/partners and ancillary businesses. Interviews were conducted as semi-structured conversations with the types of ideas framed in the following questions used as guides for discussion.

(i) Questions for Fishers

Demographics and fisheries information
What have you seen changed over what period of time?
How long have you lived or worked in commercial fishing?
What do you see are the major problems affecting Queensland fisheries?
How do you envisage the future of fisheries?
What is the impact of Queensland fisheries management on your work?
Have you noticed any change since the structural adjustment programs were introduced in (a) the Great Barrier Reef Marine Park, and (b) Moreton Bay (where relevant)?
What are the specific issues affecting Hervey Bay?
Do you think Queensland's fisheries are healthy – and what does healthy mean to you?
Why did you decide to take up fishing?
How do you feel about the industry now? What are your perceptions of its viability?
What are your reasons for continuing to fish now?
How risky is your fishing operation? Do you recognize the risks and try to reduce them?
What concerns do you have for yourself and other fishers in what is described as a risky business?
How do you cope with the vagaries of the weather?
Would you recommend young people to join the industry? If not why? How does this comment make you feel?
If you have been fishing for several years, how has the fishery changed, e.g. natural environment, coastal vegetation, numbers of fish and fishing boats, management issues etc.
Have the changes affected you in any way – social, emotional/psychological, spiritual? Can you describe the impact change – physically and emotionally?
How would you assess this impact on your fishing operations, and your family?
How has this change affected the way you carry out your work - financially, socially, physically and psychologically (i.e. mental health and well-being)?
Are you optimistic or pessimistic about the future of the fishing in Queensland?
What is your reaction to marine protected areas? Are they useful or not in terms of sustainability? Explain your answer.
How have fishing closures affected you?
Do you think the marine parks will enhance the fishery in the long run? How?
Over all, how would you rate the environmental quality of Queensland's marine environment?
What changes would you like to see for Queensland fisheries – environmentally and socially?

(ii) Questions for Wives/Partners

How long have you been involved in fisheries?
Are you part of the company, and if so, do you actively work for the fishery, e.g. on board, at the dock, at home e.g. bookkeeping?
How do you perceive the industry in Queensland?
Are you involved in any activities related to the fishery (e.g. festivals, training, lobbying etc.)?
What are some of the major concerns you experience?
How do you cope with this, for instance, do you get together with other wives and share these concerns?
What are your perspectives on the risks and dangers of the industry? How do you deal with this?
In terms of the changes to the industry, how have you and/or the family been affected? How has this made you feel?
Are you involved in any project with your partner, or other local fishers, to discuss the issues that might be affecting you?
If you have children, have they been affected in any way by the changes (e.g. if you have had to relocate, or change the fishery)?
Are the children involved in the industry?
Would you recommend young people joining the industry? If not, why?
How do you perceive the future of Queensland fisheries?
How do you perceive the health of the marine environment?

(iii) Questions for Fisheries-related Businesses

How long have you been involved in fisheries?
How do you perceive the industry in Queensland?
What are some of the major changes you have experienced?
How do you perceive the future of Queensland fisheries?
How healthy is your business?
How do you perceive the health of the marine environment?
What are some of the major changes you have noticed over time?
Were you affected by the buyback and SAP (where relevant)? If so how?
In terms of the changes to the industry, how have you and the business been affected? In what way?
Are you optimistic or pessimistic about the future of the industry in Queensland?

APPENDIX 4

Social Impact Assessment Guidelines

Fisheries specific SIAs have been developed by the Bureau of Rural Sciences in conjunction with the FRDC. The 'Social Assessment Handbook: A guide to methods and approaches for assessing the social sustainability of fisheries in Australia (Schirmer 2005) is available via:
http://www.fisheries-esd.com/a/pdf/Social_Assessment_Handbook.pdf.

As an alternative set of guidelines, the information noted here is taken from the International Finance Corporation's (IFC's) Policy and Performance Standards on Social and Environmental Sustainability and Policy on Disclosure of Information: Report on the First Three Years of Application (2009). These international management standards for Social Impact Assessment suggest the need for stakeholder engagement at the following stages of the project:

- The beginning of the project.
- During consideration of alternative project designs.
- During the assessment of project impacts on the environment, society, the health of workers and local communities, and the health infrastructure of the area in and around the affected area.
- When devising compensation rates and eligibility for entitlement.
- When considering development opportunities and initiatives.
- In designing and implementing grievance redress procedures and dispute resolution processes.
- When devising methods and mechanisms for monitoring, evaluation and implementing corrective actions.

In relation to environmental and social impact assessments, there is also a need for stakeholder engagement during:

- Development of the terms of reference.
- Identification of impacts.
- Development of mitigation measures.

The standards of the International Finance Corporation (IFC) are the basis for The IFC's Performance Standard 1: Social and Environmental Assessment and Management Systems, paragraph 21, states:

> If affected communities may be subject to risks or adverse impacts from a project, the client will conduct a process of consultation in a manner that provides the affected communities with opportunities to express their views on project risks, impacts, and mitigation measures, and allows the client to consider and respond to them. Effective consultation: (i) should be based on the prior disclosure of relevant and adequate information, including draft documents and plans; (ii) should begin early in the Social and Environmental Assessment process; (iii) will focus on the social and environmental risks and adverse impacts, and the proposed measures and actions to address these; and (iv) will be carried out on an ongoing basis as risks and impacts arise. The consultation process will be conducted in a manner

> that is inclusive and culturally appropriate. The client will tailor its consultation process to the language preferences of the affected communities, their decision-making process, and the needs of disadvantaged or vulnerable groups (IFC 2009).

The IFC describes community engagement as an important element throughout the life of a project as well as specifically in managing social and environmental impacts. Community engagement normally involves the disclosure of information, consultation with affected communities, and the establishment of a feedback and/ or grievance mechanism. The IFC states: Community engagement should occur as an integral part of the Assessment and, in the case of projects that have significant impacts on communities, will normally continue on an ongoing basis during the life of a project.

Such international standards suggest that Australian government agencies that are creating interventions into the livelihoods and lives of the country's fishers and their families should plan to consult with the impacted communities regularly throughout the life of the intervention, and beyond, on all major issues affecting the community and to monitor and evaluate the effectiveness of their consultation activities.

REFERENCES

ABC [Australian Broadcasting Corporation]. 'The angry angler: protecting the Great Barrier Reef.' *Background Briefing* April 13, 2003. Online: http://www.abc.net.au/rn/talks/bbing/stories/s833692.htm

———, 2008. 'Fishermen rally for port cleanup.' Online: http://www.abc.net.au/local/stories/2008/04/03/2207296.htm.

———, 2009. 'Crackdown on Moreton Bay green zones.' Online: http://www.abc.net.au/news/stories/2009/09/30/2700171.htm.

ABARE [Australian Bureau of Agricultural and Resource Economics]. 2008. 'Australian fisheries statistics 2008. Online: http://www.abareconomics.com/interactive/09_afs.

AFFA [Agriculture, Fisheries and Forestry – Australia]. 2003. *Looking to the future: a review of Commonwealth fisheries policy*. Canberra.

Agardy, T. 2010. *Ocean zoning: making marine management more effective.* Washington and London: Earthscan.

Agardy, T., P. Bridgewater, M.P. Crosby, J. Day, P.K. Dayton, P. Kenchington, D. Laffoley, P. McConney, P.A. Murray, J.E. Parks, and L. Peau. 2003. 'Dangerous targets? Unresolved issues and ideological clashes around marine protected areas.' *Aquatic Conservation: Marine and Freshwater Ecosystems* 13: 353-367.

Ahearn, K., J. Esdaile, K. Rudkin, and N. Udy. 2009. *Plan for the monitoring and mitigation of blooms of the cyanobacterium, Lyngbya majuscula, in south-east Queensland 2009/2010.* State of Queensland (Department of Environment and Resource Management).

Alcala, A.C. and G.R. Russ. 2006. 'No-take marine reserves and reef fisheries management in the Philippines: a new people power revolution.' *Ambio* 35(5): 245-254.

Arata, C.M., J.S. Picou, G.D. Johnson, and T.S. McNally. 2000. 'Coping with technological disaster: an application of the conservation of resources model to the Exxon Valdez oil spill.' *Journal of Traumatic Stress* 13: 23-39.

Arin, T. and R.A. Kramer. 2002. 'Divers' willingness to pay to visit marine sanctuaries: an exploratory study.' *Ocean & Coastal Management* 45: 171-183.

Aslin, H.J. and I.G. Bryon. 2003. *Community perceptions of fishing: implications for industry image, marketing and sustainability.* Project No. 2001/309. Fisheries Research and Development Corporation, Deakin West, ACT.

Aslin, H.J., R.D. Connor, and M. Fisher. 2001. *Sharing in the catch or cashing in the share? Social impacts of Individual Transferable Quotas and the South East Fishery.* Bureau of Rural Sciences, Canberra.

Aslin, H.J., T. Webb and M. Fisher. 2000. *Fishing for women: understanding women's roles in the fishing industry.* Bureau of Rural Sciences, Canberra

Australian Fisheries Management Authority (AFMA), 2004. *Cost recovery impact statement*. Online: http://www.afma.gov.au.

———, 2009a. *Ecologically sustainable development in context*. Online: http://www.afma.gov.au.

———, 2009b. *Cost recovery impact statement*. Online: http://www.afma.gov.au.

Baelde, P. 2001. 'Using fishers' knowledge goes beyond filling gaps in scientific knowledge - analysis of Australian experiences.' In N. Haggan, C. Brignall, and L. Wood. Eds., *Putting fishers' knowledge to work,* Conference Proceedings, August 27-30, 2001. Fisheries Centre Research Reports, 11(1): 78-86, Fisheries Centre, University of British Columbia, Vancouver.

———, 2005. ‘Interactions between the implementation of marine protected areas and right-based fisheries management in Australia.’ *Fisheries Management and Ecology* 12: 9-18.
Baker, A. 2006. ‘The cultural evolution of commercial fishing communities.’ Paper presented to the *2007 SAM Conference,* School of Business, Providence College. Oct. 28, 2006. Online: http://digitalcommons.providence.edu/business_fac/1.
Ballard, A. 2010. Fishing bans for Fraser Coast. *Fishingmonthly.com.au*. Online: http://www.fishingmonthly.com.au/Articles/Display/9344-Fishing-Bans-For-Fraser-Coast.
Bavington, D. B. Grzetic, and B. Neis. 2004. ‘The feminist political ecology of fishing down: reflections from Newfoundland and Labrador.’ *Studies in Political Economy* 73: 159-182.
Bavnick, M. and I. Monnereau. 2007. ‘Assessing the social costs of capture fisheries: an exploratory study.’ *Social Science Information* 46: 135-152.
Berkes, F. 2009. ‘Evolution of co-management: role of knowledge generation, bridging organizations and social learning.’ *Journal of Environmental Management* 90(5): 1692-1702.
Berns, L. 1999. ‘Lacey Berns - groundswell fisheries movement. Part 1 - fishing-dependent communities.’ *Alaska Report.* Excerpts from Master’s thesis: ‘Alaska’s changing coastal communities - a case study of Kodiak Island: implications of low salmon prices and sustainability’, Humboldt State University, McKinleyville, CA. *Alaska Report.* Online: http://www.alaskareport.com/lacey-berns.htm.
Bess, R. and R. Rallapudi. 2007. ‘Spatial conflicts in New Zealand fisheries: the rights of fishers and protection of the marine environment.’ *Marine Policy* 31(6): 645-746.
Binkley, M. 1996. ‘Nova Scotian fishing families coping with the fisheries crisis.’ *Anthropologia* 38(2): 197-219.
———, 2000a. ‘From fishing centre to tourist destination: the restructuring of Lunenberg, Nova Scotia.’ Lecture presented at the University of Faroe Islands, April 26 2000.
———, 2000b. “‘Getting by’ in tough times: coping with the fisheries crisis.’ *Women’s Studies International Forum* 23(3): 323-332.
———, 2002. *Set adrift: fishing families.* Toronto: University of Toronto Press.
Blount, B.G. and A. Pitchon. 2007. ‘An anthropological research protocol for marine protected areas: creating a niche in a multidisciplinary cultural hierarchy.’ *Human Organization* 66(2): 103-111.
Bowen, J. and M. Bowen. 2002. *The Great Barrier Reef: history, science, heritage*. Cambridge, UK: Cambridge University Press.
Brannen, C., D.J. Emberly, and P. McGrath. 2009. ‘Stress in rural Canada: a structured review of context, stress levels, and sources of stress.’ *Health & Place* 15: 219-227.
Bratton, S.P. and S. Hinz. 2002. ‘Ethical responses to commercial fisheries decline in the Republic of Ireland.’ *Ethics and the Environment,* 7(1): 54-91.
Brookfield, K., T. Gray, and J. Hatchard. 2005. ‘The concept of fisheries-dependent communities. a comparative analysis of four UK case studies: Shetland, Peterhead, North Shields and Lowestoft.’ *Fisheries Research* 72: 55-69.

Brooks, K. 2008. 'Sustainable development: social outcomes of structural adjustments in a South Australian fishery.' Paper presented to The Australian Sociological Association (TASA) Conference, *Re-imagining Sociology,* Melbourne University, Dec. 2008**.** Online: http://www.tasa.org.au/conferences/conferencepapers08/Policy/Brooks,%20Kate,%20Session%2032%20PDF.pdf.

———, 2010. 'Sustainable development: Social outcomes of structural adjustments in a South Australian fishery.' *Marine Policy* 34(3): 671-678.

Brown, I.W., M.C. Dunning, S. Hansford, and L. Gwynne. 2001. *Ecological assessment Queensland spanner crab fishery.* Department of Primary Industry, Brisbane.

Brown, S. 2008. 'Religion and fisheries management in coastal North Carolina.' Unpublished Master's thesis, Duke University, Durham, NC.

Bureau of Rural Science (BRS). 2003. *Implementing the Representative Areas Program in the Great Barrier Reef Marine Park: assessment of potential social impacts on commercial fishing and associated communities.* Canberra: Commonwealth of Australia.

Burnett Mary Regional Group. 2010. 'Concerned fishermen initiate cleanup!' Online: http://www.bmrg.org.au/information.php/2/55/160.

Butler, C.F. 2008. 'Paper fish: the transformation of the salmon fisheries of British Columbia.' In Lowe, M.E. and C. Carothers, *Enclosing the fisheries: people, places and power*, 75-98. Bethesda, Maryland: American Fisheries Society.

Cadwaller P., M. Russell, D. Cameron, M. Bishop, and J. Tanzer. 2000. 'Achieving ecologically sustainable fisheries in the Great Barrier Reef World Heritage Area.' *Proceedings of the 9th International Coral Reef Symposium,* Bali, Indonesia, October 23-27, 2000.

Caldwell, K. and C.P. Boyd. 2009. 'Coping and resilience in farming families affected by drought.' *Rural and Remote Health* 9: 1088. Online: http://www.rrh.org.au.

Campbell, A.B., M.F. O'Neill, W.D. Sumpton, J.M. Kirkwood, and S. Wesche. 2009. *Stock assessment of the Queensland snapper fishery (Australia) and management strategies for improving sustainability.* Brisbane: Queensland Primary Industries & Fisheries.

Carawan, L.E. 2004. 'Added layers of stress in the commercial fisheries.' *Stress, Trauma, and Crisis* 7(3): 187-207.

Carlsson, L. and F. Berkes. 2005. 'Co-management: concepts and methodological implications.' *Journal of Environmental Management* 75(1): 65-76.

Carothers, C. 2008. '"Rationalized out": discourses and realities of fisheries privatization in Kodiak, Alaska.' In Lowe, M.E. and C. Carothers, *Enclosing the fisheries: people, places and power*, 5-74. Bethesda, Maryland: American Fisheries Society.

Charles, A. 2006. 'The human dimensions of fisheries adjustment: an overview of key issues and policy challenges.' Paper presented at the OECD meeting on the *Human Side of Fisheries Adjustment,* Paris, Oct. 19, 2006.

Charles, A. and L. Wilson. 2009. 'Human dimensions of marine protected areas.' *ICES Journal of Marine Science* 66: 6-15.

Charmaz, K. 2007. *Constructing grounded theory: a practical guide through qualitative analysis.* Thousand Oaks, CA: Sage.

Christie, P. and A.T. White. 2007. 'Best practices for improved governance of coral reef marine protected areas.' *Coral Reefs* 26(4): 1047-1056.

Christie, P., D.L. Fluharty, A.T. White, L. Eisma-Osorio, and W. Jatulan. 2007. 'Assessing the feasibility of ecosystem-based fisheries management in tropical contexts.' *Marine Policy* 31: 239-250.

Christie. P., B.J. McCay, M.L. Miller. C. Lowe, A.T. White, R. Stoffle. D.L. Fluharty. L.T. McManus, R. Chuenpagdee, C. Pomeroy, D.O. Suman, B.G. Blount, D. Huppert, R.L.V. Eisma, E. Oracion, K. Lowry, R.B. Pollnac. 2003. 'Toward developing a complete understanding: A social science research agenda for marine protected areas.' *Fisheries* 28: 22-26.

Choo, P.S., B.S. Nowak, K. Kusakabe, and M.J. Williams. 2008. 'Guest editorial: gender and fisheries.' *Development* 51: 176–179.

Clark, C.W., G.R. Munro, and U.R. Sumaila. 2005. 'Subsidies, buybacks and sustainable fisheries.' *Journal of Environmental Economics and Management* 50: 47-58.

Clay, P.M. and J. Olson, 2008a. 'Defining 'fishing communities': vulnerability and the Magnuson-Stevens Fishery Conservation and Management Act'. *Human Ecology Review* 15 (2): 143-160.

———, 2008b. 'Defining fishing communities: Issues in theory and practice.' *NAPA Bulletin* 28: 27-42.

Commonwealth Fisheries Management Act (CFMA) 1991. Online: http://www.comlaw.gov.au.

Commonwealth of Australia. 1998. *Australia's Oceans Policy*. Online: http://www.environment.gov.au/coasts/oceans-policy/publications/pubs/policyv1.pdf.

———, 2007. *Conserving Australia. Australia's national parks, conservation reserves and marine protected areas.* The Senate Standing Committee on Environment, Communications, Information Technology and the Arts. April, 2007. Online: http://www.aph.gov.au/senate/committee/ecita_ctte/completed_inquiries/2004-07/nationalparks/report/index.htm.

Conway, F.D.L., J. Gilden, and A.M. Zvonkovic. 2002. 'Changing communication and roles: innovations in Oregon's fishing families, communities, and management.' *Fisheries* 27: 20-29.

Conway, F.D.L. and W. Shaw. 2008. 'Socioeconomic lessons learned from the response to the federally-declared West Coast groundfish disaster.' *Fisheries* 33: 269-277.

Cooke, S.J. and I.G. Cowx. 2006. 'Searching for common issues to promote unified conservation of fisheries resources and aquatic environments.' *Biological Conservation* 128(1): 93-108.

Costello, C., S. Gaines, and J. Lynham. 2008. 'Can catch shares prevent fisheries collapse?' *Science* 321: 1678-1681.

Courtney, T. and M. Campbell. 2010. *Research results show that bycatch in the Queensland scallop fishery can be reduced by 78% with no loss of commercial size scallops*. Department of Primary Industries, Queensland. Online: http://www2.dpi.qld.gov.au/extra/pdf/fishweb/bycatchresearch.pdf.

Coward, H., R. Ommer, and T. Pitcher. Eds. 2000. *Just fish: ethics and Canadian marine fisheries.* Social and economic papers 23, Institute of Social and Economic Research, Memorial University of Newfoundland, St John's, Newfoundland.

Crain, C.M., B.S. Halpern, M.W. Beck, and C.V. Kappel. 2009. Understanding and managing human threats to the coastal marine environment. *The Year in Ecology and Conservation Biology* 1162: 39-62.

Crean K. 2001. 'Centralized and community-based fisheries management strategies: case studies from two fisheries dependent archipelagos.' *Marine Policy* 23: 243-257.

Cripps, S., E. Hegerl, K. Short, D. Tarte, T. Ward, and A. Wilson. 2001. *Ecosystem-based management for marine capture fisheries*. Sydney: WWF-Australia.

Curtis, R. and D. Squires. Eds. 2007. *Fisheries buybacks.* Ames Iowa: Blackwell Publishing.

da Costa-Roque, S. 1985. 'So close yet a million miles away.' *Sunday Mail* 12-13.

Davis, A. and J. Wagner. 2006. 'A right to fish for a living? The case for coastal fishing people's determination of access and participation.' *Ocean & Coastal Management* 49(7-8): 476-497.
Davis, D. 2000. 'Gendered cultures of conflict and discontent: living the crisis in a Newfoundland community.' *Women's Studies International Forum* 10: 135-146.
Davis, M.E. 2011. 'Perceptions of occupational risk by US commercial fishermen.' *Marine Policy* (article in press, corrected proof).
DEAWR [Department of Environment and Water Resources]. 2007. *Guidelines for the ecologically sustainable management of fisheries, 2007*. Australian Government, Canberra. Online: http://www.environment.gov.au/coasts/fisheries/publications/pubs/guidelines.pdf.
DEEDI [Department of Employment, Economic Development and Innovation] 2009a. *Your fish. Your future. Queensland Fisheries Strategy, 2009-14*. Online: http://www.dpi.qld.gov.au/documents/Fisheries_PolicyAndLegislation/Qld-Fisheries-Strategy-09to14.pdf.
———, 2009b. *Guidelines for commercial operators in the East Coast Inshore Finfish fishery.* Online: http://www.dpi.qld.gov.au/documents/Fisheries_CommercialFisheries/Commercial-Fisheries-handbook.pdf.
———, 2009c. *Summary results of consultation: Draft Queensland Fisheries Strategy 2009-2014.* Online: http://www.dpi.qld.gov.au/documents/Fisheries_PolicyAndLegislation/Summary-result-of-fisheries-strategy-consultation-2009.pdf.
———, 2010a. *Annual status reports.* Online: http://www.dpi.qld.gov.au/28_10916.htm.
———, 2010b. *Commercial trawling in Queensland*. Online: http://www.dpi.qld.gov.au/28_15511.htm.
———, 2010d. *Net fisheries*. Online: http://dpi.qld.gov.au/28_16066.htm.
———, 2010d. *Annual status report 2010 - Queensland Spanner Crab fishery.* Online: http://www.dpi.qld.gov.au/documents/Fisheries_SustainableFishing/Spanner-Crab-ASR-2010.pdf.
———, 2010f. *Rocky Reef Fin Fish fishery 2009. Updated progress against DEWHA conditions and recommendations for fishery reassessment, January 2010.* Online: http://www.environment.gov.au/coasts/fisheries/qld/rocky-reef-finfish/pubs/updated-conditions-recommendations-2010.pdf.
Degnbol, P. 2003. 'Science and the user perspective: The gap co-management must address.' In D.C. Wilson, J. Raakjær Nielsen, and P. Degnbol, Eds., *The fisheries co-management experience. Accomplishments, challenges and prospects,* 31–49. Fish and Fisheries Series, 26, Kluwer Academic Publishers, Dordrecht.
Degnbol, P., H. Gislason, S. Hanna, S. Jentoft, J. Raakjær Nielsen, S. Sverdrup-Jensen, and D.C, Wilson. 2006. 'Painting the floor with a hammer: technical fixes in fisheries management.' *Marine Policy* 30: 534-543.
DEH [Department of Environment and Heritage]. 2004. Marine protected areas and displaced fishing: a policy statement.
———, 2005. *Assessment of the Queensland coral reef finfish fishery*. Canberra: Commonwealth of Australia.
———, 2010. *National representative system of marine protected areas.* Online: http://www.environment.gov.au/coasts/mpa/nrmpa/index.html.
Delaney, A. 2009. 'Social impact assessment and community profiling.' *Innovative Fisheries Management Publication* 213, Aalborg University. Online: http://www.ifm.dk/publications.html.

Delaney, A.E., H.A McLay, and W.L.T. Van Densen. 2007. 'Influences of discourse on decision-making in EU fisheries management: the case of North Sea cod (*Gadus morhua*).' *ICES Journal of Marine Science* 64(4): 804-810.

DERM [Department of Environment and Resource Management]. 2004. 'Synthesis of results-to-date of the *Lyngbya* tasks.' *Lyngbya* Update, May. Online: http://www.derm.qld.gov.au/register/p01425aa.pdf.

———, 2010. Great Sandy Marine Park provisions table. Online: http://www.derm.qld.gov.au/parks/great-sandy-marine/provisions-table.html.

DEWHA [Department of the Environment, Water, Heritage and the Arts]. 1998. Australia's Oceans Policy. Online: http://www.environment.gov.au/coasts/oceans-policy/index.html.

———, 2010. Fact sheet: the areas for further assessment in the East Marine Region. Online: http://www.fish.wa.gov.au/docs/events/ShareFish/papers/abstracts/Zena%20Dinesen.html.

DEWR [Department of Environment and Water Resources]. 2007. Guidelines for the ecologically sustainable management of fisheries – 2007. Online: http://www.environment.gov.au/coasts/fisheries/publications/pubs/guidelines.pdf.

Dinesen, Z. 2006. 'Fishing and marine protected areas – how can we best share the fish to meet fisheries and conservation objectives? Paper presented at the *Sharing the Fish Conference*, Perth.

Dolan, H., M. Taylor, B. Neis, R. Ommer, J. Eyles, D. Schneider, and B. Montevecchi. 2002. 'Restructuring and health in Canadian coastal communities.' *EcoHealth* 2:195-208.

DSEWPC [Department of Sustainability, Environment, Water, Population and Communities]. 2009. Queensland East Coast Otter Trawl fishery. Online: http://www.environment.gov.au/coasts/fisheries/qld/eco-trawl/decision.html.

Durrenberger, E.P. 1997. 'Fisheries management models: assumptions and realities or, why shrimpers in Mississippi are not firms. *Human Organization* 56(2): 158-166.

Dwyer, P.D., T.J. King, and M. Minnegal. 2008. 'Managing shark fishers in southern Australia: A critique. *Marine Policy* 32(3): 263-273.

Dwyer, P. and M. Minnegal. 2009. 'Social science research in fisheries: some reflections.' Paper presented at the CSRIO Fisheries Workshop, Cleveland, Qld., May, 2009.

Ebbin, S.A. 2009. 'Institutional and ethical dimensions of resilience in fishing systems: Perspectives from co-managed fisheries in the Pacific Northwest.' *Marine Policy* 33(2): 264-270.

Endter-Wada, J. and S.P. Keenan. 2005. 'Adaptations by long-term commercial fishing families in the California Bight: coping with changing coastal ecological and social systems.' *Human Organization*: 64(3): 225-239.

Environmental Protection and Biodiversity Conservation Act 1999. Online: http://www.environment.gov.au/epbc/about/index.html.

Ernst and Young Australia. 2008. *Audit of business exit assistance – voluntary surrender of fishing concession (licence buyback).* Report of Department of Agriculture, Fisheries and Forestry, September 2, 2008.

European Union. 2003. 'Women in the fisheries: An unnoticed role.' *Fishing in Europe* 17.

Feeney, F.G. K.J. La Valley, M. Hall-Arber. 2010. 'Assessing stakeholder perspectives on the impacts of a decade of collaborative fisheries research in the Gulf of Maine and Georges Bank.' *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 2: 205-216.

Fenton, P. and N. Marshall. 2001. 'A guide to fishers of Queensland.' CRC Reef Research Centre Technical Report No. 3. Online: http://www.reef.crc.org.au/research/fishing_fisheries/commercial.html.
FERM [Fisheries Economics, Research and Management Pry. Ltd.]. 2004. *ITQs, ageing boats and the price of fish. Profitability and autonomous adjustment in the South East Trawl Fishery,* November 2004. Online: http://www.umr-amure.fr/conf/fast_second_workshop/w2_retour_ferm.pdf.
Fisheries Act 1994. Online: http://www.legislation.qld.gov.au.
Fisheries (Coral Reef Fin Fish Fishery) Management Plan (1999). Online: http://www.legislation.qld.gov.au.
Fisheries East Coast Trawl) Management Plan (1999). Online: http://www.legislation.qld.gov.au.
Fisheries (Spanner Crab) Management Plan (1999). Online: http://www.legislation.qld.gov.au.
Fisheries Queensland. 2011. Burdekin regional fisheries management consultation. Online: http://www.dpi.qld.gov.au/28_20171.htm
Fragar, L., A. Henderson, C. Morton, and K. Pollock. 2008a. *The mental health of people on Australian farms – the facts.* Rural Industries Research and Development Corporation and Australian Centre for Agricultural Health and Safety.
Fragar, L., B. Kelly, M. Peters, A. Henderson, A. Tonna. 2008b. 'Partnerships to promote mental health of NSW farmers – the New South Wales Farmers Blueprint for Mental Health**.'** *Australian Journal of Rural Health* 16**:** 170-175.
Fraser, C.E., K.B. Smith, F. Judd, J.S. Humphreys, L.J. Fragar, and A. Henderson. 2005. 'Farming and mental health problems and mental illness.' *International Journal of Social Psychiatry* 51(4): 340-349.
Fraser Coast Chronicle. 2010. 'Operator welcomes trawler boost.' Oct 30, 2010. Online: http://www.frasercoastchronicle.com.au/story/2010/10/30/operator-welcomes-trawler-boost-plan/.
FRDC [Fisheries Research and Development Corporation] 2007. 'Crowdy confronts social issues.' *R&D News* 12(4). Online: http://search.frdc.com.au/search/cache.cgi?collection=wwwfrdc2&doc=http/www.frdc.com.au/pub/news/124.03.php.
Fuller, J. and J. Broadbent. 2006. 'Mental health referral role of rural financial counsellors.' *Australian Journal of Rural Health* 14: 79-85.
Game, E.T., M.E. Watts, S. Wooldridge, and H.P. Possingham. 2008. 'Planning for persistence in marine reserves: a question of catastrophic importance.' *Ecological Applications* 18: 670–680.
Garcin, A. 2009. 'Impacts on commercial fishers of the rezoning of Moreton Bay Marine Park, Queensland Australia.' Unpublished Master's thesis, The University of Queensland, St Lucia.
Gatewood, J.B. and B.J. McCay. 1988. 'Job satisfaction and the culture of fishing.' *MAST* 1(2): 103-128.
———, 1990. 'Comparison of job satisfaction in six New Jersey fisheries: implications for management.' *Human Organization* 49(1): 14-25.
GBRMPA [Great Barrier Reef Marine Park Authority]. 1994. Keeping it great: a 25 year strategic plan for the Great Barrier Reef World Heritage Area. Online: http://www.gbrmpa.gov.au/__data/assets/pdf_file/0005/2111/mp_017_full.pdf.
———, 2002. Representative area program: background and history. No 5, Oct. Online: http://www.reefed.edu.au/__data/assets/pdf_file/0018/7326/rap_update_2002_10.pdf.
———, 2003. The Great Barrier Reef Marine Park Authority Representative Areas Program. Update 7, Nov. 2003.

———, 2005. A brief history of the Great Barrier Reef Marine Park - major milestones. Online:
http://www.gbrmpa.gov.au/__data/assets/pdf_file/0019/9163/authority_major_milestones.pdf.
———, 2007. Protecting the Great Barrier Reef Marine Park - a precious resource. Online:
http://www.gbrmpa.gov.au/corp_site/info_services/publications/brochures/protecting_the_great_barrier_reef_marine_park.
_the_great_barrier_reef_marine_park.
———, 2010. Ecologically sustainable fishing in the Great Barrier Reef Marine Park. Position paper. Online:
http://www.gbrmpa.gov.au/__data/assets/pdf_file/0008/46385/Pos_Paper_Ecol_Sustainable_fisheries_Nov10.pdf.
———, 2011. 'Reef line pilot program case study.' *SeaRead* 38: 6. Online:
http://www.gbrmpaGersuny, C. and J.J. Poggie Jr. 1973. 'The uncertain future of fishing families.' *The Family Coordinator* 22(2): 241-244.
Gezelius, S. 2006. 'Monitoring fishing mortality: compliance in Norwegian offshore fisheries.' *Marine Policy* 30(5): 462-469.
Gilden, J.D. Ed., 1999. *Oregon's changing coastal fishing communities*. Online:
http://seagrant.oregonstate.edu/sgpubs/onlinepubs/o99001.html#useofdata.
Gilden, J.D. and C.L. Smith. 1996. 'Survey of gillnetters in Oregon and Washington: summary of results. In *Adapting to change: fishing families, businesses, communities and regions.* Corvallis, OR: Oregon Sea Grant.
Glaser, M. 2006. 'The social dimension in ecosystem management: strengths and weaknesses of human-nature mind maps.' *Human Ecology Review* 13: 122-142.
Gleason, M., S. McCreary, M. Miller-Henson, J. Ugoretz, E. Fox, M. Merrifield, W. McClintock, P. Serpa, and K. Hoffman. 2010. 'Science-based and stakeholder-driven marine protected area network planning: A successful case study from north central California.' *Ocean and Coastal Management* 53(2): 52-68.
Godwin, J.R., B. Neis, and L. Felt. 2000. 'Integrating fishery people and their knowledge into fisheries science and resource management: issues, prospects, and problems.' In B. Neis and L. Felt, Eds., *Finding our sea legs: linking fishery people and their knowledge with science and management,* 249-264, St John's Newfoundland: ISER Books – Faculty of Arts Publications.
Gordon, H.S. 1954. 'The economic theory of a common-property resource: the fishery.' *The Journal of Political Economy* 62(2): 124-142.
Gorrie, A. 2010. 'Fishing bans could 'ruin lives'. *Gympie Times,* March 26, 2010. Online: http://www.gympietimes.com.au/story/2010/03/26/tin-can-bay-fishing-bans/.
Gray, T. and J. Hatchard. 2008. 'A complicated relationship: Stakeholder participation and the ecosystem-based approach to fisheries management.' *Marine Policy* 32(2): 158-168.
Greenhill, J., D. King, A. Lane, and C. MacDougall. 2009. 'Understanding resilience in South Australian farm families.' *Rural Society Journal* (19)4: 318-325.
Grieve, C. and G. Richardson. 2001. 'Recent history of Australia's South East fishery: a manager's perspective.' *Marine and Freshwater Research* 52: 377-386.
Griffin, L. 2009. 'Scales of knowledge: North Sea fisheries governance, the local fisherman and the European scientist.' *Environmental Politics* 18(4): 557-575.
Guidetti, P. and J. Claudet. 2010. 'Comanagement practices enhance fisheries in marine protected areas.' *Conservation Biology* 24(1): 312-318.

Haggan, N., B. Neis, and I.G. Baird. Eds. 2007. *Fishers' knowledge in fisheries science and management.* Coastal Management Sourcebooks 4, UNESCO Publishing, Paris, France.
Hall-Arber, M. 2005. 'The community panels project: institutionalizing social science data collection – case study 2.' *Managing fisheries, empowering communities. Conference proceedings,* 60-70. Fairbanks: Alaska Sea Grant College Program, University of Alaska Fairbanks.
Hall-Arber, M., C. Pomeroy, and F. Conway. 2009. 'Figuring out the human dimensions of fisheries: illuminating models.' *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 1: 300-314.
Hannesson, R. 2006. *The privatization of the oceans*. Cambridge and London: The MIT Press.
Hardin, G. 1968. 'The tragedy of the commons.' *Science* 162: 1243-1248.
Harms, J. and G. Sylvia. 2001. 'A comparison of conservation perspectives between scientists, managers and industry in the West Coast Groundfish fishery.' *Fisheries (*26)3: 48-461.
Hartley, T.W. and R.A Robertson. 2006a. 'Stakeholder engagement, cooperative fisheries research and democratic science: the case of the Northeast Consortium.' *Human Ecology Review* 13(2): 161-171.
_____, 2006b. 'Emergence of multi-stakeholder-driven cooperative research in the Northwest Atlantic: The case of the Northeast Consortium.' *Marine Policy* 30(5): 580-592.
———, 2009. 'Stakeholder collaboration in fisheries research: integrating knowledge among fishing leaders and science partners in northern New England. *Society and Natural Resources* 22: 42–55.
Haysom, N.M. 1986. 'The management regime in Queensland: an overview.' In T.J.A. Hundloe, Ed. *Fisheries management: theory and practice in Queensland*, 57-61. Brisbane: Griffith University Press.
———, 2001. *Trawlers, trollers and trepangers: The story of the Queensland commercial fishing industry pre-1988*. Queensland: Department of Primary Industries.
Helvey, M. 2004. 'Seeking consensus in designing marine protected areas: keeping the fishing community engaged.' *Coastal Management* 32: 173-190.
Heselwood, J. 2008. 'Another green grab: this time Moreton Bay.' *Boating Business* (issue unknown) 12-15, Online: http://www.allisonboats.com.au/_lib/pdf/AnotherGreenGrab.pdf.
Hilborn, R. 2007a. 'Defining success in fisheries and conflicts in objectives.' *Marine Policy* 31(2): 153-158.
Hilborn, R. 2007b. 'Moving to sustainability by learning from successful fisheries.' *Ambio* 36(4): 296-303.
Hilborn, R., K. Stokes, J.-J. Maguire, T. Smith, L.W. Botsford, M. Mangel, J. Orensanz, A. Parma, J. Rice, J. Bell, K.L. Cochrane, S. Garcia, S.J. Hall, G.P. Kirkwood, K. Sainsbury, G. Stefansson, and C. Walters. 2004. 'When can marine reserves improve fisheries management?' *Ocean & Coastal Management* 47: 197–205.
Hinz, S. and S.P. Bratton. 2000. 'Religious responses to fisheries decline in Irish Coastal communities with a comparison to the Pacific Northwest region, USA.' *Ecotheology* 8: 111-128.
Hjelm, R. 2006. 'Innovation and masculinity in the Faroe Islands fishery.' Paper presented to the Global Coasts: Gender, Fisheries and Contemporary Issues Conference, University of Tromsø, Norway, June 26-30, 2006.

Hoffman, E. and A. Pérez-Ruzafa. 2009. 'Marine protected areas as a tool for fishery management and ecosystem conservation: an Introduction.' *ICES Journal of Marine Science* 66(1): 1-5.

Innes, G., K. Gorman, C. McKellar, D. Lowe, B. Jago, L. Fernandes, J. Mackay, and G. Harris. 2005. *Managing, analysing and presenting public submissions to achieve marine park planning outcomes: an example from the Great Barrier Reef Marine Park*. Great Barrier Reef Marine Park Authority, Townsville, Qld. Online: http://www.gbrmpa.gov.au/__data/assets/pdf_file/0005/8267/rap_public_submission_analysis.pdf.

International Finance Corporation. 2009. *IFC's policy and performance standards on social and environmental sustainability and policy on disclosure of information: report on the first three years of application.* Online: http://www.ifc.org/ifcext/disclosure.nsf/attachmentsbytitle/ifc_third_year_report/$file/ifc_third_year_report_ps_dp_.pdf.

Jago, B.. J. Day. L. Fernandes, L. Thompson, J. Hall and K. Sampson. 2004. 'Bringing the Great Barrier Reef Marine Park zoning into the 21st century: an overview of the Representative Areas Program.' Paper presented to the Coast-to-Coast Conference, Hobart, 2004. Online: http://www.cdesign.com.au/proceedings_c2c2004/pages/coastfinal00093.pdf.

Jamieson, L. with G. Munro and M. Perrier. 2009. 'Social change in Scottish fishing communities: a brief literature review and annotated bibliography.' Scottish Government Social Research. Online: http://www.scotland.gov.uk/socialresearch.

Jennings, S. 2009. 'The role of marine protected areas in environmental management.' *ICES Journal of Marine Science* 16(1): 16-25.

Jentoft, S. 1993. *Dangling lines*. St Johns, Newfoundland: Memorial University of Newfoundland, Institute of Social and Economic Research Press.

———, 2000. 'The community: a missing link of fisheries management.' *Marine Policy* 24: 53-59.

———, 2005.'Fisheries co-management as empowerment.' *Marine Policy* 29(1): 1-7.

Jentoft, S., McCay, B.J., Wilson, D.C. 2010. 'Fisheries co-management: improving fisheries governance through stakeholder participation.' In R.Q. Grafton, R. Hilborn, D. Squires, M. Tait, and M. Williams. Eds. *Handbook of marine fisheries conservation and management,* 675-686, New York: Oxford University Press.

Johannes, R.E., and B. Neis. 2007. 'The value of anecdote.' In N. Haggan, B. Neis, and I. G. Baird, Eds., *Fishers' knowledge in fisheries science and management,* 41-58. Coastal Management Sourcebooks Series, UNESCO, Paris.

Johnson, D.G., C. Formichella, S.J. Thomas, D. Bhaumik, F.V. Degruy, and C.A. Riordan. 1998. 'Stress and distress among Gulf of Mexico shrimp fishermen.' *Human Organization* 57(4): 404-413.

Johnson, D.G., J.S. Thomas, and C.A Riordan. 1994. 'Job stress, social support and health amongst shrimp fishermen.' *Work and Stress* 8(4):343-354.

Johnson, T.R. and W.L.T. van Densen. 2007. 'Benefits and organization of cooperative research for fisheries management.' *ICES Journal of Marine Science* 64(4): 834-840.

Jones, P.J.S. 2007. 'Point-of-View: arguments for conventional fisheries management and against no-take marine protected areas: only half of the story?' *Reviews in Fish Biology and Fisheries* 17(1): 31-43.

———, 2008. 'Fishing industry and related perspectives on the issues raised by no-take marine protected area proposals.' *Marine Policy* 32: 749-758.

———, 2009. 'Equity, justice and power issues raised by no take marine protected area proposals.' *Marine Policy* 33: 759-765,

Judd, F., H. Jackson, C. Fraser, G. Murray, G. Robins, and A. Komiti. 2006. 'Understanding suicide in Australian farmers.' *Social Psychiatry and Psychiatric Epidemiology* 41(1): 1-10.

Kaplan, I.M. and B.J. McCay. 2004. 'Cooperative research, co-management and the social dimensions of fisheries science and management.' *Marine Policy* 28(3): 257-258.

Kaplan, I.M. and H.L. Kite-Powell. 2000. 'Safety at sea and fisheries management: fishermen's attitudes and the need for co-management.' *Marine Policy* 24: 493- 497.

Kearney, J., F. Berkes, A. Charles, E. Pinkerton, and M. Wiber. 2007. 'The role of participatory governance and community-based management in integrated coastal and ocean management in Canada.' *Ocean and Coastal Management.* 35: 79-104.

Kearney, R.E. 2001. 'Fisheries property rights and recreational/commercial conflict: implications of policy developments in Australia and New Zealand.' *Marine Policy* 25: 49-59.

Kearney, R.E. 2002. 'Co-management: the resolution of conflict between commercial and recreational fishers in Victoria, Australia.' *Ocean and Coastal Management* 45: 201-214.

King, T.J. 2006. 'Between the devil and the deep blue sea: negotiating ambiguous physical and social boundaries within the shark fishing industry of Bass Strait, Australia.' Unpublished PhD thesis, The University of Melbourne, Parkville.

———, 2007. 'Bad habits and prosthetic performances: negotiation of individuality and embodiment of social status in Australian shark fishing.' *Journal of Anthropological Research* 63(4): 537-560.

Klein, C.J., A. Chan, L. Kircher, A.J. Cundiff, N. Gardner, Y. Hrovat, A. Scholz, B.E. Kendall, and S. Airame. 2008. 'Striking a balance between biodiversity conservation and socioeconomic viability in the design of marine protected areas.' *Conservation Biology* 22(3): 691-700.

Kofinas, G.P and F. Stuart Chapin III. 2009. 'Sustaining livelihoods and human well-being during social-ecological change.' In F. Stuart Chapin III. G.P. Kofinas, and C. Folke, Eds., *Principles of ecological stewardship: resilience-based natural resource management in a changing world*, 55-75. New York: Springer.

Kübler-Ross, E. and D. Keller. 2005. *On grief and grieving. Finding the meaning of grief through the five stages of loss.* New York: Scribner.

Laspina, R. 2007. 'Fishing the Townsville region.' Online: http://spooled.com.au/Article:1036.

Lawrie, T., C. Matheson, L. Ritchie, E. Murphy, and C. Bond. 2004. 'The health and lifestyle of Scottish fishermen: a need for health promotion.' *Health Education Research* 19(4): 373-379.

Lehtonen, M. 2004. 'The environmental-social interface of sustainable development: capabilities, social capital, institutions.' *Ecological Economics* 49:199-214.

Lewthwaite, E. 2009a. *The changing tide: a history of professional fishing on the Fraser Coast.* Hervey Bay Seafood Festival Association Incorporated.

———, 2009b. 'Workshop to build seafood industry skills.' *The Queensland Fisherman* 27(11-12):14.

———, 2010. 'Fishermen adopt EMS in Hinchinbrook – a very special place.' *The Queensland Fisherman* 28(4): 20-22.

Little, R., G.A. Begg, B. Goldman, A. Williams, B.D. Mapstone, A.E. Punt, M. Russell, B. Kerrigan, R. Officer, S. Slade, and G. Muldoon. 2001. *Modelling individual transferable quotas as a management tool in the Queensland coral reef fin fish fishery.* Fishing and Fisheries Research Centre Technical Report, No. 3.

Lord, F. 2011. 'Understanding social impacts by using new variables and a causal model diagram in New England fisheries.' *Impact Assessment and Project Appraisal* 29(1): 59-68.

Lowe, M.E. and C. Carothers. 2008. *Enclosing the fisheries: people, places and power*. Bethesda, Maryland: American Fisheries Society.

McCauley, L. 2010. 'Environments and health: will the BP oil spill affect our health?' *American Journal of Nursing* 110(9): 54-55.

McCay, B.J. 1995. 'Social and ecological implications of ITQs: an overview.' *Ocean and Coastal Management* 28 (1-3): 3-22.

McCook, L.J., T. Aylong, M. Cappo, J.H. Choat, R.D. Evans, D.M. De Freitas, M. Heupel, T.P. Hughes, G.P. Jones, B. Mapstone, H. Marsh, M. Mills, F.J. Molloy, C.R. Pitcher, R.L. Pressey, G.R. Russ, S. Sutton, H. Sweatman, R. Tobin, D.R. Wachenfeld, and D.H. Williamson. 2010. 'Adaptive management of the Great Barrier Reef: A globally significant demonstration of the benefits of networks of marine reserves,' (including supporting information). *PNAS Early Edition*. Online: http://pnas.org/cgi/doi/10.1073/pnas.0909335107.

McGoodwin, J.R. 1990. *Crisis in the world's fisheries: people, problems, and policies*. Stanford: Stanford University Press.

Macintosh, A. and T. Bonhady (with A. Smith). 2009. *Commonwealth marine protected areas displaced activities analysis.* Australian Centre for Environmental Law, Australian National University, Canberra. Online: http://www.environment.gov.au/coasts/mbp/publications/pubs/mpa-dap-analysis.pdf.

Mackinson, S., D.C. Wilson, P. Galiay, and B. Deas. 2011. 'Engaging stakeholders in fisheries and marine research.' *Marine Policy* 35: 18-14.

McLeod, K.L., J. Lubchenco, S.R. Palumbi, and A.A. Rosenberg. 2005. Scientific consensus statement on marine ecosystem-based management. Signed by 221 academic scientists and policy experts with relevant expertise and published by the Communication Partnership for Science and the Sea. Online: http://compassonline.org/?q=EBM.

McPhee, D. 2008. *Fisheries management in Australia*. Sydney, NSW: The Federation Press.

———, 2009. 'Co-management is coming: what's it all about?' *The Queensland Fisherman* 27(10): 12-13.

McPhee, D, D. Leadbitter and G.A. Skilleter. 2002. 'Swallowing the bait: is recreational fishing ecologically sustainable?' *Pacific Conservation Biology* 8: 40-51.

McPhee, D.P., M. Mills, T.J.A. Hundloe, C. Buxton, I. Knuckey, and K.A. Williams. 2008. Excerpts from *A participatory and coordinated fishing industry solution to the rezoning of the Moreton Bay Marine Park.* Fisheries Research and Development Corporation Project No. 2007/053.

McPhee, D.P. and S. Stone. 2008. *Assessment of by-catch reduction devices in Moreton Bay trawl and net fisheries.* McPhee Research Consultants Pty Ltd, and Moreton Bay Seafood Industry Association. Online: http://www.mbsia.org.au/Documents/Bycatch%20Reduction%20in%20Moreton%20Bay%20-%20preliminary%20trials.pdf.

Maguire, J-J., B. Neis, and P.R. Sinclair. 1995. 'What are we managing anyway? The needs for an interdisciplinary approach to managing fisheries ecosystems.' *The Dalhousie Law Journal* 18: 141-153.

Manoogian-O'Dell, M. L.A. McGraw, and A.M. Zvonkovic. 2002. *The ebb and flow of fishing family life*. Corvallis, OR: Oregon Sea Grant. Online: http://seagrant.oregonstate.edu/sgpubs/onlinepubs/g98002.html.

Mansfield, B. 2004a. 'Neoliberalism in the oceans: "rationalization", property rights and the commons question.' *Geoforum* 35: 313-326.

———, 2004b. 'Rules of privatization: contradictions in neoliberal regulation of North Pacific fisheries.' *Annals of the Association of American Geographers* 94(3): 565-584.

———, 2007. 'Property, markets and dispossession: the Western Alaska community development quota as neoliberalism, social justice, both and neither.' *Antipode* 39(3): 479-499.

———, 2008. 'Comments on Daniel Bromley's paper.' *MAST* 6(2): 23-26.

Mapstone, B.D., C.R. Davies, L.R. Little, A.E. Punt, A.D.M. Smith, F. Pantus, D.C. Lou, A.J. Williams, A. Jones, A.M. Ayling, G.R. Russ, A.D. McDonald. 2004. *The effects of line fishing on the Great Barrier Reef and evaluations of alternative potential management strategies.* CRC Reef Research Centre Technical Report No 52. CRC Reef Research Centre, Townsville, Australia.

Marine Parks Act 2004. Online: http://www.legislation.qld.gov.au.

Maritime Centre of Excellence for Women's Health. 2001. 'Social and economic stress: women's health in fishing communities.' *Moving Towards Women's Health* 12.

Marshall, N.A. 2005. 'Predicting social resilience to policy change within the commercial fishing industry in Queensland.' In R.C. Tobin, R.J. Pears, N. Marshall, R.J. Marriott, S. Busilacchi, and M.A.J. Bergenius. Eds., *Fishing for more: a student-stakeholder workshop on the biology, ecology, sociology and economics of fisheries.* CRC Reef Research Centre Technical Report No. 59. CRC Reef Research Centre, Townsville.

Marshall, N.A. and P.A. Marshall. 2007. 'Conceptualizing and operationalizing social resilience within commercial fisheries in Northern Australia.' *Ecology and Society* 12(1). Online: http://www.ecologyandsociety.org/vol12/iss1/art1/.

Marshall, N.A., D.M. Fenton, P.A. Marshall, and S.G. Sutton. 2007. 'How resource dependency can influence social resilience within a primary resource industry.' *Rural Sociology* 72(3): 359–390.

Martin, I. E. 2008. 'Resilience in Lower Columbia River salmon communities.' *Ecology and Society* 13(2): 23. Online: http://www.ecologyandsociety.org/vol13/iss2/art23/.

Mascia, M.B. 2003. 'The human dimension of coral reef marine protected areas: recent social science research and its policy implications.' *Conservation Biology* 17(2): 630-632.

Mathiesen, C. 2004. 'Analytical framework for studying fishers' behaviour and adaptation strategies.' *Innovative Fisheries Management Publication* 116, Aalborg University. Online: http://www.ifm.dk/publications.html.

Mattison, L. 2009. 'Participatory equality in the governing of marine resources: a gender focused study on fisheries management in Kerala, India and Southern New England, USA.' Unpublished Master's thesis, Program in Environmental Studies, Brown University, Providence, Rhode Island. Online: http://envstudies.brown.edu/theses/LauraMattisonthesis.pdf.

Mattock, J.L. 2005. 'Resource loss and psychosocial distress: an application of the conservation of resources (COR) model to the 2004 Asian tsunami in Sri Lanka.' Unpublished Master's thesis, Disaster Management and Sustainable Development, University of Northumbria. Online: http://www.alnap.org/pool/files/mattlock_psychosocial_distress_tsunami_nov_2005.pdf.

Maurstad A. 2002. 'Fishing in murky waters – ethics and politics of research on fishers knowledge.' *Marine Policy* 26(3): 159-166.
Mederer, H. 1999. 'Surviving the demise of a way of life: Stress and resilience in Northeastern commercial fishing families.' In H.I. McCubbin and E.A. Thompson, Eds., *The dynamics of resilient families: Resiliency in Families* Vol. 4, 203-235. Thousand Oaks, CA: Sage.
Mederer, H. and C. Barker. 2000. 'Reconstructing identities, families, communities, and futures in the wake of fisheries regulation.' In S. Hanna and M. Hall-Arber, Eds., *Change and resilience in fishing,* 63-81, Corvallis, OR: Oregon Sea Grant.
Menzies, C.R. 2003. 'Fishing, families and the survival of artisanal boat-ownership in the Bigouden region of France.' *MAST* 2(1): 73-90.
Miller, M.L. and J. Van Maanen. 1982. 'Getting into fishing: observations on the social identities of New England fishermen.' *Journal of Contemporary Ethnography* 11(1): 27-54.
Minnegal, M. and P.D. Dwyer, 2008a. 'Mixed messages: buying back Australia's fishing industry.' *Marine Policy* 32(6): 1063-1071.
———, 2008b. 'Managing risk, resisting management: stability and diversity in an Australian fishing fleet.' *Human Organization* 67(1): 97-108.
Minnegal, M., T.J. King, R.J. Just, and P.D. Dwyer. 2003. 'Deep identity, shallow time: sustaining a future in Victorian fishing communities.' *The Australian Journal of Anthropology* 14(1): 53-71.
Momtaz, S., and W. Gladstone, 2007. 'Ban on commercial fishing in the estuarine waters of New South Wales, Australia: Community consultation and social impacts.' *Environmental Impact Assessment Review* 28: 214-225.
Morse, J.M., P.N. Stern, and J.M. Corbin. 2009. *Developing grounded theory: the second generation.* Walnut Creek, CA: Left Coast Press.
MSQ [Maritime Safety Queensland]. 2010. *Marine incidents in Queensland – 2009*. Part 2. Online: http://www.msq.qld.gov.au/~/media/f5313687-8495-447e-83b2-a8542b7ea140/pdf_mi_report_2009_part2.pdf.
Murphy, S. 2009. 'Reports from port meetings to discuss EC review.' *The Queensland Fisherman* 27(10-11): 5-6.
Murray , G., T. Johnson, B.J. McCay, M. Danko, K. St. Martin, and S. Takahashi. 2010. 'Creeping enclosures, cumulative effects and the marine commons of New Jersey.' *International Journal of the Commons* 4(1): 367-389.
Murray, M. 2007. ''It's in the blood and you're not going to change it': fish harvesters' narrative accounts of injuries and disabilities.' *Work* 28: 165-174.
Nadel-Klein, J. and D.L. Davis. Eds. 1988. *To work and to weep: women in fishing economies*. St. John's, Newfoundland, Canada: Institute of Social and Economic Research, Memorial University of Newfoundland.
National Oceans Office. 2003. Oceans Policy: principles and processes. Online: http://www.environment.gov.au/coasts/oceans-policy/publications/pubs/principles-processes.pdf.
Neis, B. 1999. 'Familial and social patriarchy in the Newfoundland fishing industry.' In D. Newell and R.E. Ommer. Eds., *Fishing places, fishing people: traditions and issues in Canadian small-scale fisheries,* 32-54.Toronto: University of Toronto Press.
Neis, B., L.F. Felt, R.H. Haedrich, and D. Schneider. 1999. 'An interdisciplinary method for collecting and integrating fishers' ecological knowledge into resource management.' In *Fishing places, fishing people: traditions and issues in Canadian small-scale fisheries,* 216-238. Toronto: University of Toronto Press.

Newby, J., P. Gooday, and L. Elliston. 2004. Structural adjustment in Australian fisheries. *ABARE eReport* 04.17. Prepared for the Fisheries Resources Research Fund, Canberra, November.

O'Brien, R., K. Hunt, and G. Hart. 2005. 'It's caveman stuff, but that is to a certain extent how guys operate: men's account of masculinity and help seeking.' *Social Science and Medicine* (61): 503-516.

OceanWatch Australia. 2010. 'Reducing interactions with marine mammals in the Gulf of Carpentaria Gillnet Fishery using acoustic alarms and pingers.' Oceanwatch Australia. Online: http://www.oceanwatch.org.au/seanet/seanet-programs-by-state/seanet-queensland/reducing-interactions-with-marine-mammals/.

Olsson, P. and C. Folke. 2001. 'Local ecological knowledge and institutional dynamics for ecosystem management: a study of Lake Racken watershed, Sweden.' *Ecosystems* 4(2): 85-104.

Osmond, M., S. Airame, M. Caldwell, Jon Day. 2010. 'Lessons for marine conservation planning: A comparison of three marine protected area planning processes.' *Ocean and Coastal Management* 53(2): 41-51.

Ota, Y. and R. Just. 2008. 'Fleet sizes, fishing effort and the 'hidden' factors behind statistics: an anthropological study of small-scale fisheries in the UK.' *Marine Policy* 32: 301-308.

Pahlke, A., S. Lord, and L. Christiansen-Ruffman. 2001. *Women's health and wellbeing in six Nova Scotia fishing communities.* Report of the Canadian Research Institute for the Advancement of Women, in association with Nova Scotia Women's Fishnet.

Pálsson, G. and A. Helgason. 1995. 'Figuring fish and measuring men: The ITQ system in the Icelandic cod fishery.' *Ocean and Coastal Management* 28 (1-3): 117-146.

Paolisso, M. 2002. 'Blue crabs and controversy on the Chesapeake Bay: a cultural model for watermen's reasoning about blue crab management.' *Human Organization* 61(3): 226-239.

Parnell, S. 2009. 'Formal evaluation not over, but CSIRO says fishing restriction a success.' *The Australian,* Feb 27, 2009.

Pickworth, J., J, Schirmer, and A.M. Casey. 2006. *Social fabric of Australian fishing. A case study in South Australia.* Canberra: Fisheries Research and Development Corporation and Commonwealth of Australia (with the Bureau of Rural Sciences).

Picou, J.S. 2009. 'Disaster recovery as translational applied sociology: transforming chronic community distress.' *Humboldt Journal of Social Relations* 32(1): 123-157.

Pikitch, E.K., C. Santora, E.A. Babcock, A. Bakun, R. Bonfil, D.O. Conover, P. Dayton, P. Doukakis, D. Fluharty, B. Heneman, E.D. Houde, J. Link, P.A. Livingston, M. Mangel, M.K. McAllister, J. Pope, and K.J. Sainsbury. 2004. 'Ecosystem-based fishery management.' *Science* 305: 346-347.

Pillans S., R. Johnstone, H. Possingham, R. Pillans, G. Dews and I. McPhail. 2003. 'Effectiveness of no-take marine reserves in subtropical Australia.' In N.W.P. Munro et al., Eds., *Proceedings of the fifth international conference on science and the management of protected areas*, May 11-16, 2003, University of Victoria, Victoria Canada. Online: http://espace.library.uq.edu.au/eserv/UQ:10207/Effectiveness_of.pdf.

Pita C., G.J. Pierce, and I. Theodossiou. 2010. 'Stakeholders' participation in the fisheries management decision-making process: fishers' perceptions of participation.' *Marine Policy* 34(5): 1093-1102.

Pollnac, R.B. 1988. 'Social and cultural characteristics of fishing peoples.' *Marine Behavior & Physiology* 14: 23-39.

Pollnac, R.B., S. Abbot-Jamieson, C. Smith, M.L. Miller, P.M. Clay, and B. Oles. 2006. 'Toward a model for fisheries social impact assessment.' *Marine Fisheries Review* 68(1-4): 1-18.

Pollnac, R.B. and J.J. Poggie. 2006. 'Job satisfaction in the fishery in two Southeast Alaskan towns.' *Human Organization* 65(3): 329-339.

———, 2008. 'Happiness, well-being, and psychocultural adaptation to the stresses associated with marine fishing.' *Human Ecology Review* 15(2): 194-200.

Pollnac, R.B., R.S. Pomeroy, and I.H.T. Harkes. 2001. 'Fishery policy and job satisfaction in three Southeast Asian fisheries.' *Ocean and Coastal Management* 44: 531-544.

Pomeroy, R.S., J.E. Parks, and L.M. Watson. 2004. *How is your MPA doing? A guidebook of natural and social indicators for evaluating marine protected areas management effectiveness*. Gland, Switzerland & Cambridge, UK: IUCN.

QRAA [Queensland Rural Adjustment Authority] 2010. *QRAA Annual Report 2009-2010: broadening our focus.* Online: http://www.qraa.qld.gov.au/images/2009_10%20annual%20report_final.pdf.

QSIA [Queensland Seafood Industry Association]. 2005. 'My final column as your president but thanks for the opportunity.' *The Queensland Fisherman* 23(1): 2-5.

———, 2010a. *Rocky reef fishery*. Online: http://www.qsia.com.au/rocky-reef-fishery.html.

———, 2010b. *QSIA & GBRMPA climate change and fisheries.* Online: http://www.qsia.com.au/future-proofing-industry.html.

———, 2011a. *Crab Working Group statement.* Online: http://www.qsia.com.au/wp-content/uploads/2011/03/Crab-Working-Group-Statement.pdf.

———, 2011b. 'Funding welcomed for Cyclone Yasi industry recovery officer for seafood.' Media Release, March 9, 2011. Online: http://www.qsia.com.au/wp-content/uploads/2011/03/QSIA-Media-Release-Yasi-IRO.pdf.

Reef water quality protection plan. 2009. Online: http://www.reefplan.qld.gov.au/about/rwqpp.shtm.

Richardson, E.A., M.J. Kaiser, and G. Edwards-Jones. 2005. 'Variation in fishers' attitudes within an inshore fishery: implications for management.' *Environmental Conservation* 32(3): 213-225.

Roberts, C.M and J. Hawkins, 2003. *Fully protected marine reserves: a guide*. Washington DC: WWF Endangered Seas Campaign.

Roberts, C.M., S.J. Andelman, G.S. Branch, R.H. Bustamante, J.C. Castilla, J. Dugan, BS Halpern, K.D. Lafferty, H. Leslie, J. Lubchenco, D. McArdle, H.P. Possingham, M. Ruckelshaus, and R.R. Warner. 2003. 'Ecological criteria for evaluating candidate sites for marine reserves.' *Ecological Applications* 13: 199-214.

Robinson, J. and C. Mangan, 2008. Socio-economic assessment of the rezoning of the Moreton Bay Marine Park: The base-line analysis. Report to the Environmental Protection Agency, Queensland Government, Brisbane.

Rochet, M-J., M. Prigent, J.A. Bertrand, A. Carpentier, F. Coppin, J-P. Delpech, G. Fontenelle, E. Foucher, K. Mahé, E. Rostiaux, and V.M. Trenkel. 2008. 'Ecosystem trends: evidence for agreement between fishers' perceptions and scientific information.' *ICES Journal of Marine Science* 65: 1057-1068.

Rosenberg, A.A. and C.W. Glass. 2007. 'Fishers' responses to management measures and their socio-economic effects.' *ICES Journal of Marine Science* 64(8): 1612-1613.

Russ, G.R. 2002. 'Yet another review of marine reserves as reef fishery management tools.' In PF Sale. Ed., *Coral reef fishes: dynamics and diversity in a complex ecosystem*, 421-444. Oxford and St. Louis: Academic Press.

Russ, G.R., A.J. Cheal, A.M. Dolman, M.J. Emslie, R.D. Evans, I. Miller, H. Sweatman, and D.H. Williamson. 2008. 'Rapid increase in fish numbers follows creation of world's largest marine reserve network.' *Current Biology* 18(12): 14-15.

Russ, G. and A. Alcala. 2010. 'Enhanced biodiversity beyond marine reserve boundaries: the cup spilleth-over.' *Ecological Applications* 21: 241-250.

Salas, S. and D. Gaertner. 2004. 'The behavioural dynamics of fishers: management implications.' *Fish and Fisheries* 5: 153-167.

Sale, P.F. 2002. 'The science we need to develop for more effective management.' In P.F. Sale. Ed., *Coral reef fishes: dynamics and diversity in a complex ecosystem*, 361-376. Oxford and St. Louis: Academic Press.

Sartore, G., B. Kelly, H.J. Stain, G. Albrecht, N. Higginbotham. 2008. 'Control, uncertainty, and expectations for the future: a qualitative study of the impact of drought on a rural Australian community.' *Rural and Remote Health* 8: 950. Online: http://www.rrh.org.au.

Schirmer, J. and A.M. Casey. 2005. *Social assessment handbook*: *A guide to methods and approaches for assessing the social sustainability of fisheries in Australia*. FRDC ESD Reporting and Assessment Subprogram Publication No. 7. Bureau of Rural Sciences and Fisheries Research and Development Corporation, Canberra. Online: http://www.affashop.gov.au/product.asp?prodid=13168.

Schirmer, J. 2005. *ESD reporting and assessment subprogram: a social assessment handbook for use by Australian fisheries managers in ESD assessment and monitoring*. Final Report FRDC Project 2003/05, Canberra.

Schirmer, J., A.M. Casey, and N. Mazur. 2004. *Socio-economic impact assessment in the proposed Cod Grounds marine protected area.* Report prepared for the Department of Environment and Heritage. Canberra: Commonwealth of Australia.

Schirmer, J. and J. Pickworth. 2005a. *Social impacts of the South Australian marine scalefish fishery.* FRDC ESD Reporting and Assessment Subprogram Publication No. 10. Canberra: Fisheries Research and Development Corporation and Bureau of Rural Sciences.

Schirmer, J. and Pickworth, J. 2005b. *Social assessment of commercial fishing in the East Gippsland region.* FRDC ESD Reporting and Assessment Subprogram Publication No. 11. Canberra: Fisheries Research and Development Corporation and Bureau of Rural Sciences.

Scholz, A., K. Bonzon, R. Fujita, N. Benjamin, N. Woodling, P. Black, and C. Steinback. 2004. 'Participatory socioeconomic analysis: drawing on fishermen's knowledge for marine protected area planning in California.' *Marine Policy* 26(4): 335-349.

Sen, S. 2010. 'Developing a framework for displaced fishing effort programs in marine protected areas.' *Marine Policy* 34: 1171-1177.

Shaw, S., H. Johnson, W. Dressler, K. Conrad, and H. Ross. 2009. 'The human dimension of Moreton Bay Marine Park: A baseline analysis of social values and perceptions.' Report to the Department of Environment and Resource Management, Queensland.

Shaw, W. and F. Conway. 2007. *Responses to the West Coast groundfish disaster: lessons learned for communities and decision makers*. Corvallis: Oregon Sea Grant. Online: http://seagrant.oregonstate.edu/sgpubs/onlinepubs/g07006.html.

Skaptadóttir, U.D. 2000. 'Women coping with change in an Icelandic fishing community: A case study.' *Women's Studies International Forum* 23(3): 311-321.

Smith, S. 1995. 'Social implications of changes in fisheries regulations for commercial fishing families.' *Fisheries* 20: 24-26.

Smith, C.L. and P.M. Clay. 2010. 'Measuring subjective and objective well-being: analyses from five marine commercial fisheries.' *Human Organization* 69(2): 158-168.
Smith, C.L., and J.D. Gilden. 2000. 'Human and habitat needs in disaster relief for Pacific Northwest Salmon Fisheries.' *Fisheries* 25(3): 6-13.
Smith, S, S. Jacob, M. Jepson, and G. Israel. 2003. 'After the Florida net ban: the impacts on commercial fishing families.' *Society and Natural Resources* 16: 39-59.
Soto, C.G. 2006. 'Socio-cultural barriers to applying fishers' knowledge in fisheries management: an evaluation of literature cases.' Doctoral thesis, School of Resource Management, Simon Fraser University, Vancouver. Online: http://ir.lib.sfu.ca/retrieve/2901/etd2209.pdf.
Squires, D., J. Joseph, and T. Groves. 2006. 'Buybacks in fisheries.' Paper presented at the Department of Economics, University of California, San Diego, and the Inter-American Tropical Tuna Commission workshop, Institute of the Americas, University of California, San Diego, Oct. 2006.
Stamieszkin, K., J. Wielgus, and L.R. Gerber. 2009. 'Management of a marine protected area for sustainability and conflict resolution: lessons from Loreto Bay National Park (Baja California Sur, Mexico).' *Ocean and Coastal Management* 52: 449-458.
Stewart, J., K. Walshe, and B. Moodle. 2006. 'The demise of the small fishery? A profile of exiters from the New Zealand fishery.' *Marine Policy* 30(4): 328-340.
Stineman, J.G. 2009. 'Commercial fishing in the U.S.: How we can reduce the number of fatalities and vessel losses.' Unpublished Master of Science in Public Health thesis, Texas A&M University. Online: http://gradworks.umi.com/1462243.pdf.
St. Martin, K. 2001. 'Making space for community resource management in fisheries.' *Annals of the Association of American Geographers* 91(1): 122-142.
———, 2007. 'The difference that class makes: neoliberalization and non-capitalism in the fishing industry of New England.' *Antipode*: 39(3): 527-549.
St. Martin, K., B.J. McCay, G.D. Murray, T.R. Johnson, and B. Oles. 2007. 'Communities, knowledge and fisheries of the future.' *International Journal of Global Environmental Issues* 7(2-3): 221-239.
Stone, J. 2010. 'Fisheries focus groups. A summary and discussion of findings.' *Coastal Vitality Project,* July 2010. Online: http://www.coastalvitalityproject.org/GNO_FishermensFocusGroup.pdf.
Stuart Chapin III, F., G.P Kofinas, and C. Folke. Eds. 2009. *Principles of ecosystem stewardship: Resilience-based natural resource management in a changing world.* New York: Springer.
Stump, N.E. and L. Kriwoken. 2006. 'Tasmanian marine protected areas: attitudes and perceptions of wild capture fishers.' *Ocean and Coastal Management* 49(5-6): 298-307.
Suman, D., M. Shivlani and J.W. Milon. 1999. 'Perceptions and attitudes regarding marine reserves: a comparison of stakeholder groups in the Florida Keys National Marine Sanctuary.' *Ocean and Coastal Management* 42(12): 1019-1040.
Sutton, S.G. and R.C. Tobin. 2009. 'Recreational fishers' attitudes towards the 2004 rezoning of the Great Barrier Reef Marine Park.' *Environmental Conservation* 36 (3): 245-252.
Suuronen, P., P. Jounela, and V. Tschernij. 2010. 'Fishermen responses on marine protected areas in the Baltic cod fishery.' *Marine Policy* 34: 237-243.
Sydney Fish Market. 2008. *Brought to you by our fishermen campaign.* Sponsored by the Sydney Fish Market, Department of Agriculture, Fisheries and Forestry and NSW Department of Primary Industry.

Sydney Fish Market. 2010. 'There's more to fishing than just catching fish.' *Aussie seafood: Brought to you by our fishermen.* Online: http://www.sydneyfishmarket.com.au/Default.aspx?alias=www.sydneyfishmarket.com.au/aussieseafood.

Szymańska, K., B. Jaremini, and E. Rosik. 2006. 'Suicides among Polish seamen and fishermen during work at sea.' *International Maritime Health* 57(1-4): 36-45.

Taylor-Moore, N. 2006. 'Great Barrier grief: a case study of the socio-economic impacts of the representative areas program for the Great Barrier Reef Marine Park on the Queensland seafood industry.' Paper presented at the Sharing the Fish Conference, Perth. http://www.fish.wa.gov.au/docs/events/ShareFish/papers/abstracts/Noel%20Taylor-Moore.html.

Thompson, L., B. Jago, L. Fernandes, and J. Day. 2004. 'Barriers to communication – how these critical aspects were addressed during the public participation for the rezoning of the Great Barrier Reef Marine Park.' Great Barrier Reef Marine Park Authority Online: http://www.gbrmpa.gov.au/__data/assets/pdf_file/0016/8251/Breaking_through_the_barriers_15April0420FINAL.pdf.

Tobin, R.C. 2005. 'Competition and conflict between recreational and commercial gillnet fishers in north Queensland estuaries: perception or reality?' In R.C. Tobin, R.J. Pears, N. Marshall, R.J. Marriott, S. Busilacchi, and M.A.J. Bergenius. Eds., *Fishing for more: A student-stakeholder workshop on the biology, ecology, sociology and economics of fisheries.* CRC Reef Research Centre Technical Report No. 59. CRC Reef Research Centre, Townsville.

Tobin, R.C., S.G. Sutton, A. Penny, L. Williams, J. Maroske, and J. Nilsson. 2010. *Baseline socio-economic data for Queensland east coast inshore and rocky reef fishery stakeholders. Part A: commercial fishers.* Report. Fishing and Fisheries Research Centre, Townsville, Qld.

Tuler, S. and T. Webler. 2008. *Demonstrating a risk-based approach to rapid vulnerability assessment in New England fishery communities.* Final Report. Social and Environmental Research Institute Inc. Greenfield, MA. Online: http://www.seri-us.org/pubs/SERIRVAFinal.pdf.

Tuler, S., J. Agyeman, P.P. da Silva, K.R. LoRusso, and R. Kay. 2008. 'Assessing vulnerabilities: integrating information about driving forces that affect risks and resilience in fishing communities.' *Human Ecology Review* 15(2): 171-184.

Tuler, S., T. Webler, C. Polsky. 2009. *Final project report for risk-based approach to rapid vulnerability and consequence assessment.* Greenfield, MA: Social and Environmental Research Institute, Inc. Online: http://www.seri-us.org/content/final-report-vulnerability-fisheries-communities-regulatory-change.

Van Densen, W.L.T. and B.J. McCay. 2007. 'Improving communications from managers to fishers in Europe and the US.' *ICES Journal of Marine Science* 64: 811-817.

Van Ginkel, R. 2001. 'Inshore fishermen: cultural dimensions of a maritime occupation.' In D. Symes and J. Phillipson, Eds., *Inshore fisheries management,* 177-193. Dordrecht: Kluwer Academic Publishers.

———, 2009. *Braving troubled waters. Sea change in a Dutch fishing community.* Amsterdam: Amsterdam University Press.

Vieira, S., C. Perks, K. Mazur, R. Curtotti, and M. Li. 2010. *Impact of the structural adjustment package on the profitability of Commonwealth fisheries,* ABARE Research Report 10.01, Canberra, February.

Vince, J. 2006. 'The South East Regional Marine Plan: implementing Australia's Oceans Policy.' *Marine Policy* 30: 420-430.
Waitt, G. and K. Hartig. 2005. 'All at sea: rethinking fishers' identities in Australia. *Gender, Place and Culture* 12(4): 403-418.
Weible C.M. 2008. 'Caught in a maelstrom: implementing California's marine protected areas.' *Coastal Management* 36(4): 350-373.
Wendt, D.E. and R.M. Starr. 2009. 'Collaborative research: an effective way to collect data for stock assessments and evaluate marine protected areas in California.' *Marine and Coastal Fisheries: Dynamics, Management, and Ecosystem Science* 1: 315-324.
Whalley, A. 2009. 'Women's Network national meeting in Hervey Bay.' *The Queensland Fisherman* 27(10-11): 18-19.
Wiber, M., F. Berkes, A. Charles, and J. Kearney. 2004. 'Participatory research supporting community-based fishery management.' *Marine Policy* 28(6): 459-468.
Williams, A. and N. Bax. 2003. 'Integrating fishers' knowledge with survey data to understand the structure and use of a seascape off Southeastern Australia.' In N. Haggan, N., C. Brignall, and L. Wood, L. Eds. *Putting fishers' knowledge to work.* Fisheries Center Research Reports 11(1): 238-245.
Williams, R. 2005. 'Fishing identities in "New Times": experiences from Northeast Scotland.' Paper presented at the MARE conference *People and the Sea 3*. Online: http://www.marecentre.nl/people_and_the_sea_3/Pages/Streams.htm.
Willing, J. 2007. 'Expert meeting on the human side of fisheries adjustment. Chair's summary.' In *Structural change in fisheries: dealing with the human dimension.* Paris: OECD.
Wilson, D.C. 2002. 'Examining the two cultures theory of fisheries knowledge: the case of the Northwest Atlantic bluefish.' In N. Haggan, C. Brignall, and L. Wood. Eds., *Putting fishers' knowledge to work,* Conference Proceedings, August 27-30, 2001. Fisheries Centre Research Reports, 11: 163-177, Fisheries Centre, University of British Columbia, Vancouver.
Zvonkovic, A.M., S. Moon and M. Manoogian-O'Dell. 1997. *Fishing marriages over time.* Corvallis: Oregon Sea Grant. Online: http://seagrant.oregonstate.edu/sgpubs/onlinepubs/g97007.html.
Zvonkovic, A.M., C.R. Solomon , Á.M. Humble , M. Manoogian. 2005. 'Family work and relationships: lessons from families of men whose jobs require travel.' *Family Relations* 54(3): 411-422.
Zvonkovic, A.M., T. Trosper and M. Manoogian-O'Dell. 1996. *Connecting with fathers at sea.* Corvallis: Oregon Sea Grant. Online: http://seagrant.oregonstate.edu/sgpubs/onlinepubs/g06007.pdf.

CONTACT:

Queensland Seafood Industry Association
Suite 12, 699 – 713 Sandgate Road,
Clayfield Qld 4011 AUSTRALIA

Telephone: (07) 3262 6855
Facsimile: (07) 3262 7650

Email: qsia@qsia.com.au
Website: www.qsia.com.au